CALIFORNIA 2006 ANNUAL REPORT OF NC-140 COOPERATIVE REGIONAL PROJECT

PROJECT: **NC-140, California**

COOPERATING AGENCIES AND PRINCIPAL LEADERS:

R. Scott Johnson and Ted DeJong, University of California, Department of Pomology, Davis, CA 95616

Objective 1. ROOTSTOCK – ENVIRONMENT INTERACTIONS

PROGRESS OF THE WORK AND PRINCIPAL -ACCOMPLISHMENTS

2001 Red Top Peach Rootstock Planting

Overall, these trees did well in 2006 with high production, good fruit size and no tree mortality (Table 1). Of greatest interest are the dwarfing and semidwarfing rootstocks. The semidwarf stock Pumiselect had very poor fruit size. One tree died in 2005 and another looked weak in 2006. The other semidwarfing stocks, P30-135, Hiawatha and Bailey all continue to show some promise. Of the dwarfing rootstocks, Jaspi and Julior are plagued by a suckering problem. K146-44 and K146-43 often have problems with small fruit size but K146-44 performed reasonably well in 2006. Our greatest interest in the past has been in VVA-1 – a thrifty looking dwarf tree with very good fruit size. In 2006, this rootstock gave us some reason for concern. The fruit size was not as good and the trees seemed a little weak. We are not sure of the cause but will continue to monitor these trees carefully in order to determine the long-term vitality of this rootstock.

Table 1. 2001 NC-140 Red Top peach rootstock planting at the Kearney Ag Center – 2006 data.

Rootstock	Trunk Circ. 2/06 (cm)	Yield 7-06 (kg/tree)	Fruit Weight (g/fruit)	Root Suckers 6/06 (#/tree)	Tree Survival (%)
BH-4	63.1 a	72.8 a	198 ab	0 b	100
Cadaman	64.1 a	76.8 a	191 a-c	0 b	100
SLAP	57.8 ab	74.9 a	201 ab	0 b	75
Lovell	54.2 b	71.2 a	206 a	0 b	100
SC-17	57.6 ab	68.6 ab	177 c-e	0 b	100
Nemaguard	54.0 b	72.2 a	198 ab	.4 b	88
Hiawatha	43.4 c	61.1 ab	170 de	.3 b	100
P30-135	53.3 b	55.5 bc	174 c-e	0 b	100
Bailey	46.1 c	69.8 ab	182 b-d	0 b	100
Pumiselect	39.8 c	52.6 b-d	143 f	0 b	83
K146-44	32.4 d	38.1 de	175 c-e	0 b	100
K146-43	29.7 de	34.5 de	155 ef	0 b	100
Jaspi	28.8 de	36.2 de	166 de	27 b	88
Julior	32.1 d	44.9 cd	176 c-e	26 a	100
VVA-1	23.3 e	29.4 e	174 c-e	.1 b	75

[z] Mean separation within columns by Duncan's multiple range test, P=0.05.

2002 Redhaven Peach Rootstock Planting

In contrast to the 2001 planting, VVA-1 looked outstanding in this trial (Table 2). It had the largest fruit size of any of the rootstocks and the trees looked very healthy. Unfortunately, it had some suckers which did not occur in the 2001 planting. All of the rootstocks showed some degree of suckering, but it was a particular problem with Adesoto 101 and VSV-1. VSV-1 and Pumiselect also had problems with small fruit. Penta continues to show promise as a productive semidwarf rootstock and Cadaman as a productive vigorous stock.

Table 2. 2002 NC-140 Red Top peach rootstock planting at the Kearney Ag Center – 2006 data.

Rootstock	Trunk Circ. 1-06 (cm)	2006 Yield (kg/tree)	2006 Fruit Weight (g/fruit)	Root Suckers 6/06 (#/tree)	Tree Survival (%)
Cadaman	44.2 a	43.5 a	213 a	7 b	100
Lovell	43.2 a	46.2 a	193 b	1 b	100
Pumiselect	34.2 b	32.0 b	172 c	15 b	88
Penta	29.2 cd	28.9 b	206 ab	10 b	100
Adesoto 101	25.5 de	26.7 b	215 a	78 a	100
MRS 2/5	30.1 bc	26.8 b	205 ab	39 ab	63
VVA-1	22.1 ef	15.6 c	221 a	15 b	100
VSV-1	18.1 f	10.8 c	147 d	72 a	100

[z] Mean separation within columns by Duncan's multiple range test, P=0.05.

1999 Fuji Apple Rootstock Planting

Data are no longer being collected from this trial.

2003 Golden Delicious Apple Rootstock Planting

In order to maximize fireblight pressure in this block, we have not cut out shoot strikes. Every tree had at least some strikes in both 2005 and 2006. As a result many trees have died in the last two years, particularly those on standard rootstocks. Approximately half the trees on M26 and M9 (including both T337 and Pajam 2 clones) have died (Table 3). In addition, we also lost several of the experimental rootstocks in 2006. Three trees on PiAu 56-83, one on PiAu 51-11 and one on Bud 62-396 all died, probably from fireblight. So far, none of the CG or JM series rootstocks have succumbed to this disease. The very weakest rootstocks in the block, B9 and J-TE-G, are barely surviving. One tree on B9 did not make it through 2006 and others will soon follow. Obviously, several of the rootstocks in this trial are not very dwarfing and will soon outgrow their allotted space. Of the other rootstocks, many continue to show promise as productive, dwarfing and disease resistant trees.

Table 3. 2003 NC-140 Golden Delicious apple rootstock planting at the Kearney Ag Center – 2006 tree survival, yield, fruit weight and trunk circumference measurements.

Rootstock	# Planted	# Died in 2005	# Died in 2006	2006 Yield (kg/tree)	2006 Fruit Weight (g)	10/05 Trunk Circumference (cm)
B.9	8	0	1	1.2 e	72 d	6.9 h
Bud.62-396	8	0	1	4.7 c-e	117 bc	11.5 g
CG.3041	8	0	0	9.1 ab	129 a-c	12.8 e-g
CG.4210	7	0	0	12.1 a	140 a-c	19.9 ab
CG.5179	8	0	0	8.3 a-c	116 c	13.9 d-g
CG.5935	8	0	0	7.7 a-d	121 bc	16.8 b-d
G.16	18	0	0	11.7 a	115 c	16.8 b-d
JM.1	7	0	0	5.5 b-e	152 ab	15.8 c-f
JM.2	7	0	0	7.0 b-e	148 ab	22.0 a
JM.4	8	0	0	4.7 c-e	137 a-c	18.9 a-c
JM.5	5	0	0	3.8 c-e	126 a-c	23.3 a
JM.7	7	0	0	2.8 e	131 a-c	16.0 c-f
JM.8	7	0	0	5.6 b-e	149 ab	16.3 b-e
JM.10	4	0	0	7.6 a-d	157 ab	19.7 a-c
J-TE-G	7	1	0	1.8 e	115 c	6.9 h
J-TE-H	8	0	0	7.3 a-d	118 bc	14.4 d-g
M.26	18	11	3	5.2 b-e	124 a-c	12.2 fg
M.9Pajam2	8	1	3	7.0 a-e	117 bc	12.2 fg
M.9T337	18	4	4	4.9 c-e	114 c	12.2 fg
PiAu 36-2	3	0	0	3.3 de	171 a	21.3 ab
PiAu 51-11	8	0	1	5.4 b-e	115 c	16.4 b-d
PiAu 51-4	7	0	0	8.0 a-c	160 ab	22.9 a
PiAu 56-83	8	0	3	9.6 ab	163 a	22.9 a
G Smith/M26 (Pollenizer)	20	3	3	-	-	-
Total	215	20	19			

Related Rootstock Work

Peach rootstock breeding and evaluation studies. The rootstocks K146-43 and P30-135 have been patented and given the names of Controller 5 and Controller 9, respectively. They have now been released to nurseries for commercial plantings. We continue to evaluate the physiology of these rootstocks. We are particularly interested in their water and nutrient relations.

The peach rootstock breeding program includes a large number of selections from a wide array of crosses. In 2001, several of these with O'Henry peach grafted on top looked to be extremely promising. The trees ranged in size from very dwarfing to semi dwarfing and all had excellent fruit size. More than 20 of these have been identified and were planted in a large replicated trials in 2003, 2004 and 2005. Several are going out in grower trials in 2007.

WORK PLANNED FOR NEXT YEAR: Data collection and rootstock evaluation will continue in 2007 following guidelines established by the NC-140 Technical Committee.

Publications

Pernice, F., L. Solari, and T.M. DeJong. 2006. Comparison of growth potentials of epicormic shoots of nectarine trees grown on size-controlling and vigorous rootstocks. J. Hort. Sci. and Biotechnology 81:211-218.

Solari, L.I. and T.M. DeJong. 2006. The effect of root pressurization on water relations, shoot growth, and leaf gas exchanges of peach (*Prunus persica*) trees on rootstocks with differing growth potential and hydraulic conductance. J. Experimental Botany 57:1981-1989.

Solari, L.I., S. Johnson, and T.M. DeJong. 2006. Relationship of water status to vegetative growth and leaf gas exchange of peach (*Prunus persica*) trees on different rootstocks. Tree Physiology 26:1333-1341.

Solari, L.I., S. Johnson, and T.M. DeJong. 2006. Hydraulic conductance characteristics of peach (*Prunus persica*) trees on different rootstocks are related to biomass production and distribution. Tree Physiology 26:1343-1350.