

FINAL PROJECT REPORT 2014

Project Title: Consulting to the WTFRC and OSCC for cherry improvement

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Total Project Funding: \$7,500.

Budget History:

Item	2014
Salaries	
Benefits	
Wages	
Benefits	
Equipment	
Supplies	
Travel	\$4,000
Plot Fees	
Miscellaneous	3,500
Total	\$7,500

ORIGINAL OBJECTIVES:

1. Provide analysis and critique of technical aspects of proposals and reports for competitive funding of research and development related to cherry improvement.
2. Provide ideas and analysis of approaches and methods to facilitate adoption of new sweet cherry cultivars by clientele groups in the sweet cherry production and delivery pipeline.
3. Facilitate adoption and use of technology and materials from research projects worldwide to support sweet cherry improvement.
4. Interact with WSU, OSU and ARS scientists and PNW growers on scientific matters related to cherry improvement for the region.

ACTIVITIES AND ACCOMPLISHMENTS:

- Provided expertise and analyses to WTFRC and OSCC
 - Reviewed and critiqued research proposals and reports to the Boards
 - Critiqued proposals from cherry team members to WTFRC and competitive grants programs.
 - Visited California nurseries (Duarte and ProTree) with Amy Iezzoni
- Participated in the NW Cherry Research Review Nov. 12 & 13, 2013 in Wenatchee, WA
 - Presented assessment of and discussed proposals
 - Participated in Cherry GGB workshop prior to the Cherry Research Review
- Attended the Plant and Animal Genome Conference (Fruit and Nut Crop Workshop) and other sessions, January 11, 2014, San Diego, CA.
- Facilitated interaction among breeders and scientists.
 - Participated in discussions with members of the guiding committee about and reviewed drafts of the new RosBREED2 proposal.
 - Reviewed and discussed cherry research data and information with PNW and other researchers.
 - Provided information about graduate education for future plant breeders and plant breeding capacity needed in fruit and nut crop breeding.
- Alerted cherry team members to key references for breeding and genetics of sweet cherry.
- Submitted invoices for expenditures on a quarterly basis.

RESULTS & DISCUSSION:

I provided science-based reviews of proposals and reports for which I have expertise to the commissions. In addition to those submitted for support from the commissions, researchers continue to submit good proposals that are competitive and are being funded at a level commensurate with other public institutions. The grant proposals I reviewed have innovative ideas and approaches that I believe contribute to continued competitiveness and opportunities for funding that will benefit the PNW cherry industry. Amy and I visited the Duarte and ProTree nurseries in California in February

to see their operations for the production of cherry (and other) rootstocks using tissue culture. Both are producing large numbers of uniform, high quality plant materials for use in producing compound cultivars for growers.

The cherry GGB workshop organized by Dr. Oraguzie and held prior to the Research review was a good forum for presentation of research findings and information by PNW scientists. The morning session is primarily for discussion of scientific issues among the scientists, while the afternoon session is for a breeding program update for commission advisory committee members. Overall the cherry breeding program benefits from collaborative interaction with other supporting scientists in the PNW (WSU, OSU, ARS, WTFRC and others) who devote significant resources and effort to issues and opportunities impacting sweet cherry improvement and the tree fruit industries. Collaboration and exchange of ideas among members of the cherry improvement team promotes synergy and minimizes redundancy and duplicated effort.

The federally-funded RosBREED project was successfully completed and most of the activities, milestones and goals achieved. Scientists associated with the PNW Cherry Improvement have played key roles in the success of RosBREED and the functional Genome Database for Rosaceae (GDR) which is critical for success of DNA-facilitated breeding, genetics and genomics. The PNW cherry breeding program stands to be a major beneficiary of tools and materials for DNA-informed breeding when it is well integrated into a targeted breeding program for cultivar development. Without these projects it would not have been possible to utilize the extensive tools and information that are changing all areas of crop improvement. The availability of these collaborative, community wide projects have been very important for implementing and will have a continuing impact on the ultimate success of the cherry breeding program, measured by development and release of outstanding new cultivars for the cherry industry. The WTFRC and OSCC have been key supporters of these initiatives. It is a win-win situation wherein provision of matching funds leverages several times more federal funding for programs important to continuing profitability for the PNW cherry industry. This is the only public sweet cherry breeding program in the U.S. taking advantages of these key resources.

For the PNW cherry breeding program, DNA-based information and technology are critical plant breeding capacity elements for success and efficiency. Diagnostic marker-locus-trait (M-L-T) associations are becoming available for a growing number of important traits, e.g., incompatibility/fertility alleles, fruit maturity date, fruit size, firmness, color, flavor components, etc. Others showing promise include flowering time, cracking, stem retention force. Using tools from the breeder tool box, informed decisions can be made for parental choice and production of the most efficient crosses for segregating traits. Molecular genotyping provides the opportunity for early generation, marker assisted selection of preferred genotypes, genetic verification of selected phenotypes, and genetic fingerprinting of elite selections for intellectual property protection.

Continuing collaborations among breeders and other scientists include; new sources of genetic variability for important fruit traits (Iezzoni), data base management and breeder toolbox (Main), development of marker-locus-trait associations and genotyping of breeding materials (Peace), genome sequencing and Fast-trac breeding (Dhingra), testing and commercial evaluation of elite selections (Einhorn, Long, Whiting, Commission scientists). Linkages to foreign scientists through personal interactions and various international meetings support a robust global Rosaceae community. Interaction among these (and other) programs is critical to continued support and success.

A new project, “RosBREED: Combining disease resistance with horticultural quality in new rosaceous cultivars” has been recommended for funding by the USDA-NIFA Specialty Crop

Research Initiative. The \$10 million grant means five more years of research and innovation in rosaceous crop breeding programs across the country.” Amy, Jim and Cameron were key members of the steering committee developing this project, with contributions from many others. I had the opportunity to participate during development and will serve as a member of the Scientific Advisory Committee. It will be a critical resource for the PNW cherry breeding program.

Because of continuing restrictive research and development budgets in all sectors – private, state and federal - it is important to prioritize cherry improvement activities in order to maximize return on investment for all programs. Advancement of promising new selections into pre-commercial testing and evaluation is progressing as anticipated. Collaborative efforts among the breeding team, growers in Washington and Oregon, and WTFRC personnel will ensure effective evaluation and that the selections meet industry needs and opportunities to expand profitability. New elite selections will be identified each year in the breeding cycle. Therefore, it is important to have a strategy to utilize phenotypic and molecular marker information along with grower evaluations and feedback from various stage trials to decide whether to either discard/discontinue selections or introduce and release them as new commercial cultivars.

Along with the research and breeding studies, these projects provide opportunities to train and prepare the next generation of breeders and genetic support scientists at W.S.U. Grad students and post doctoral researchers often have key roles in the programs. I continue to work with faculty to review curriculum and program components of plant breeder education and training.

EXECUTIVE SUMMARY

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WTFRC and OSCC Funding: \$7,500

After a decade of consulting to the WTFRC and OSCC for cherry improvement, I am not submitting a funding request for the coming year. The breeding, genetics and genomics programs have made excellent progress and have reached a level of maturity and productivity such that there have been minimal requests for my input and expertise the past year. The information, tools and materials provided through the initial RosBREED program and that will continue from RosBREED2 were possible in part because of the exceptional support and collaboration from the PNW industries, WSU and the ARS-USDA. This is a very strong and productive private-public partnership that you are rightly proud of and should continue to support with clear direction and commitment. I have enjoyed the opportunity to work with all of you and surely have gotten as much or more than I have given. I will remain engaged with fruit breeding through participation in RosBREED2 and other interactions in the public and private sectors. I expect to see a continuing stream of exciting new cherry cultivars and rootstocks moving into commercial use in the PNW and fruit of unprecedented quality in the market place.

My objectives were to: 1) Provide analysis and critique of technical aspects of proposals and reports for competitive funding of research and development related to cherry improvement; 2) provide ideas and analysis of approaches and methods to facilitate adoption of new sweet cherry cultivars by clientele groups in the sweet cherry production and delivery pipeline; 3) facilitate adoption and use of technology and materials from research projects worldwide to support sweet cherry improvement; and 4) Interact with WSU, OSU and ARS scientists and PNW growers on scientific matters related to cherry improvement for the region.

These objectives were met through telephone calls, electronic communication, and participation in various meetings. Activities included: 1) reviewing and critiquing research proposals from cherry team members and other scientists as requested; 2) participating in the Cherry Research Review and the GGB workshop prior to the annual research meeting; 3) working with the steering committee to develop a new RosBREED project proposal that has recently been approved, 4) facilitating interaction among breeders and scientists; 5) alerting cherry team to key references and ideas for breeding and genetics of sweet cherry, and 6) working on education and curriculum for breeders.

My role was to provide information and feedback to Jim McFerson and Board members about progress toward objectives and to support the breeder and researchers working on this project. I worked with researchers, cooperators and members of the industry to provide expertise and knowledge about fruit breeding. I provided insight, guidance and ideas for identifying and applying appropriate technology to facilitate efficient cultivar development. I accompanied Amy on a visit to the Duarte and ProTree nurseries in California in February to see their operations for the production of cherry (and other) rootstocks using tissue culture. I evaluated research proposals when requested.

The PNW cherry breeding program can be a major beneficiary of tools and materials for DNA-informed breeding when it is well integrated into a targeted breeding program for cultivar development. This is the only public sweet cherry breeding program in the U.S. taking advantage of these valuable resources. Interaction among university, ARS-USDA and commission internal programs provides for continued support and success. The advancement of promising new selections into pre-commercial testing and evaluation is gaining momentum. Collaborative efforts among the breeding team, growers in Washington and Oregon, and WTFRC personnel are required to ensure effective evaluation and that the selections meet industry needs and opportunities to expand profitability.