

AVOCADO CLONAL ROOTSTOCK PRODUCTION TRIAL

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We have continued to monitor the 'Hass' clonal rootstock planting at the UC South Coast Research and Extension Center in Irvine, California. The original planting was established in 1986 and contains 6 clonal rootstocks replicated 20 times. Two additional rootstocks, G1033 and Thomas, were planted within the original planting design in 1987. The yield data collected over the last 6 years is reported in Table 1. The trends observed during the previous 5 years, still were evident in the sixth year. Cumulative yield data through 1993 indicates that 'Hass'¹ on either Duke 7 or Borchard consistently produce the greatest amount of fruit per tree. The amount of fruit harvested in April 1993 from the entire trial was equivalent to approximately 25,000 pounds per acre. As observed in previous years, the three G755 rootstocks did not yield as well as the remaining 6 rootstocks which were planted in 1986. In fact, with the exception of the G755A, the average yield from these trees was less than that of 'Hass' on the Thomas rootstock which were planted in 1987.

It is virtually impossible to directly compare the performance of the Thomas and G1033 rootstock to the remainder of the trial. Except in year 4, we have not observed any significant differences in yield between the two rootstocks. The cumulative yield for these two rootstocks is different, however, at the 5% level. This can be explained by the lower yields observed with the G1033 rootstock in years 4 and 6.

We did not observe any dramatic change in average fruit size, although we observed a dramatic increase in yield between years 6 and 7 (Table 2). There is no apparent difference in average fruit size when comparing the average fruit size for year 6 (an off year) to year 7 (an on year). We have not observed any significant differences in fruit size between the Thomas and G1033 rootstocks.

Table 3 presents the tree size information for the 'Hass' planting. Note that the Borchard tree has produced the largest tree (Canopy volume at 4.5 year and 6.5 years) consistently through the trial. Note that in both years 5 and 7 (both "on" years) that there were no significant differences detected in yield efficiency for the 6 highest producing rootstocks. Also note that the yield efficiency for both these years is virtually the same, suggesting that an efficiency of approximately 2.2 kg per cubic meter of tree is the maximum production potential for 'Hass'¹ avocado. No significant differences have been detected related to either canopy volume or yield efficiency between the Thomas and G1033 rootstocks.

In May 1993 we planted the second phase of the rootstock trial in consultation with Dr. Menge. The following 9 rootstocks with 'Hass'¹ as the scion are being compared: Duke 7, Thomas, D9, CR-180, UCR 2011, Dusa, Hibbard, and Queretero. The first three rootstocks are included as controls for the trial. In addition, we have also included 20

trees of the 'BL-122' selection on Duke 7. These are included within the experimental design so that as the trial progresses, we can statistically compare 'Hass' to 'BL-122' on the Duke 7 rootstock.

Table 1. Yield (kg/tree) for 'Hass' avocado on selected clonal rootstocks. Trees are harvested in April of each year.

Rootstock	Years from Planting							Total
	2	3	4	5	6	7		
<i>Planted 1986</i>								
G755A	0.3 b	1.5 c	2.8 d	30.6 b	17.5 ab	83.8 bc	136.7 c	
G755B	0.0 b	1.7 c	1.1 d	16.7 b	23.1 a	68.9 cd	111.7 cd	
G755C	0.0 b	0.8 c	0.9 d	24.6 b	5.6 bc	49.6 d	81.6 d	
Duke 7	0.6 b	6.7 ab	29.7 a	66.5 a	11.8 abc	129.4 a	244.7 a	
Borchard	0.4 b	3.8 bc	20.8 b	68.4 a	23.2 a	127.7 a	244.0 a	
D9	1.1 b	1.3 c	9.3 cd	57.9 a	10.0 abc	110.3 ab	190.4 b	
Toro Canyon	3.8 a	2.9 c	17.0 bc	61.1 a	4.0 bc	115.1 a	204.0 ab	
Topa Topa	0.2 b	7.5 a	17.7 bc	64.0 a	0.5 c	112.4 a	202.1 b	
<i>Significance^z</i>	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>	<i>0.01</i>	
<i>Planted 1987</i>								
Thomas	0.8	3.0	35.2	16.1	71.7	-	125.9	
G1033	0.2	4.1	19.3	17.1	58.4	-	98.7	
<i>Significance</i>	<i>NS</i>	<i>NS</i>	<i>0.01</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>0.05</i>	

^z NS = not significant. Mean separation using LSD.

Table 2. Average fruit size (g) for 'Hass' avocado on selected clonal rootstocks. Trees harvested in April of each year.

Rootstock	Years from Planting						
	2	3	4	5	6	7	
<i>Planted 1986</i>							
G755A	254	253	218	171 a	164 c	223 ab	
G755B	-	232	214	144 abc	160 c	220 ab	
G755C	-	249	240	159 ab	153 c	205 c	
Duke 7	276	275	263	151 ab	217 ab	219 ab	
Borchard	250	271	288	156 ab	209 ab	225 a	
D9	267	288	281	171 a	220 ab	220 ab	
Toro Canyon	293	276	265	121 c	194 b	211 bc	
Topa Topa	263	262	263	138 bc	230 a	212 abc	
<i>Significance^z</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>0.01</i>	<i>0.01</i>	<i>0.05</i>	
<i>Planted 1987</i>							
Thomas	250	252	166	168	213	-	
G1033	250	290	170	157	223	-	
<i>Significance</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	

^z NS = not significant. Mean separation using LSD.

Table 3. Canopy volume and yield efficiency of 'Hass' trees on selected clonal rootstocks. Trees are harvested in April of each year.

Rootstock	4.5 years		5 years		6 years		7 years	
	Canopy volume (m ³)	Yield efficiency (kg/m ³)	Yield efficiency (kg/m ³)	Yield efficiency (kg/m ³)	Canopy volume (m ³)	Yield efficiency (kg/m ³)	Yield efficiency (kg/m ³)	Yield efficiency (kg/m ³)
<i>Planted 1986</i>	4.5 years				6.5 years			
G755A	25.9	0.11 d	1.57 ab		56.2 ab	0.32 ab	1.56 b	
G755B	28.0	0.05 d	0.64 b		51.4 bc	0.41 a	1.37 b	
G755C	32.3	0.03 d	0.79 b		44.7 bc	0.11 bcd	1.08 b	
Duke 7	28.6	1.10 a	2.55 a		53.2 abc	0.22 abcd	2.49 a	
Borchard	30.9	0.67 bc	2.47 a		63.2 a	0.28 abc	2.24 a	
D9	26.2	0.35 cd	2.38 a		49.1 bc	0.19 abcd	2.38 a	
Toro Canyon	29.4	0.60 bc	2.19 a		43.9 c	0.10 cd	2.66 a	
Topa Topa	29.1	0.72 b	2.88 a		52.5 abc	0.01 d	2.34 a	
<i>Significance^z</i>	NS	0.01	0.01		0.01	0.01	0.01	
<i>Planted 1987</i>	3.5 years				5.5 years			
Thomas	28.5	1.26 a	-		39.67	2.00	-	
G1033	24.1	0.75 b	-		35.92	1.68	-	
<i>Significance</i>	NS	NS			NS	NS		

^z NS = not significant. Mean separation using LSD.