

AVOCADO IRRIGATION

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The following are summaries of several irrigation experiments conducted in Israel during the last 30 years in order to determine the avocado water requirements.

Exp. I. Water amounts and irrigation intervals for avocado in Israel.

The effect of different irrigation intervals on the avocado tree was tested during the years 1968-1974 in the northern coastal plain of Israel. The objectives of this experiment were: (a) to make measurements of soil and plant parameters to help understand mechanisms of response to irrigation; and (b) to establish the most suitable irrigation schedule for highest yields of export quality fruit.

The trial consisted of four irrigation treatments, at intervals of 7, 14, 21 and 28 days; the respective average annual water applications were 8890, 7450, 6680, and 5940 m³/ha. The cultivars Ettinger, Fuerte and Hass were tested in five replications in randomized blocks. Soil moisture consumption was estimated by using a neutron probe and tensiometers.

Most of the water consumption was from the upper 60-cm soil layer. With the 7-day interval, the calculated daily loss from the soil profile was greater throughout the whole irrigation season than with the other intervals.

The least salt accumulation occurred under the long interval treatments since the large amounts of water supplied at each irrigation leached the salts continuously.

Reduced intervals between irrigations resulted in increased trunk growth and increased tree size. It is concluded that with a 21-day interval the vegetative growth of producing

trees was restricted and therefore relatively smaller trees with easier fruit picking and delayed orchard thinning were obtained.

After 6 years no significant reduction in yield was observed with Ettinger or Fuerte trees irrigated once in 21 or 28 days. With the Hass cultivar the 28-day interval gave lower yields than with the three other intervals tested.

Shortening of irrigation intervals increased the growth rate and size of individual fruits, which may be of economic importance for cv. Hass, where overproduction leads to small fruits unsuitable for export. Shortening of irrigation intervals tended to increase the oil percentage of the fruit, which may advance the harvest date.

Exp. II. Determination of the Irrigation Regimen for an Avocado Plantation in Spring and Autumn.

An irrigation experiment was conducted with three cultivars (Hass, Ettinger and Fuerte) in the avocado plantation of the Akko Experiment Station, Israel, during 1974-80 to determine the effect of irrigation regimen in spring and autumn on tree growth and productivity.

Two treatments (wet and dry) were tested in the spring and in the autumn. In spring the trees receiving the wet treatment were irrigated when the tension at a soil depth of 30 cm reached 25 cbar, while those in the dry treatment were irrigated at 40 cbar tension. The same wet treatment was also applied in the autumn, while in the dry treatment the trees were not irrigated until the fruit reached elasticity at noon.

The water regimen in the spring affected tree growth slightly, but in cv. Hass and Ettinger the absolute and relative growth was higher in the spring dry treatment than in the wet. Trees grew faster under the autumn wet regimen than with the autumn dry regimen.

The effect of irrigation regimen on yield, fruit size and export quality was light. Only with cv. Ettinger were higher yields recorded from trees irrigated with the dry-wet

regimen. The autumn water stress sometimes decreased fruit size, but size was affected much more by the tree yield than by the irrigation regimen.

It seems that regimens in spring and autumn do not increase the productivity of avocado trees. However, equivalent yields of the same quality can be obtained with reduced water amounts, by using the water more efficiently.

Exp. III. The Effect of Water Reduction and Increased Salinity on Avocados.

An experimental plot was planted to study the effect of drip irrigation on the development and bearing capacity of avocado trees. The following four water rations were applied: the commonly applied amount of water (100%), determined according to tensiometer readings and neutron probe (this ration was applied to the upper soil layer (0-60 cm) when the tension did not exceed 20 centibars); and three rations which amounted to 60%, 80% and 120% of the above. The amounts of water actually applied ranged from 2830 to 5720 m³/ha, which are markedly less than those applied in commercial orchards.

The irrigation regimes had a marked effect on tree growth. The more water was applied, the larger the trunk circumference grew, Trees of "Fuerte" were affected more than those of "Hass".

Irrigation treatments had a significant effect on yield. In both cultivars a 17% reduction in the amount of water applied resulted in a 20% reduction in the number of fruit per tree and in individual fruit size. A 50% reduction in the amount of water applied reduced yield by 33%.

A second experiment under the same conditions (using microjets instead of drippers for irrigation) showed that an increase in salinity from 90 to 380 mg Cl/l reduced "Ettinger" and "Hass" yield by 25%. A significant reduction in the damage can be achieved by proper selection of rootstocks, leaching and nitrogenous fertilization.