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AVOCADO CLONAL ROOTSTOCK PRODUCTION TRIAL

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We have continued to monitor the Hass[1] clonal rootstock planting at the UC South Coast Research and Extension Center in Irvine, California. The original planting was established in 1986 and contains 10 clonal rootstocks replicated 20 times. Table 1 reports the leaf analysis results from the September 1992 analysis. The trees are within the recommended levels for most elements. The trees were higher than recommended for nitrogen and lower in zinc and boron. A foliar application of zinc was applied in Spring 1992 because of lower zinc levels detected in September 1991. We have asked the field station to apply another zinc application this year. There are no foliar symptoms of zinc apparent in the planting. There were significant differences between the rootstocks in all elements. In general, the Thomas, Duke 7, Toro Canyon, G1033 and G755A were the rootstocks which generally had the highest levels of elements in the leaves. The G755C, Thomas and G1033 tended to have the lowest levels. Note that the Thomas and G1033 rootstocks fall in both categories.

Table 2 presents the tree size information for the "Hass[1] planting. There is no significant difference in trunk circumference between the clonal rootstocks that were planted in 1986, although significant differences were detected in the height and canopy volume measurements. The "Borchard[1] rootstock, as reported previously, continues to produce one of the largest trees. It is interesting to also note that there are substantial and significant differences among the three G-755 rootstocks. Note that the G755A has produced one of the largest trees in the trial, whereas the G-755C is one of the smallest.

The yield data collected over the last 5 years is reported in Table 3. Note that the amount of fruit harvested in 1992 was quite low, although significant differences were still detectable. In year 5 there were no significant differences in yield among the 6 highest yielding rootstocks planted in 1986, whereas in year 6 there were significant differences between the same rootstocks. Clonal rootstock may influence the magnitude of alternate bearing in "Hass[1]. The biennial bearing pattern of this trial will be continued to be monitored to ascertain if there is a rootstock effect on alternate bearing. Although we observed a dramatic reduction in yield between year 5 and year 6, we did not see a dramatic increase in average fruit size (Table 4), except in the case of "Hass[1] on Topa Topa (which only produced 0.5 kg/tree).

During Fall 1992 we were interested in monitoring the accumulation of dry weight between clonal rootstocks. Five rootstocks were selected: Thomas, Topa Topa, Duke 7, D9 and Toro Canyon. Five trees per rootstock were monitored for changes in dry weight accumulation. At each sampling date (10/14, 10/28, 11/17, 12/3, and 12/15) 5 fruits per tree were harvested based on fruit diameter at the blossom end. Upon return to UC

Riverside individual fruit weights were recorded. A composite sample from each tree was taken for dry weight content. No significant differences were detected due to rootstock regardless of sample date. Figure 1 reports the changes in dry weight over the 5 sampling dates. Average fruit size at the time of sampling was 6.1, 6.7, 7.3, 7.2 and 7.1 ounces for the 10/14, 10/28, 11/17, 12/3 and 12/15 sampling dates, respectively.

Future Plans:

We plan to continue to closely monitor the 1986 planting as reported above. In the Spring of 1993 we will establish a second "Hass" planting, using new clonal rootstock selections that look promising from Dr. Menge's selection program

Table 1. Nutrient content of 'Hass' avocado as influenced by clonal rootstock. Leaf samples collected in September 1992.

Rootstock	Nitrogen (%)	Phosphorus (%)	Potassium (%)	Zinc[z] (ppm)	Calcium (%)	Magnesium (%)	Manganese (ppm)	Boron (ppm)	Copper (ppm)	Iron (ppm)	Sulphur (%)	Sodium (ppm)	Chloride (%)
G755A	2.48	0.19	1.03	24.7	2.17	0.80	145	25.3	7.78	45.6	0.51	47	0.25
G755B	2.47	0.20	1.08	24.9	2.14	0.76	128	24.7	7.59	48.2	0.50	49	0.25
G755C	2.15	0.13	1.13	18.4	2.14	0.83	147	28.2	4.87	56.2	0.31	48	0.29
G1033	2.57	0.20	1.35	27.1	2.03	0.58	177	24.1	7.19	50.4	0.37	59	0.17
Thomas	2.59	0.20	1.19	26.2	1.78	0.52	231	28.0	8.54	53.0	0.44	45	0.26
Duke 7	2.45	0.18	1.09	24.0	2.21	0.69	243	27.9	8.56	50.5	0.44	49	0.25
Borchard	2.40	0.17	1.11	21.1	2.14	0.65	212	27.0	7.61	56.8	0.35	48	0.22
D9	2.43	0.19	1.13	23.5	2.13	0.62	183	30.2	7.61	51.2	0.39	51	0.27
Toro Canyon	2.42	0.15	0.99	22.5	2.25	0.85	162	26.4	6.38	55.8	0.35	48	0.25
Topa Topa	2.40	0.17	1.02	21.2	2.11	0.74	202	28.7	7.44	53.4	0.41	50	0.27
LSD value	0.13	0.03	0.12	3.12	0.23	0.07	44	3.19	1.28	6.92	0.03	0.01	0.05
Probability	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Recommended level	1.6-2.0	0.10-0.25	0.75-2.0	30-150	1.0-3.0	0.25-0.80	30-500	50-100	5-15	50-200	0.20-0.60	<0.25	<0.25

[z] A foliar application of zinc was applied in June 1992.

[y] Recommended levels from updated adaptation (May 1978) of Leaflet 2024, UC Division of Agricultural & Natural Sciences, Oakland, CA.

Table 2. Tree size information and yield efficiency for 'Hass' avocado on selected clonal rootstocks. Data collected in November 1992.

	Trunk circumference (cm)[z]	Tree height (m)	Canopy volume (m^3)
Rootstock			
Planted 1986 (6.5 years)			
G755A	57.0	4.5	54.8
G755B	56.8	4.3	51.2
G755C	55.5	4.0	43.1
Duke 7	55.1	4.2	53.4
Borchard	58.7	4.7	63.4
D9	53.1	4.0	47.2
Toro Canyon	53.0	4.2	44.1
Topa Topa	54.5	4.3	52.7
Significance[y]	*NS*	*0.01*	*0.01*
Planted 1987 (5.5 years)			
Thomas	42.9	3.8	38.0
G1033	48.7	4.2	37.8
Significance	*NS*	*0.01*	*NS*

[z] Trunk circumference measured 10 cm above the bud union.
[y] NS = not significant.

Table 3. Yield (kg/tree) for 'Hass' avocado on selected clonal rootstocks. Trees are harvested in April of each year.

	Years from Planting					
	2	3	4	5	6	Cumulative
Rootstock						
Planted 1986						
G755A	0.3	1.5	2.8	30.6	17.5	52.7
G755B	0	1.7	1.1	16.7	23.1	42.6
G755C	0	0.8	0.9	24.6	5.6	31.9
Duke 7	0.6	6.7	29.7	66.5	11.8	115.3
Borchard	0.4	3.8	20.8	68.4	23.2	116.3
D9	1.1	1.3	9.3	57.9	10.0	79.6
Toro Canyon	3.8	2.9	17.0	61.1	4.0	88.8
Topa Topa	0.2	7.5	17.7	64.0	0.5	89.9
Significance	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
Planted 1987						
Thomas	0.8	3.0	35.2	16.1	----	55.1
G1033	0.2	4.1	19.3	17.1	----	40.7
Significance	*NS*	*NS*	*0.01*	*NS*		*0.05*

[z] NS = not significant.

Table 4. Average fruit size (g) for 'Hass' avocado on selected clonal rootstocks. Trees harvested in April of each year.

	Years from Planting				
	2	3	4	5	6
Rootstock					
Planted 1986					
G755A	254	253	218	171	152
G755B	-	232	214	144	153
G755C	-	249	240	159	159
Duke 7	276	275	263	151	185
Borchard	250	271	288	156	173
D9	267	288	281	171	198
Toro Canyon	293	276	265	121	186
Topa Topa	263	262	263	138	301
Significance[z]	*NS*	*NS*	*NS*	*0.01*	*0.01*
Planted 1987					
Thomas	250	252	166	168	-
G1033	250	290	170	157	-
Significance	*NS*	*NS*	*NS*	*NS*	

[z] NS = not significant.

Figure 1. Changes in 'Hass' dry weight with time as influenced by clonal rootstock.