CALIFORNIA 2003 ANNUAL REPORT OF NC-140 COOPERATIVE REGIONAL PROJECT

PROJECT: **NC-140, California**

COOPERATING AGENCIES AND PRINCIPAL LEADERS:

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Objective 1. ROOTSTOCK – ENVIRONMENT INTERACTIONS

PROGRESS OF THE WORK AND PRINCIPAL -ACCOMPLISHMENTS

1999 Fuji Apple Rootstock Planting

Due to a wet spring, fireblight was again a problem in 2003. Major pruning cuts were needed on some trees to remove all infections. This reduced yield somewhat but it was still comparable to 2002. In addition to fireblight, problems with sunburn, codling moth and other disorders lead to a low percentage of marketable fruit in this block (Table 1). In the dwarf planting, G16T looks like a promising rootstock with high yield and good fruit size. CG179 also had high yield but fruit size was a little smaller. CG13 is too vigorous for this spacing.

In the semi dwarf trial, CG814 has performed well the last two years with high production and good fruit size (Table 1). It was clearly superior to the two standard rootstocks (M26 and M7). CG30T also had very good production in 2003.

Table 1. 1999 NC-140 Fuji apple rootstock planting established at the Kearney Ag Center – 2002 data.

Rootstock	Root Suckers 02 (#)	Trunk Circ. 1/03 (mm)	Yield 9/03 (kg/tree)	Ave Fruit Wgt 9/03 (g/fruit)	Marketable Fruit (%)
Dwarf Planting					
Supporter 1	1.0	177 f	6.9 b-d	197 e	48
Suuporter 2	0.3	192 f	8.6 ab	213 c-e	58
Supporter 3	0	203 ef	5.0 cd	211 c-e	47
CG41	0	221 de	6.1 b-d	234 ab	48
M9T337	0	233 d	7.9 a-c	229 a-c	48
CG179	0.5	198 ef	10.4 a	207 de	53
G16N	0	242 cd	8.3 ab	206 de	45
CG202	0	258 c	7.3 a-d	215 b-e	46
M26EMLA	0	294 b	4.5 d	243 a	36
CG935	0	245 cd	6.9 b-d	222 a-d	52
G16T	0	259 c	10.4 a	225 a-d	47
CG13	0.5	327 a	7.0 b-d	235 a	44
Semi Dwarf Planting					
M26EMLA	0 b	282 b	12.6 c	220	62
Supporter 4	0 b	244 c	15.4 bc	215	64
CG707	0 b	263 bc	14.4 bc	204	66
M7EMLA	12 a	267 bc	10.5 c	195	62
CG814	2.2 b	266 bc	20.4 a	209	68
CG30N	0 b	261 bc	14.3 bc	217	57
CG30T	0.3 b	268 bc	18.9 ab	213	61
CG210	0 b	335 a	13.0 bc	219	49

[Z]Mean separation within columns for each planting by Duncan's multiple range test, P=0.05.

2003 Golden Delicious Apple Rootstock Planting

This trial got off to a rough start in 2003. About 20% of the trees had major problems as growth began in the spring (Table 2). Some did not push out any new growth even though the buds looked viable and the bark remained green. Others grew very weakly and some died. The problem was spread across most of the rootstocks and even included the Granny Smith pollenizer trees that were obtained from a local nursery. Therefore, it doesn't seem to be a rootstock or nursery problem, but rather something associated with the site or early care of the trees. Even the trees without problems did not grow very vigorously. The cause of the problem is still under investigation.

Table 2. 2003 NC-140 Golden Delicious apple rootstock planting at the Kearney Ag Center – 2003 tree status.

		Number of "Problem" Trees in July 2003				
Rootstock	**# Planted**	**No Growth**	**Weak**	**Dead**	**Total**	**% of # Planted**
B.9	8				0	0
Bud.62-396	8				0	0
CG.3041	8	2			2	25
CG.4210	7	1			1	14
CG.5179	8			1	1	13
CG.5935	8				0	0
G.16	18	3	1	1	5	28
JM.1	7			1	1	14
JM.2	7				0	0
JM.4	8	1	2		3	38
JM.5	5			3	3	60
JM.7	7	2	2		4	57
JM.8	7	2	1		3	43
JM.10	4	1	1	1	3	75
J-TE-G	7		2		2	29
J-TE-H	8				0	0
M.26	18				0	0
M.9Pajam2	8		1	3	4	50
M.9T337	18	1	1		2	11
PiAu 36-2	3		1	1	2	67
PiAu 51-11	8				0	0
PiAu 51-4	7		2		2	29
PiAu 56-83	8				0	0
G Smith/M26 (Pollenizer)	20	3	1		4	20
Total	215	16	15	11	42	20

2001 Red Top Peach Rootstock Planting

The trees in this planting have separated into 3 statistically different tree size categories (Table 3). Of the vigorous rootstocks, BH-4 is the strongest and is significantly larger than Lovell or Nemaguard. Two of 8 SLAP trees collapsed during the season and SC-17 had more suckers than any other rootstock in the trial. Of the semi dwarfing stocks, Bailey and Hiawatha looked the most promising. Both had good production and fruit size in 2003. Pumiselect had small fruit size and was not very productive. The dwarfing rootstocks generally had smaller fruit size. The exception to this was VVA-1 which had excellent fruit size, although very low yield. Also, two of the 8 trees on this rootstock have died so far and three others have still not produced a substantial crop. Therefore, it is premature to make judgement on this rootstock. 2004 may prove to be a critical year for VVA-1 since the trees have grown well and should be able to carry a reasonable fruit load.

Table 3. 2001 NC-140 Red Top peach rootstock planting at the Kearney Ag Center – 2003 data.

Rootstock	Trunk Circ. (mm)	Yield 7-03 (kg/tree)	Fruit Weight (g/fruit)	Root Suckers 02 (#/tree)	Tree Survival (%)
BH-4	291 a[z]	31.1 a	183.4 a	.1 c	100
Cadaman	272 ab	20.1 b-d	174.4 ab	.8 bc	100
SLAP	253 ab	23.3 b	173.7 ab	0 c	75
Lovell	247 b	21.8 bc	170.3 ab	2.1 b	100
SC-17	247 b	21.4 bc	172.4 ab	4.4 a	100
Nemaguard	242 b	21.1 bc	163.8 a-c	2.1 b	88
Hiawatha	200 c	14.6 de	176.8 ab	1.0 bc	100
P30-135	191 c	11.3 ef	167.9 ab	0 c	100
Bailey	191 c	16.8 c-e	174.7 ab	.5 bc	100
Pumiselect	181 c	6.5 fg	137.8 de	1.0 bc	100
K146-44	128 d	5.7 fg	144.1 cd	0 c	100
K146-43	124 d	7.4 fg	118.1 e	.8 bc	100
Jaspi	120 d	6.9 fg	160.6 b-d	.4 bc	100
Julior	119 d	2.7 g	161.2 a-d	.1 c	100
VVA-1	96 d	2.5 g	180.2 ab	.7 bc	75

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

2002 Redhaven Peach Rootstock Planting

In 2003 the trees in this plot survived and grew well. No additional trees have died since one Pumiselect at planting in 2002. The trees will be able to carry substantial fruit loads in 2004 for evaluation of yield and fruit quality.

Table 4. 2002 NC-140 Redhaven peach rootstock planting at the Kearney Ag Center – 2003 data.

Rootstock	Root Suckers 5-03 (#/tree)	Trunk Circ. 2-03 (mm)	Tree Height 11-03 (cm)	Tree Survival 11-03 (%)
Cadaman	2.4	89 a[z]	283 a	100
Lovell	1.4	90 a	276 a	100
Pumiselect	0.4	81 a	226 b	88
Penta	0.3	63 b	184 c	100
Adesoto 101	0.6	59 b	171 cd	100
MRS 2/5	0.8	66 b	170 c-e	100
VVA-1	0.3	45 c	148 de	100
VSV-1	1.1	60 b	145 e	100

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

Related Rootstock Work

Peach rootstock breeding and evaluation studies. The rootstocks K146-44 and P30-135 have been patented and will be released to nurseries in 2004. We continue to evaluate the physiology of these rootstocks. We are particularly interested in their water relations and we just initiated a large irrigation trial to determine optimum irrigation strategies for maximizing fruit size.

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 trial in 2003.

WORK PLANNED FOR NEXT YEAR: Data collection and rootstock evaluation will continue in 2004 following guidelines established by the NC-140 Technical Committee.