

FINAL PROJECT REPORT

1 year (2012)

Project Title: Consulting for the Washington apple breeding project

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Cooperators: Jim McFerson, Kate Evans, Cameron Peace, Amit Dhingra, YanMin Zhu, Gennaro Fazio

Total Project Funding:

Budget History:

Item	2012		
Salaries			
Benefits			
Wages			
Benefits			
Equipment			
Supplies			
Travel	\$2,000		
Plot Fees			
Miscellaneous	5,500		
Total	\$7,500		

ORIGINAL OBJECTIVES:

- Coordinate and lead monthly conference calls among members of the apple team to facilitate discussion of important issues related to apple breeding, genetics and genomics.
- Support the breeder, Kate Evans and other collaborating scientists through presentation of ideas, evaluation of strategies and plans, assuring focus on commercially-oriented objectives and measurement of progress against project goals.
- Provide analysis and critique of proposals for competitive funding of research and development related to apple breeding.
- Identify programs, breeders, and scientists in the public and private sectors that can provide collaborative support to the breeding program.
- Provide an additional link between RosBREED and the improvement program as a member of the Scientific Panel of RosBREED.

SIGNIFICANT ACTIVITIES AND FINDINGS

- Coordinated conference calls with members of the apple team.
 - Seven conference calls during the year to discuss issues relevant to apple team activities. Participants included Jim McFerson, Kate Evans, Cameron Peace, Amit Dhingra, YanMin Zhu, Gennaro Fazio.
- Reviewed and critiqued research proposals for apple team members
 - Individual submissions to competitive grants program
 - Pre-proposals from individuals prior to submission.
 - Funding proposals for apple research to the WTFRC
- Facilitated integration of MAS into the Washington apple breeding program.
 - Worked with Cameron and Kate to critique integration of MAB applications.
 - Reviewed procedures to use molecular markers for selection for important traits in the apple breeding program
- Reviewed data and information from the project “Increasing decision confidence in cultivar development and adoption” and materials for the corresponding workshop held in Dec., 2012.
- Participated as member of the RosBREED Scientific Advisory Panel and meeting in San Diego, CA, January 2012.
- Provided R&D information to apple team members.
- Participated in the 2011 Apple Research review.
- Submitted invoices for expenditures on a quarterly basis.

RESULTS & DISCUSSION

The monthly conference calls for apple team members were continued but with limited participation due to other competing activities of team members. When possible topics discussed included; scion and rootstock breeding progress from Kate and Gennaro, respectively, developing the breeders’ toolbox by Dorrie and Kate, activities associated with the Genome Database for Rosaceae by Dorrie and Cameron, marker enhanced breeding by Cameron and Kate, YanMin’s research along with activities of the ARS/USDA scientists in Washington State, and Jim’s update of information from the WTFRC, W.S.U. and U.S. National Program activities.

Cameron continues to lead on critical issues related to all aspects of marker assisted breeding. The collaborative efforts of Amit Dhingra and other research programs world-wide have been important for use of the apple genome sequence information by W.S.U. and ARS scientists for various projects that contribute to success of the breeding program and other research.

New methods, tools and materials are being incorporated effectively into the WABP by Kate Evans to enhance standard breeding practices. The promising elite selections in the pipeline are being evaluated for commercial potential. MAB is being implemented for parental selection and seedling selection with use of markers that affect fruit firmness and storability flavor components skin color and bitter pit. It is expected that the expanded use of genomics-enhanced breeding will continue to gain momentum for breeding and cultivar development and evaluation. The program is continuing to make use of the new genomics and genetics resources to enhance selection efficiency and effective evaluation for release of new materials to benefit the Washington apple industry.

An effective and efficient procedure for evaluating whether to either advance or drop elite selections for commercialization is critical. The many elite selections at stages 2, 3 and 4 will require thorough evaluation for commercial potential. I have helped explore how to implement an efficient action plan to utilize objective phenotypic data from field trials, molecular information and subjective grower evaluations and consumer opinions about important traits and performance for new clone evaluation. The information from the project “Improving decision confidence in Apple cultivar development and adoption” and the workshop held in Wenatchee, Dec., 2012 should provide guidance for effective ways to identify elite selections with high commercial potential.

There is continuing progress to implement a data base (e.g., the Breeder Information Management System (BIMS) concept being developed in RosBreed) for collecting, storing and using information about parents and breeding populations, and identifying market-leading cultivars in target markets for use as standards or checks for comparison. That along with the Breeders’ Toolbox will allow effective use of the large amount of data being collected in the breeding program and the various collaborative programs such as RosBREED.

WSU faculty and ARS scientists continue to play lead roles in the RosBREED project and in planning a sequel proposal for submission. Members of the GGB team continue to secure funding from competitive programs that extends the impact of support from the WTFRC. I serve on the Scientific Advisory Panel for RosBreed, which meets annually and reviews activities as requested throughout the year.

I continue to work with Cameron and his lab to critique ideas about effective use of DNA-based information for marker-assisted breeding and new markers developed through the RosBREED project that are becoming available to breeders. There is considerable work on identifying the most important target traits for breeder selection using combined phenotypic evaluation and MAS so the breeding program can integrate marker-locus-trait targets into selection protocols for cultivar development. The information gained from different segments of the industry about valuable traits is should provide additional insight into selection strategies that breeders and researchers should employ for effective apple improvement.

EXECUTIVE SUMMARY

Title: Consulting for the Washington apple Breeding Project

PI: Fredrick A. Bliss

The project objectives were to: 1) Coordinate and lead monthly conference calls to facilitate discussion of important issues related to apple breeding, genetics and genomics; 2) support the breeder and other collaborating scientists through presentation of ideas, evaluation of strategies and plans; 3) provide analysis and critique of proposals for competitive funding of research and development; 4) identify programs, breeders, and scientists in the public and private sectors that can offer collaborative support; and 5) provide an additional link between RosBREED and the apple improvement program.

I provided consultation to the Washington apple breeding program which is developing new cultivars to enhance the global competitiveness of the Washington apple industry. I read and critiqued competitive grant requests and evaluated proposals to the WTFRC for funding. Monthly conference calls were held to facilitate sharing ideas, concerns and opportunities among team members about scion and rootstock breeding and research applicable to apple improvement. However there was limited participation at those calls due to other competing activities of team members and I plan to discontinue these calls.

The breeding program is making use of DNA-based information to complement classical breeding methods. MAB is being implemented for parental selection and seedling selection using markers for genes that affect fruit firmness and storability, flavor components, skin color and bitter pit. It is expected that expanded use of genomics-enhanced breeding will continue to gain momentum for breeding and cultivar development and evaluation. The program is continuing to make use of the new genomics and genetics resources to enhance selection efficiency and effective evaluation of elite selections as potential new cultivars to benefit the Washington apple industry.

The WABP is producing new selection populations from crosses among new parents and prior selections from the program are being evaluated each year to provide genetic variability for traits important to target markets in Washington. Numerous elite selections are being evaluated in stage 2, 3 and 4 trials at on station-plots and in growers' fields to identify putative new commercial cultivars. I have helped explore how to implement an efficient action plan to utilize objective phenotypic data from field trials, molecular information and subjective grower evaluations and consumer opinions about important traits and performance for new clone evaluation. The information from the project "Improving decision confidence in Apple cultivar development and adoption" and the workshop held in Wenatchee, Dec., 2012 should provide guidance for effective ways to identify elite selections with high commercial potential.