

**FINAL PROJECT REPORT****WTFRC Project Number:** ST 04-413**Project Title:** Apricot scion & peach rootstock evaluations

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**Cooperators:****Budget History:**

<b>Item</b>	<b>Year 1: 2004</b>	<b>Year 2: 2005</b>	<b>Year 3: 2006</b>
<b>Salaries</b>			
<b>Benefits</b>			
<b>Wages</b>	2000	3500	3500
<b>Benefits</b>	320	560	560
<b>Equipment</b>			
<b>Supplies</b>	2080	2040	2040
<b>Travel</b>			
<b>Miscellaneous</b>			
<b>Total</b>	4400	6100	6100

## OBJECTIVES:

- Evaluate apricot scion productivity, fruit quality and horticultural traits (e.g., bloom dates, harvest dates, growth habit)
- Evaluate effects of peach rootstock genotype on tree growth habit and vigor, precocity, and fruit quality
- Engage the stone fruit industry to optimize the usefulness of this trial

## SIGNIFICANT FINDINGS:

### *Peach rootstock evaluations (2001 planting, 12 rootstocks):*

- rootstock had a tremendous impact on fruit yield; we documented ca. 10-fold difference
- SLAP was the highest yielding (158 lb/tree, Lovell + 58%), K146-44 was the lowest yielding (10 lb/tree, 9% of Lovell)
- the standard, Lovell was the fourth highest yielding at 112 lb/tree
- rootstock affected vigor; approximately 5-fold variability existed in 2006
- SLAP remains the most vigorous rootstock (Lovell + 1%), K146-44 was the least vigorous (20% of Lovell)
- VVA-1 induced good vigor control (ca. 43% of Lovell)
- rootstock induced up to a 10 day difference in fruit harvest date
- P30-135 consistently hastens fruit maturity the greatest extent (24 Aug in 2006)
- Hiawatha, Pumiselect and Lovell delayed maturity (trees picked 6 September)
- fruit quality overall was excellent in 2005 and poor in 2006
- in 2006, fruit size was good from BH-4, Bailey, SC-17, Lovell, SLAP, and K146-43 (ca 200 g/fruit, ca. 2.9" diameter, 13 °brix)
- P30-135 yielded the poorest quality fruit (96 g, 2.2" diameter, 13.4 °brix)
- yield was related positively and linearly to tree vigor

### *Peach rootstock evaluations (2002 planting, 8 rootstocks):*

- 2006 was the third fruiting year for this trial
- almost 6-fold differences in yield existed, Cadaman was the highest yielding (132 lbs/tree, Lovell +18%), VSV-1 was the lowest yielding (24 lb/tree, 21% of Lovell)
- ca. 5-fold differences in vigor existed, Lovell was the most vigorous, VVA-1 was the least vigorous (20% of Lovell)
- highest quality fruit were harvested from Cadaman and Lovell 101 (204 g, 2.9" diameter, 12.2 °brix)
- Pumiselect yielded the worst quality fruit (121 g, 2.4" diameter, 13.2°brix)
- yield was related positively and linearly to tree vigor
- there was no close relationship between tree yield and fruit quality

### *Apricot variety evaluations (2004 & 2005):*

- Beliana, Katy, and Goldrich were the earliest blooming (first bloom on 9 Mar)
- Tilton and PA7003-2 were the latest blooming selections (first bloom on 13 Mar)
- the earliest maturing selections were Beliana, Castlebrite, Katy, and Tomcot (ca. 30 June)
- the latest maturing selections were Fantasme, Tilton, and Vulcan (ca. 28 July)

- fruit quality overall was excellent - diameter ranged from 2.0" – 2.4"
- Goldcot, Malise and Castlebrite were the smallest (2.0"), Goldbar, Goldrich, Hargrand, Lehrman and Rival were the largest (2.4")
- firmness ranged from 2.0 kg – 5.3 kg
- Beliana and Katy were the softest (2.0 kg)
- Helena, Goldensweet, Hargrand, Dunstan, Goldbar, PA 7005-2, and Vulcan were among the firmest (> 4.5 kg)
- fruit weight ranged from 69 g – 125 g
- Goldcot and Malise were the smallest by weight (ca. 70 g)
- Goldbar, Goldrich, and Hargrand were the heaviest (> 120 g)
- in an unofficial consumer survey, PA7003-2 was ranked as the best tasting

#### METHODS:

##### *Peach rootstock evaluations (2001 & 2002 NC-140 trials):*

Two rootstock trials were planted at the WSU-Roza experimental farm, one in 2001 comprised of 13 rootstocks, and another in 2002 comprised of 8 rootstocks. The scion variety is Cresthaven. Orchards were planted at approximately 15' x 18' in north-south rows. Soil is a silty-loam limited by basalt at a depth of approximately 4 feet. Standard orchard management practices, including hand-thinning, are followed and trees are trained to a multiple-leader open-center architecture. Trees were irrigated weekly by under-tree microsprinklers (1/tree). Vigor estimates are made from measurements of trunk circumference taken in the fall. At harvest, yield is determined and fruit quality evaluations (size, weight, soluble solids) are made on randomly-selected fruit subsamples.

##### *Apricot variety evaluations:*

The research orchard was planted in 1997 at 12 x 18' in north-south rows. Under-tree microsprinklers and propane heaters have been installed. The block is comprised of 33 apricot (*Prunus armeniaca* L.) selections, several of which were developed at WSU-Prosser. For each selection the following data will be collected annually:

- first and full bloom dates
- fruit set rating
- tree growth habit (vigor, branch angle)
- fruit yield rating
- fruit quality (mass, soluble solids, diameter, acidity, firmness)

#### RESULTS & DISCUSSION:

##### *Peach rootstock evaluations*

The results from the 2001 and 2002 plantings are summarized in tables 1 and 2, respectively. Once again we recorded significant variability in two critical tree characteristics: vigor and yield. Interestingly, these characteristics were related closely and linearly (Figure 1) in both years ( $r^2 = 0.85$  and  $0.81$  for 2001 and 2002 plantings, respectively). This is largely due to the bearing habit of peach (i.e., fruiting on one-year-old wood). There was no close relationship between fruit yield or tree yield efficiency and fruit quality in previous years. This is because trees are hand-thinned to balance crop load, irrespective of canopy/tree size. However, in 2006, trees were thinned later than they should have been and, as a result, there was a slight positive relationship between tree vigor, yield, and fruit quality. In 2006, we again documented the highest yielding trees also bore excellent quality fruit (e.g., SLAP). Overall, in both trials, fruit quality was reduced compared to the previous season. This is due

to late, and perhaps insufficient thinning on some rootstocks. Fruit weight was approximately 30% lower in 2006 compared to 2005 (173 g vs. 248 g).

From these preliminary data (fourth fruiting year for 2001 planting and third for 2002 planting), we continue to consider VVA-1 and K146-43 among the most promising for higher efficiency plantings. VVA-1 induces excellent size control, tree TCSA was about 36% that of Lovell. Yield efficiency was moderate on this rootstock in 2005 and fruit quality was good. In 2006, K146-43 induced vigor control similar to VVA-1 yet had higher yields and slightly better fruit quality than VVA-1-rooted trees. At this early stage, both K146-43 and VVA-1 appear promising as rootstocks suitable for high density plantings. We recommend these rootstocks for further testing the relationship between tree density and yield and quality.

We confirmed in 2005 that the Jaspi-rooted trees do not have Cresthaven as the scion. Fruit on Jaspi were ripe a full month before the others - this is not a rootstock effect. These trees have 'Redglobe' for the scion, an earlier maturing selection that was part of the eastern cooperators' plantings. As a result, Jaspi is not listed in the dataset.

We learned recently that Pumiselect in both plantings was not thoroughly tested for viruses from where it was indexed in Europe. Apple Chlorotic Leaf Spot Virus and Cherry Virus A were identified in this clone during indexing. Because of the risk of these viruses spreading, the 2002 and 2001 NC140 peach rootstock plantings have been destroyed. Drs. Greg Reighard and Scott Johnson are preparing a 5-year summary of each trial.

Rootstock	Yield (lb)	Fruit weight (g)	Fruit diameter (cm)	Soluble solids (%)	TCSA (cm <sup>2</sup> )	Yield Efficiency	Harvest Date	Red coloration (% surface)
K146-44	10.3 f	159 d	2.7 d	13.9 ab	19.0 d	0.45 bc	8/30	47
P 30-135	14.7 f	96 e	2.2 e	13.4 abc	21.2 d	0.29 c	8/24	37
K146-43	22.9 ef	194 abc	2.9 ab	13.2 abcd	35.3 d	0.49 abc	8/31	53
Pumiselect	46.5 ef	162 d	2.7 d	12.2 d	68.0 c	0.29 c	9/6	62
VVA-1	48.3 e	177 cd	2.8 bc	11.9 d	35.6 d	0.70 a	8/29	49
SC-17	86.8 d	197 ab	2.9 ab	13.9 ab	89.1 ab	0.46 bc	8/31	44
Hiawatha	92.5 cd	184 bc	2.8 bc	13.9 a	70.8 c	0.59 ab	9/6	44
Julior	96.2 cd	171 d	2.7 cd	12.7 cd	73.9 bc	0.60 ab	8/29	52
Lovell	112.0 cd	200 a	2.9 ab	12.9 bcd	96.8 a	0.53 b	9/6	47
Bailey	118.4 bc	202 a	2.9 a	12.5 cd	86.5 abc	0.62 ab	9/1	46
BH-4	148.2 ab	208 a	2.9 a	12.3 cd	94.1 a	0.73 a	9/2	53
SLAP	157.9 a	197 a	2.9 ab	12.6 cd	97.3 a	0.70 a	9/4	47

Table 1. Effect of rootstock on yield, fruit quality, and vigor of Cresthaven peach in 2006. Trees were planted in 2001. Means followed by the same letter within columns are not significantly different by LSD (P < 0.05).

Rootstock	Yield (lb)	Fruit weight (g)	Fruit diameter (in)	Soluble solids (%)	TCSA (cm <sup>2</sup> )	Yield Efficiency	Harvest Date	Red coloration (% surface)
VSV-1	24 d	151 c	2.6 c	15.2 a	25.6 e	0.43 bc	8/30	42
VVA-1	28 d	154 c	2.6 c	12.7 bc	18.6 e	0.61 a	8/28	52
Pumiselect	38 d	121 d	2.4 d	13.2 b	55.1 d	0.30 c	9/4	58
Penta	77 c	152 c	2.6 c	12.3 c	56.2 d	0.61 a	8/31	46
Adesoto 101	89 bc	177 b	2.8 b	12.6 bc	74.2 bc	0.55 ab	9/1	38
MRS 2/5	103 bc	153 c	2.6 c	12.6 bc	65.5 cd	0.68 a	9/3	55
Lovell	114 ab	202 a	2.9 a	12.2 c	99.7 a	0.58 ab	9/7	43
Cadaman	132 a	208 a	2.9 a	12.1 c	85.1 ab	0.68 a	9/7	39

Table 2. Effect of rootstock on yield, fruit quality, and vigor of Cresthaven peach in 2006. Trees were planted in 2002. Means followed by the same letter within columns are not significantly different by LSD ( $P < 0.05$ ).

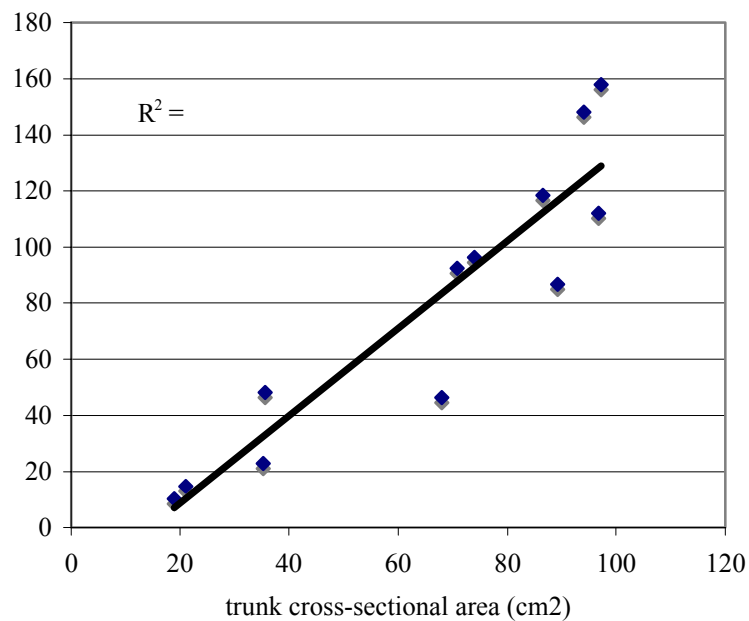


Figure 1. Relationship between tree trunk cross-sectional area (TCSA, cm<sup>2</sup>) and fruit yield (lb/tree) from rootstocks in the 2002 NC-140 peach rootstock planting ( $n = 12$ ).

In fall 2005, we transplanted the selections from the University of California – Pom 20013, Pom 20012 and R15T15 and removed all apricot selections/varieties from the orchard due to lack of interest. Future apricot scion evaluations should target selections with late-maturing, large, firm, and flavorful fruit.