

IRRIGATION AND FERTILIZATION MANAGEMENT OF AVOCADO

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The major focus of this project's activities during the last year has been at the Covey Lane irrigation site in San Diego County. This irrigation project was initiated in the summer of 1992. It is both an irrigation rate and frequency trial on mature 'Hass' avocado trees. The differential irrigation treatments were imposed in November 1992 and will be maintained as much as possible throughout the year. Table 1 lists the 9 irrigation treatments included in the study. The irrigation rate will be determined by using the Kc values determined from the Corona Foothill Properties irrigation trial (Table 2) and utilizing both Escondido and Temecula CIMIS data and our own E-pan and atmometer equipment on site. A more complete description of the project was provided in last year's report. The transducer equipped tensiometers which we purchased last year have been installed and we have been collecting preliminary data from the site.

We are taking soil samples twice a year (Fall and Spring) to determine soil pH and electrical conductivity (an indication of salinity), sodium, chloride and potassium. This helps us to monitor the effect of the irrigation treatments on any salinity buildup in the soil profile. The soil sample is broken into 4 subsamples: 0 to 6 inches, 6 to 12 inches, 12 to 24 inches and 24 to 48 inches. Water samples are taken quarterly to monitor water quality. Leaf samples were taken in Fall both 1992, 1993 and 1994.

In Fall 1992 we established a 3 year girdling project on an adjacent block of trees. Single branches per tree are being girdled either in November, February or Full Bloom. We have replicated each treatment 15 times in a randomized complete block design. We will summarize the results of this secondary project following the 1995 harvest.

Figure 1 illustrates the seasonal changes that we have observed in the soil EC readings for the 110% ET_c treatment based on irrigation frequency. The corresponding graphs for the 90% and 130% ET_c treatments show similar trends. The seasonal fluctuation in soil EC is greatest at the shallow soil depths as is the the overall readings. It is generally believed that the majority of avocado roots are found in the top 6 inches of soil. We have not yet done root sampling at this site but plan to do so in October 95. Table 3 lists the average leaf levels of sodium and chloride of the various treatments in 1993 and 1994. There were no significant differences between treatments in 1992 prior to initiation of the treatments. Note that the trees receiving the daily irrigation frequency (7x) have significantly higher sodium levels both in 1993 and 1994. This irrigation treatment also had significantly higher chloride leaf levels in 1994. We also detected significantly higher chloride levels in 1994 in the 90% ET_c treatment.

Table 1. Irrigation treatments at the Covey Lane site.

Irrigation Rate (% ETc)	Irrigation Frequency (times per week)
90	1
90	2
90	7
110	1
110	2
110	7
130	1
130	2
130	7

Table 2. Crop Coefficients being used at the Covey Lane Irrigation Project. These are based on the data generated from the Corona Irrigation Project (1987-1992). These crop coefficients were increased by 20% based on the data accumulated from the Corona Irrigation Project.

Month	Kc
January	0.40
February	0.50
March	0.55
April	0.55
May	0.60
June	0.65
July	0.65
August	0.60
September	0.55
October	0.55
November	0.55
December	0.50

Table 3. Sodium and chloride levels as influenced by irrigation amount and frequency for 1993 and 1994 sampling periods. Leaves were collected in September of each year.

		Sodium (ppm)		Chloride (ppm)	
		1993	1994	1993	1994
Irrigation Amount					
ETc	90%	75	90	0.072	0.999
	110%	73	82	0.073	0.908
	130%	66	80	0.070	0.862
Irrigation Frequency					
times/week	1x	64	73	0.072	0.874
	2x	67	95	0.070	0.907
	7x	84	84	0.073	0.988
Significance^z					
Replication		***	***	n.s.	n.s.
ETc		n.s.	n.s.	n.s.	**
Frequency		***	*	n.s.	*
ETc x Freq.		n.s.	n.s.	n.s.	n.s.

^z Probability of significant differences at the 5% level (*); 1% level (**) or 0.1% level (***).

Figure 1. Covey Lane Irrigation Project.
Soil EC at varying depths for 110% ETc treatment.



