

FINAL PROJECT REPORT

WTFRC Project Number: AP-07-700

Project Title: Consulting for the Washington apple breeding project (2007)

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Cooperators: Bruce Barritt, Jim McFerson, Amit Dhingra, Cameron Peace, Yanmin Zhu

Other funding Sources

Agency Name:

Amount awarded: NA

Notes:

Total Project Funding: \$6,680.

Budget History:

Item	Year 1: 2007	Year 2:	Year 3:
Salaries			
Benefits			
Wages			
Benefits			
Equipment			
Supplies			
Travel	\$2,840.		
Miscellaneous	\$3,840.		
Total	\$6,680.		

Significant Activities and Findings:

Initiated and coordinated conference calls with collaborators to consider high value traits for MAS and other applications

Traveled to Washington State to evaluate project and participate in reviews and planning.

- Wenatchee, Jan. 22 and 23 to participate in Washington Apple Research Review
- Pullman, Prosser and Wenatchee, May 6-11 to participate in summer workshop organized by Cameron Peace

Provided reviews of project proposals, plans and results.

- Reviewed manuscript prepared for publication by Bruce Barritt and Yanmin Zhu
- Participated in planning and review of RosCap proposals developed by Washington Scientists and breeders.
- Reviewed pre-proposals and proposals as requested.

Submitted invoices for expenditures on a quarterly basis.

Quarter one (Oct. 1, 2006 – Dec. 31, 2006)	\$ 840.00
Quarter two (Jan. 1, 2007 – Mar. 31, 2007)	\$3,731.51
Quarter three (Apr. 1, 2007 – June 30, 2007)	\$4,589.30
Quarter four (July 1, 2007 – Sept. 30, 2007)	\$ 560.00
Total	\$9,720.81

Results and Discussion:

Conference calls during the Spring, 2007 were used to discuss the feasibility of marker assisted selection for improving apple traits in the breeding program and for focused study using genomic tools. Trait importance and feasibility of success using MAS were assigned using the Apple Trait Decision Tree for Implementing Marker Assisted Selection. The following traits have been discussed and prioritized:

Trait limited)	Trait importance (V = very ; M = medium ; L=
Tree juvenile period,	V
mildew reaction,	M
productivity (fruit yield),	?
fruit weight,	V
fruit abscission,	L
fruit skin overcolor,	V
lenticel breakdown,	L

fruit flesh color,	M
fruit flesh texture (= fruit flesh firmness),	V
fruit crispness (chewiness),	V
fruit juiciness (specific gravity),	V
fruit acidity (malic acid),	V
fruit aroma,	V
fruit sweetness,	V
fruit storability (=duration in storage),	V
bitter pit.	V

These priorities and assessments were used for guiding program development during the summer workshop organized by Cameron Peace and for the RosCap proposal to be submitted for competitive funding.

The first application of markers in the Washington apple breeding program was outlined in the paper by Zhu and Barritt “Md-ACS1 and Md-ACO1 genotyping of apple (*Malus x domestica* Borkh.) breeding parents and suitability for marker-assisted selection” that has been accepted for publication in the journal **Tree Genetics Genomes**. Markers can be used to assess the genotypes of the parental cultivars and to facilitate early selection and elimination of seedlings that will unlikely produce firm fruit.

The summer workshop brought together key people from the Pacific N.W., other regions and the international sector involved in apple breeding and genomics. The expertise and information from this evolving collaboration will measurably strengthen the future activities of the breeding program. This workshop also provided an opportunity for the participants to view the various phases of the breeding program and access the considerable progress that is being made in developing promising new selections.

There will be a major transition during the upcoming year when a new breeder is hired to replace Dr. Barritt. One of the recommendations made during the breeding review three years previously was to implement marker assisted breeding. Good progress is being made to achieve this recommendation and the breeding program is in very good shape as this upcoming transition proceeds.

There have been a substantial number of new scientists hired through Washington State Univ. and the USDA/ARS. This adds considerable depth and breadth of expertise to those already in place and provides the tree fruit industry with excellent opportunities to address their needs for competitiveness and innovation of new products.