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AN AVOCADO IRRIGATION PROGRAM

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As information accumulates from results of research by the Agricultural Experiment Station and of field experience and trials by the Agricultural Extension Service, the irrigation requirements of avocados have become better known. There are three points which stand out relative to the irrigation needs of avocados.

IRRIGATION NEEDS OF AVOCADOS

1. Avocados require an adequate soil moisture condition at all times. The meaning of "adequate" for avocados is, to remain well within the wet half of the "available moisture range" in the major portions of the root zone. In more recent terminology, based on soil suction values in which low suctions mean a wet soil and high suctions a dry soil, "adequate soil moisture" means, maintenance of soil suctions less than 50 to 60 centibars. (A centibar is the usual unit of tensiometer calibration). The need for adequate moisture conditions, as described, appears to be slightly greater during fruit set and the early fall heat wave.

2. A condition of "wet feet" is detrimental to avocados. Where infectious spores exist, the hazard of root rot is greater the longer soil in the root zone remains at or near saturation. This means that irrigation should be managed so that very low soil suctions (0-5) exist only a few hours during the irrigation season, and the fewer the better.

3. Avocados are sensitive to moderate soil salinity levels in the root zone, particularly chlorides. The problem varies with the water quality used for irrigation, but with any water the irrigations have to be managed to maintain low soil salinity levels to minimize absorption by the avocado roots. Failure to do so results in leaf burn, especially in the fall of the year.

TRENDS IN IRRIGATION

In the past years it was common for avocado irrigation to be used on routine schedules at approximately 2-to 4-week intervals. During much of the growing season, these schedules would be followed whether needed or not. This pattern of irrigation may have been borrowed from citrus culture, where it was quite common.

For many orchards these irrigation intervals were too long during the summer, and trees were showing various symptoms of stress. Avocados are mostly shallow-rooted and do not have as large a soil moisture reservoir on which they can draw as most trees. A

reduction of the time-interval between irrigations was instituted in many orchards, with intervals as short as 7 to 10 days in some. This change generally resulted in better tree appearance and improved production.

Results from an Agricultural Experiment Station avocado-irrigation project (1) showed that avocado trees responded in a striking manner to different irrigation levels maintained in a consistent pattern by the use of tensiometers. The most favorable response was obtained by the trees which were irrigated when soil suction (measured by tensiometers at 1-foot depths) reached 50 centibars. Response of trees on plots irrigated when the soil suction reached 100 and 1000 centibars, respectively, was progressively less. None of these values is as dry as the wilting point, which is presumed to be 1500 centibars.

The results of this research have established a trend toward the use of tensiometers as a guide to irrigation timing for avocados. The method and experiences of using tensiometers in the field have been described previously (2). The authors have observed increasing use of tensiometers by avocado growers with each succeeding year.

PRESENT SUGGESTIONS FOR GOOD IRRIGATION

The three points comprising the irrigation needs of avocados can be met by the following program. Install tensiometers at 12-and 24-inch depths at strategic locations in the grove. When the 12-inch tensiometers attain readings of 40 to 50 centibars, apply an irrigation. This will maintain an adequate soil moisture condition and will amount to an interval of about 7 to 10 days during hot weather but will vary widely at other seasons. One of the main assets of using tensiometers is to avoid unneeded and possibly detrimental irrigations during the cooler portions of the year.

When applying the irrigation, it should be of sufficient duration to wet the soil to a depth of 15 to 20 inches, but not deeper. The deeper soil, as indicated by the 24-inch tensiometer, will not have become as dry as the upper portion and need not be rewet so soon. The duration of the next irrigation should be about the same if the 24-inch tensiometer still reads less than 25.

When the 24-inch tensiometer reads about 45, which is usually about every third irrigation, the duration of application should be about twice as long as the previous applications. The longer irrigation is intended to rewet the entire root zone. The response of tensiometers at the 24-inchdepth will reveal if the objective has been accomplished. Future irrigations can then be adjusted to a longer or shorter duration, so that the 24-inch tensiometers will return to readings of 10 or slightly less.

An irrigation program following this pattern will maintain adequate soil moisture conditions at all times for good tree performance. It will also help maintain a healthy root environment and minimize the very wet conditions which might lead to root diseases.

Salinity control, the third essential point, is aided by the same type of program. The short-duration irrigations pour less salt into the soil than if all irrigations were of somewhat longer duration. Then the double-length irrigation washes the salt below the root zone.

If the irrigation water is known to be moderately high in salt content, especially chlorides, it is advisable to lengthen every second long-duration irrigation by another 25 to 30 per cent. This would be about every sixth irrigation. Occasional soil samples analyzed for salt content will help decide the need for such an extended irrigation. An example of such an irrigation program would be, successive irrigations having durations of 4, 4, 8, 4, 4, and 11 hours.

A recent field trial, conducted by the authors, showed that an alternate irrigation program following this general principle resulted in the soil containing only half as much salt in the fall of the year as an adjacent plot irrigated on a steady basis with enough water to just refill the root zone at each irrigation. The latter plot had more total hours of irrigation during the season, adding more salt, but lacked the occasional longer irrigation to wash the salts below the root zone.

By following the irrigation program described, it is possible to meet all three irrigation requirements in a compatible manner: (1) Maintain an adequate soil moisture condition at all times; (2) minimize the periods of very low soil suctions (nearly saturated soil) in the root zone; (3) keep soil salinity at the low levels required by avocados.

LITERATURE CITED

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