

FINAL PROJECT REPORT (for 2011)

Project Title: Consulting for the Northwest cherry improvement project

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Cooperators: Jim McFerson, Amy Iezzoni, Nnadozie Oraguzie, Cameron Peace, Amit Dhingra, Yanmin Zhu

Other funding sources None

Total Project Funding:

Budget History:

Item	2011		
Salaries			
Benefits			
Wages			
Benefits			
Equipment			
Supplies			
Travel	\$4,000		
Miscellaneous	\$5,500		
Total	\$9,500		

ORIGINAL OBJECTIVES:

- Coordinate and lead monthly conference calls among members of the cherry team to highlight and facilitate discussion of key issues related to sweet cherry improvement.
- Facilitate collaboration among team members and scientists in the public and private sectors in the PNW and externally for improved breeding technology. Provide an additional link to RosBREED.
- Work with N. Oraguzie the breeding program leader and Amy Iezzoni, consultant, to continue development and implementation of an efficient breeding program for developing and releasing commercial sweet cherry cultivars suited for the PNW.
- Provide analysis and critique of reports and proposals for competitive funding of research and development related to cherry improvement.

FINDINGS AND ACCOMPLISHMENTS:

- Coordinated conference calls with members of the cherry team
 - Eight conference calls during the year to discuss issues relevant to sweet cherry improvement. Participants included Jim McFerson, Amy Iezzoni, Cameron Peace, Amit Dhingra, Dorrie Main, Yanmin Zhu and Nnadozie Oraguzie
- Reviewed and critiqued research proposals
 - Research and technology proposals to the WTFRC
 - From cherry team members to WTFRC and competitive grants programs.
 - Projects and work being done in the RosBreed project
- Facilitated interaction among breeders and scientists.
 - Discussed Prunus breeding activities at Davis with C. Peace, N. Oraguzie and others
 - Attended RosBreed annual meeting and served on Scientific Advisory Panel
 - Communicated findings from the UC Davis Delphi study about graduate education for future plant breeders
- Worked with Nnadozie to integrate and present evaluation information for new elite selections
- Alerted cherry team to key references for breeding and genetics of sweet cherry.
- Submitted invoices for expenditures on a quarterly basis.

RESULTS AND DISCUSSION:

The monthly (fall and spring) conference calls were continued provide an opportunity for members of the cherry team to discuss important issues about cherry improvement. We strive to include as many people and topics as possible that impact the breeding program and others that may benefit from genetic, genomic and breeding information. Topics discussed included; scion and rootstock breeding updates, key marker-locus-trait associations for marker-assisted breeding, key traits of economic importance, evaluation procedures for promising selections during advanced stage testing, evaluation sites in the PNW and implementation of RosBREED activities and procedures.

Members of the cherry team are collaborative, and have a constructive, interactive approach to cherry improvement. They exchange ideas and provide constructive input to each others' ideas and questions. This promotes synergy and minimizes redundancy and duplicated effort. I have read several proposals in preparation which I believe contributes to a higher likelihood of acceptance and funding success. Members of the team continue to submit good research proposals that are competitive and are being funded by various grants programs. Many members of the cherry team contributed substantial time and effort to the RosBreed project and numerous other national, regional and local projects.

The cherry breeding program and other cherry research programs are fortunate to have participation by outstanding scientists in the PNW (WSU, OSU, ARS, WTFRC and others) devoting significant resources and effort to improving the vitality and competitiveness of the tree fruit industries. These scientists are successful in garnering funds from competitive grants which multiple the effects of the funding from the Washington and Oregon. Through continued collaboration these efforts often result in promising new cultivars, better production and handling methods, improved consumer acceptance, and ultimately sustainability of growers. Continued interaction among these components is critical to continued support and success. Especially with reduced budgets for support, it is important to prioritize activities for cherry improvement activities in order to maximize return on investment.

The Northwest Sweet Cherry Breeding Program led by Dr. Oraguzie is making steady progress toward established program goals. There has been some turnover of support personnel but the important positions have been filled and new people are acquiring knowledge for running operations and support of the work. Pollination, seed handling, germination, seedling growing in the greenhouse and tree management in the field continue to improve and the seedlings in the field are producing fruit for evaluation prior to selecting individuals for further testing and propagation. Crossing efficiency continues to improve. The number of seeds produced annually from crosses is quite sufficient to meet program targets. It will be important to limit the crossing to only those required for established goals and to explore new possibilities for added traits of importance. Upgrading of support facilities for the breeding program is continuing.

Field plantings and plant growth are on target and fast tract evaluation of outstanding seedlings is being done for the third year. For selections identified in 2009, there are now three years of data for decision making. Some that were selected initially have been dropped following analysis of information from 2010 and 2011. Those that show promise will be planted in Stage 2 field trials at three sites in Washington and two in Oregon. Phenotypic and molecular marker information is being combined to make better decisions about future performance and value.

Use of DNA-based information for marker assisted breeding is a key element of the cherry breeding program. Marker-assisted seedling selection (MASS) for self fertility/incompatibility and fruit quality traits continues to show promise for improving program efficiency and accuracy of selecting potentially outstanding plants. There is emphasis on using markers for parental selection to produce S populations with high frequency of the most important genetic combinations. Collaboration with the Peace lab for timely genotyping and with Iezzoni for genetic analysis as well as guidance about program practices provided important resources for the breeding program. Continued work with Dr. Main on building a data base and breeder toolbox for sweet cherries to better manage the extensive information is critical. Much information and data are accumulating and tracking the plants in the populations that are being evaluated and selected as well as the testing of advanced materials for commercial utility is a challenge without these tools.

EXECUTIVE SUMMARY

Title: Consulting for the Northwest Cherry Improvement Project

PI: Fredrick A. Bliss

WTRFC Funding: \$9,500.

I served as a consultant to the Northwest Cherry Improvement Project which is focused on development of new cultivars through classical breeding and applied genomics such as marker-assisted selection to improve efficiency. My role is to support the efforts of the breeder and researchers working on this project and provide information and feedback to Jim McFerson and Board members about progress toward objectives and opportunities for improvement in program management. I evaluate research proposals when asked. I worked with researchers, cooperators and members of the industry to provide expertise and knowledge about fruit breeding. I provide insight, guidance and ideas for identifying and applying appropriate technology to facilitate efficient cultivar development.

Objectives this year were to: 1) Arrange and lead monthly conference calls among members of the cherry team to highlight and facilitate discussion of key issues related to sweet cherry improvement; 2) Facilitate collaboration among team members and scientists in the public and private sectors for improved breeding technology and to provide an additional link to RosBREED; 3) work with N. Oraguzie the breeding program leader and Amy Iezzoni, consultant, to continue development and implementation of an efficient breeding program for developing and releasing commercial sweet cherry cultivars suited for the PNW; and 4) provide analysis and critique of reports and proposals for competitive funding of research and development related to cherry improvement.

These objectives were met through telephone conference calls, electronic communication, and participation in some meetings of the Advisory Committee whenever possible. Activities included: 1) Coordinated conference calls with members of the cherry team; 2) reviewing and critiquing research proposals from cherry team members and other scientists as requested; 3) participating in the Prunus GGB Team Workshop prior to the research review; 4) involvement with the RosBREED project as a member of the Scientific Advisory Panel; 5) facilitating interaction among breeders and scientists; and 6) alerting cherry team to key references and ideas for breeding and genetics of sweet cherry.

The NWCIP continues to make significant progress towards developing new cherry cultivars.

- Crossing efficiency continues to improve. Targeted crosses have resulted in several thousand seedlings each year that are being evaluated using standard phenotypic evaluations and molecular markers in the lab, greenhouses and field.
- The breeding program is actively involved in the RosBREED project which is providing many resources that add greatly to overall breeding capacity.
- Resources are being added to meet sufficient plant breeding capacity. Key support positions have been re-filled and some students are becoming involved in the program.
- There is continued collaboration among the breeder and other scientists from the PNW, nationally and internationally to provide information and materials for the breeding program. Marker-assisted breeding is being integrated with other core activities.
- Outstanding seedlings have been selected the past three years for fast-track evaluation as potential new cultivars. Fruit trait evaluations are used to make decisions about whether selections should be cloned, multiplied and evaluated in the next Stage 2 field trials.
- There are many elite selections coming from the breeding program annually that must be evaluated for potential cultivars. This will require efficient use of all types of information in order to be cost effective, reduce risk and improve chances of success.

The consulting project budget included \$4,000. for travel to Wash. State for project review and related activities and \$5,500 for miscellaneous expenses related to consulting. I will spend less than the amount budgeted.