CALIFORNIA 2002 ANNUAL REPORT OF NC-140 COOPERATIVE REGIONAL PROJECT

PROJECT: **NC-140, California**

COOPERATING AGENCIES AND PRINCIPAL LEADERS:

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

Objective 1. ROOTSTOCK – ENVIRONMENT INTERACTIONS

PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS

1999 Fuji Apple Rootstock Planting

Flowering in 2002 was a major problem for Fuji in California. Some commercial blocks were almost completely devoid of any flowers. The cause of the problem was not clear but rootstock seemed to be one factor involved. Therefore, we decided to count all flower clusters in the NC-140 Fuji apple block even though it was not called for in the protocol. Flowering was clearly reduced in the dwarf planting compared to 2001. The number of clusters per tree varied from 186 to 374 for the various rootstocks in 2001 but only between 58 and 143 in 2002 (Table 1). The rootstocks showing the lowest level of flowering were CG41 and the three Supporter rootstocks. In 2002, the number of flower clusters on CG41 trees was 33% of what it was in 2001. In the semi-dwarf planting, flowering was about the same in 2002 as it was in 2001. However, since the trees had grown considerably during the year, this would still be considered a reduction in flowering, although not as dramatic as in the dwarf planting.

Fireblight was not a problem in 2002 and no more trees have died since the first year (only one Supporter 1 tree died then). It has been determined that three CG707 and two M7 trees are McIntosh instead of Fuji so those trees have been dropped from the analysis. There were very few root suckers in any of the rootstock treatments in 2002 (data not shown).

All of the rootstocks had good fruit size in 2002, averaging about 200 g/fruit (Table 1). This is considerably greater than fruit size in 2001 when the average was about 150 g. Although there were no significant differences among treatments, the M9 clone had the largest size with 231 g/fruit and one of the largest yields at 10.2 kg/tree. Yield on the dwarfing stocks varied between 4.9 and 12.3 kg/tree, with CG41 and the three Supporter stocks having the lowest yields. Only marketable fruit was included in the yield data. Many fruit were thrown out that were sunburned, cracked, damaged by codling moth or abnormally small. This amounted to at least 25% on all rootstocks and reached as high as 45% on the Supporter stocks. For the semi-dwarfing rootstocks, there was less variability in yield, fruit size and unmarketable fruit. Although CG30 (both N and T) looked very productive in 2001, it was very similar to the controls (M26 and M7) in 2002 (Table 1).

2001 Red Top Peach Rootstock Planting

Data have been collected for this trial, but have not been analyzed at this time. There are very big differences in tree size at the end of the second leaf. Yields and fruit size also varied considerably in 2002. In general, the smaller trees tended to have smaller fruit size even if they were not cropped too heavily.

Related Rootstock Work

Peach rootstock breeding and evaluation studies. We have been conducting physiological studies on 4 rootstocks that appear to have promise as dwarfing stocks for peaches and nectarines. These include the very dwarfing K146-43 and K146-44 selections and the semi dwarfing Hiawatha and P30-135 stocks. Comparisons were always made with the standard vigorous Nemaguard rootstock. Results have shown that all the rootstocks have similar productivity when measured on a canopy light interception basis but the more dwarfing stocks tend to have better fruit quality. Detailed analysis of diurnal water potentials and root hydraulic conductivities suggest water relations can explain the dwarfing mechanism in these rootstocks.

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 for more extensive replicated studies.

WORK PLANNED FOR NEXT YEAR: Data collection and rootstock evaluation will continue in 2003 following guidelines established by the NC-140 Technical Committee.

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

Rootstock	Tree Hgt 10/01 (cm)	Trunk Circ. 10/01 (mm)	Flower Clstrs/Tree 02 (#)	Yield 10/02 (kg/tree)	Ave. Fruit Wgt 10/02 (g/fruit)
Dwarf Planting					
Supporter 1	257 de[z]	143 g	84 ab	5.5	219
Suuporter 2	270 de	153 fg	77 ab	5.8	195
Supporter 3	250 e	154 fg	91 ab	6.7	193
CG41	288 cd	172 ef	58 b	4.9	206
M9T337	323 b	183 de	123 a	10.2	231
CG179	340 ab	173 ef	143 a	12.3	205
G16N	318 bc	198 cd	112 ab	8.5	209
CG202	334 b	204 bc	99 ab	9.1	211
M26EMLA	329 b	221 b	108 ab	9.3	216
CG935	343 ab	207 bc	136 a	12.3	221
G16T	314 bc	213 bc	135 a	10.1	196
CG13	372 a	261 a	111 ab	8.4	204
Semi Dwarf Planting					
M26EMLA	302 bc	204 bc	153	10.2	198
Supporter 4	304 bc	190 c	154	13.6	203
CG707	301 bc	206 bc	117	10.6	199
M7EMLA	271 c	209 bc	175	11.3	189
CG814	318 ab	218 b	192	16.3	197
CG30N	314 ab	211 bc	132	11.5	213
CG30T	330 ab	225 b	158	15.3	207
CG210	350 a	281 a	192	13.7	197

[Z]Mean separation within columns for each planting by Duncan's multiple range test, P=0.05.
[Y]Columns with no letters indicate no significant differences.