FINAL PROJECT REPORT (2012)

Project Title: Consulting for the Northwest cherry improvement project

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

Total Project Funding:

Budget History:

Item	**2012**		**Ye**
Salaries			
Benefits			
Wages			
Benefits			
Equipment			
Supplies			
Travel	$4,000.		
Plot Fees	5,500.		
Miscellaneous			
Total	$9,500.		

ORIGINAL OBJECTIVES

- Coordinate and lead monthly conference calls among GGB members of the cherry team to identify 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 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
  - Seven conference calls during the year to discuss issues relevant to sweet cherry improvement. Participants included Jim McFerson, Amy Iezzoni, Cameron Peace, 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 in the RosBreed project as a member of the Scientific Advisory Panel.

- Facilitated interaction among breeders and scientists.
  - Attended RosBreed annual meeting and served on Scientific Advisory Panel
  - Developed information about graduate education for future plant breeders and plant breeding capacity needed in fruit and nut crop breeding.
  - Made presentation at the National Association of Plant Breeders

- Worked with Nnadozie to integrate and present evaluation information for new elite selections
  - Reviewed crossing plans
  - Reviewed powdery mildew field segregation data

- 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 to provide an opportunity for members of the cherry team to discuss important issues about cherry improvement. Although we strived to include as many people as possible, participation was often limited because researchers have full schedules that precluded some from participating. During the calls, topics discussed included; scion

and rootstock breeding updates, key marker-locus-trait associations for DNA-facilitated breeding, key traits of economic importance, evaluation procedures for promising selections during advanced stage testing, evaluation sites in the PNW and utilization of RosBREED materials, information and other resources.

Good collaboration continues among members of the cherry improvement team who are interactive and constructive. They exchange ideas and provide input to each others' ideas and questions. This promotes synergy and minimizes redundancy and duplicated effort.

The grant proposals I read show innovative ideas and approaches that I believe contributes to continued competitiveness and opportunities for funding. Researchers continue to submit good research proposals that are competitive and are being funded at a level commensurate with other public institutions. Several members of the cherry team are contributing substantial time and effort to the RosBreed project and other national, regional and local projects.
The cherry breeding program benefits from collaborative interaction with other outstanding scientists in the PNW (WSU, OSU, ARS, WTFRC and others) who devote significant resources and effort to issues and opportunities impacting the tree fruit industries. Those scientists are successful in garnering funds from competitive grants which multiply the effects of the funding from the Washington and Oregon for cherry breeding and overall improvement. This collaboration often results in synergy that would otherwise not be possible. Continued interaction among these programs is critical to continued support and success. Especially with reduced budgets for research and development in the public sector, it is important to prioritize activities for cherry improvement activities in order to maximize return on investment for all programs.

The Northwest Sweet Cherry Breeding Program led by Dr. Oraguzie is making progress toward agreed-upon program goals which were prioritized and re-focused this year. Some new support personnel have been hired which hopefully will provide some stability and reduced turnover to facilitate building internal expertise. 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 generally adequate to meet program targets. It will be important to maintain focus crossing on parents required for priority market classes that meet established goals as well as to explore new possibilities for added traits of importance.

Use of DNA-based information for marker assisted breeding is a key element for success and efficiency of the cherry breeding program. With implementation the breeder toolbox, considerable efficiency can be gained through use of marker-assisted parental selection to maximize the potential for each cross to produce progeny likely to meet objectives and minimize the number of seedlings likely to be discarded later. DNA-informed for self fertility/incompatibility and fruit quality traits continues to utilized for improving program efficiency and accuracy of selecting potentially outstanding plants. 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. Work with Dr. Main on building a data base and breeder toolbox for sweet cherries is beginning to show good return on investment. 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 would be an untenable challenge without these tools. Joint efforts to phenotype important populations within the RosBREED project will be quite important for the breeding effort.

Evaluation of elite selections from 2009 and continuing to the present is being fast-tracked as much as feasible in field plantings on-station and in grower orchards. Collaborative efforts with growers and WTFRC personnel are being expanded to ensure efficient evaluation and that the selections meet industry needs and opportunities to expand profitability. As new elite selections are identified each year and breeding cycle, it is critical to have an effective selection strategy to utilize phenotypic and molecular marker information and grower evaluations and feedback from various stage trials until decisions are made to either discard/discontinue selections or introduce and release as new commercial cultivars.

EXECUTIVE SUMMARY
Title: Consulting for the Northwest Cherry Improvement Project
PI: Fredrick A. Bliss
WTRFC Funding: $9,500

The objectives were to: 1) Coordinate and lead monthly conference calls among GGB members of the cherry team to identify and facilitate discussion of key issues; 2) facilitate collaboration among team members and scientists in the public and private sectors for improved breeding technology and 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 commercial sweet cherry cultivars; and 4) provide analysis and critique of reports and proposals for competitive funding of research and development.

These objectives were met through telephone conference calls, electronic communication, and participation in some meetings of the Advisory Committee before that was reorganized into its current structure. 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 annual research meeting; 4) serving 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.

I provided consultant services to the Northwest Cherry Improvement Project that is developing new cultivars using classical breeding and applied genomics to improve efficiency and precision. My role is to support the breeder and researchers working on this project and provide information and feedback to Jim McFerson and Board members from Washington and Oregon about progress toward objectives and opportunities for improved program management. 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. I evaluate research proposals when requested.

There is continuing progress toward developing new sweet cherry cultivars in the NWCIP.
- **The** target market objectives have been prioritize to focus on outstanding early and late cultivars that are more important to Northwest growers.
- **Crossing** efficiency continues to improve with adequate numbers of progeny from selected parents produced annually. Because of unpredictable adverse weather in the spring, it may be prudent to look for ways to minimize those adversities to ensure continuing success.
- **Selection** procedures using both standard phenotyping and DNA-facilitated decisions are being used, with considerable savings being realized compared to phenotyping only approaches. Integration of these approaches for key genes/traits should continue.
- **The** breeding program is actively involved in the RosBREED project which is providing many resources that add greatly to overall breeding capacity.
- **Key** support positions have been re-filled which is critical and continuity should be maintained.
- **Continued** collaboration among the breeder and other scientists from the PNW, nationally and internationally to provide information and materials is a key element for the breeding program. Marker-assisted breeding is being integrated with other core activities.
- **Elite** seedlings have been selected for fast-track evaluation as potential new cultivars. Decisions about movement of these selections are being made jointly with industry representatives.
- **Wise** choices among the elite selections coming from the breeding program annually 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.