

For Orange Trees

A *New* Irrigation Plan

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EFFECT of three irrigation programs on fruit production of Valencia orange trees.

Yields, sizes, and quality of oranges have been significantly changed by the timing of irrigations. It appears that a program of drying the soil during October should be seriously considered for commercial groves. This is particularly important with the Washington Navel orange which tends to produce light crops of large fruit in the Salt River Valley.

Let Soil Dry in the Fall

The length of the fall drying period required to attain these objectives for an individual grove will vary with the soil type and depth, the tree spacing, and the size of the trees. By drying the soil in the fall, growth has been retarded so that carbohydrates accumulated.

In an experiment in progress at the Citrus Experiment Station near Tempe, three irrigation programs each receive approximately four acre feet of water per year. The timing and rate of application of water for each treatment during the past six years is as follows:

"B" Plots: Uniform soil moisture all year by applying ten irrigations of five acre inches each: These B plots were irrigated when moisture in the surface foot of soil was within the wilting range and ample available water was present in the subsoil. This provided almost uniform fruit growth.

"E" Plots: Soil kept wet in spring and dry during fall: These E plots were frequently irrigated between March 14 and July 16 so that available water was always present throughout the root area. After July 16 irrigations were applied on

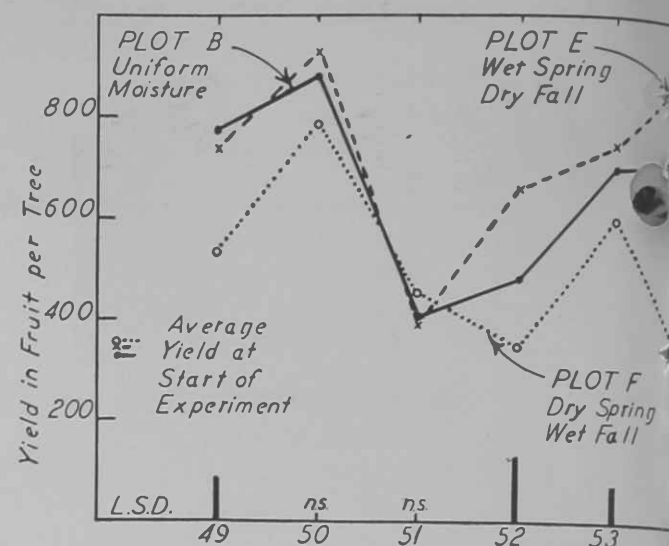
September 2 and November 1. Prior to these irrigations the upper 30 inches of soil dried progressively to the wilting range. Fruit growth was uniform in June and July, moderately retarded in late August and almost stopped after mid-October.

"F" Plots: Soil kept dry in spring and wet during fall: In these F plots irrigations were applied on March 16, May 29, and July 16. Between irrigations the soil moisture was largely depleted from the upper 30 inches of soil. Growth of young fruit was restricted for about 3 weeks before the July irrigation. After July 16 frequent irrigations kept the soil above the wilting range so that fruit growth was rapid and uniform. Near the end of the dry periods in both the E & F plots only very slight or no wilting of leaves occurred in the afternoon.

Yields Were Influenced

These treatments have significantly influenced yields in four of the six years that the experiment has been in progress. (See chart above). As the experiment has progressed, the E and F schedules developed opposite types of fruiting behavior. These changes in fruiting behavior apparently were induced by physiological conditions within the tree caused by the irrigation program.

By drying the soil in the fall, growth has been retarded and carbohydrates have accumulated. This situation apparently is responsible for the larger set of fruit in the spring. Conversely, frequent irrigations in the fall reduced carbohydrates which tended to cause a poor set of fruit.



The effects of these programs appear to be accumulative so that high and low producing characteristics have evolved.

Treatment E has produced significantly larger amounts of fruit than the uniformly irrigated B plot in 2 of the past 3 years. This suggests that a program of drying the soil in the fall is superior to a uniform irrigation program.

The table below shows that plot E has produced small, smooth fruit and plot F has developed large, coarse fruit. In January the E plot had produced fruit with the highest amount of dissolved solids, whereas the F plot fruit contained the lowest amount. Differences in acid tended to parallel the differences in dissolved solids.

Trunk growth has not differed significantly between the three treatments, but plot F has tended to produce more vigorous summer and fall shoot growth.

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EFFECT OF IRRIGATION ON FRUIT CHARACTERISTICS

		B	E	F	LSD (b)
U. S. #1 Grade	(Per cent)	71	73	56	11
Size 110 & larger (a)	(Per cent)	57	39	63	10
Soluble solids in Jan.	(Per cent)	10.7	11.7	10.4	.4
Soluble solids in May	(Per cent)	12.2	13.2	12.6	.6

(a) Commercial size per carton.

(b) Difference between any two values which is required to be significant.