

FINAL PROJECT REPORT

Project Title: Apple scion breeding

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Cooperators: Amit Dhingra, WSU Pullman

Other Funding Sources

Agency Name: N/A

Total Project Funding: \$158,422

Budget History:

Item	Year 1: 2008
Salaries	59,340
Benefits	20,769
Wages	9,000
Benefits	1,413
Equipment	0
Supplies	56,900
Travel	11,000
Total	158,422

Objectives:

1. Produce, through traditional breeding methods, promising selections and subsequently elite selections with outstanding eating quality and commercial potential.
2. Use extensive trait phenotyping in combination with genomic tools (phenotype/genotype associations) to develop Marker Assisted Selection for key fruit and tree traits.
3. Use both objective (instrumental) and subjective (sensory) evaluation techniques to identify selections with outstanding eating quality.

Significant findings:

1. Over 30 new crosses were made and 25,432 seeds produced in the WSU Apple Breeding Program (WABP). Seedlings from 20,000 seeds from 2007 crosses were grown in the greenhouse and transplanted to the nursery.
2. Over 6,200 seedling/M.9 trees were produced in the nursery for planting in evaluation orchards at TFREC in 2008.
3. Thirty-one promising selections made in 2007 were propagated in 2008 for planting in 2009 second stage trials at three diverse sites in Central Washington.
4. Promising selections in second test trials (planted in 2004, 2005, 2006 and 2007) at three evaluation sites in Central Washington were evaluated for productivity and fruit quality.
5. Trees of four elite selections were propagated and will be planted in 2010 in third stage grower trials. Trials will be managed by the WTFRC, with input from the apple breeder and producer-warehouse cooperators.
6. Fruit from eight elite selections were profiled by the sensory panel at WSU-Food Science and Human Nutrition under the supervision of Dr. Ross.
7. A new industry advisory council is being established which will meet at least twice a year to discuss progress in the apple breeding program with Dr. Evans.

Results and discussion:

The WABP continues annually with new crosses frequently derived from the best selections from earlier WABP breeding generations. New seedling orchards provide the opportunity for the identification of new promising selections which can then be propagated for stage two trials.

Leaf tissue from several seedling progenies has been provided to Dr. Peace to enable progress in the identification of molecular markers for pre-selection.

Seven stage two and three selections were evaluated by over 120 visitors to the Washington State Horticultural Association show in Yakima, December 2008. Data obtained from these evaluations will help to guide selection of material for grower trials. Two elite selections currently in grower trials were also well received during a tasting session at the Washington State Horticultural Association show. Elite selections currently in third stage grower trials have good texture and flavor, medium or larger fruit size, average or better productivity and range in harvest date from late August to early October. Several of these selections have the potential to be commercial cultivars, having a positive impact on the Washington apple industry. Small plots of elite selections are also being tested in the more challenging growing conditions of Minnesota, Michigan and New York State. These plots will provide fast-track data on key traits of the selections, such as winter-hardiness and susceptibility to fireblight. Plans for the release of the first elite selection are underway. Approximately 10,000 trees have been produced in the nursery and will be ready for planting in 2010.

Samples of eight second and third stage selections were sent to Pullman for evaluation by Dr. Ross and her team. The sensory panel was provided with fruit exhibiting a wide range of quality attributes for training prior to assessing the selections and consumers compared the samples to a reference variety.

Executive summary:

The WSU Apple Breeding Program (WABP) continues annually with new crosses, newly established seedling orchards for selection and the identification of new promising selections. The parents for new crosses are frequently the best selections from earlier breeding cycles. A new industry advisory council is being established which will meet at least twice a year to discuss progress in the apple breeding program with Dr Evans.

Over 30 new crosses were made in 2008 and resulted in the production of 25,432 seeds. Seedlings from 20,000 seeds from 2007 crosses were grown in the greenhouse and transplanted to the nursery. Leaf tissue from several seedling progenies has been provided to Dr. Peace to enable progress in the identification of molecular markers for pre-selection.

Over 6,200 seedling/M.9 trees were produced in the nursery for planting in evaluation orchards at TFREC in 2008. Thirty-one promising selections made in 2007 were propagated in 2008 for planting in second test trials at three diverse sites in Central Washington. Promising selections in second test trials (planted in 2004, 2005, 2006 and 2007) at three evaluation sites in Central Washington were evaluated for productivity and fruit quality.

Trees of four elite selections were propagated and will be planted in 2010 in grower trials, managed by the WTFRC. Plans for the release of the first elite selection are underway. Approximately 10,000 trees have been produced in the nursery and will be ready for planting in 2010.

Fruit from eight elite selections were profiled by the sensory panel at WSU-Food Science and Human Nutrition under the supervision of Dr. Ross. Data obtained from these evaluations and the more informal tastings at the Washington State Horticultural Association show will help to guide selection of material for further grower trials and release.