PARSONS ON CITRUS
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Timely Irrigation Issues

March, April, and May are the most critical months for citrus irrigation. Growth is the most sensitive process to water stress. Therefore, water deficits during these months can reduce growth, increase young fruit drop, and ultimately decrease yield. In one study, lack of irrigation for several weeks in April caused a 300 box/acre decrease in yield.

In another study on well-drained Ridge sands, we purposely over-irrigated, applying 100 inches per year of reclaimed water to orange trees for 10 years. This rate is much higher than would ever be recommended, but it was done to see if such high levels of reclaimed water would damage the trees. Much to our surprise, trees were not damaged by this excessive amount of water, but actually grew faster and larger than trees that received less water. Because of their larger canopies, these trees also produced more fruit than trees receiving less water. Due to irrigation management and experimental design, trees receiving less irrigation did not always get sufficient water to meet evapotranspiration (ET) requirements. While pounds solids per box decreased due to the high irrigation, total pounds solids production per acre was higher because of the overall greater fruit yield.

These trees with high irrigation most likely performed well because they experienced virtually no water stress during their 10 years of growth. While no one is recommending irrigation rates this high, it shows that minimal stress (particularly in the spring) can lead to better growth and yield. If we allow water stress to occur in the spring, we can expect lower yields, primarily because of greater young fruit drop.

Weather Watching

What's new in irrigation research? Doctors Adair Wheaton, Kelly Morgan, and myself recently developed a water-use simulation for citrus. This model used actual Florida rainfall and ET data for several dry and wet years. It was used to simulate the effects of climate, rooting depth, soil-available water, allowable depletion of available water, and partial coverage irrigation on annual irrigation requirements. One surprising finding was that, even though there was a nearly three-fold variation in rainfall (26.3 to 71.9 inches) over the years studied, there was relatively little effect on the amount of irrigation required. The relatively small response of irrigation to rainfall may be due to high rainfall from June through September, with less rain during the rest of the year. The insensitivity of irrigation requirements to rainfall suggests that annual rainfall may not be a good basis for determining irrigation needs for Florida citrus.

Less Watering, More Savings

The number of irrigations needed per year was affected by factors that influence soil water-storage ability. The simulated number of irrigations (NI) required per year ranged from six to 93, and varied with year, allowable depletion of available water, and rooting depth. The NI was very sensitive to the allowable depletion. Common recommended depletions for microsprinkler irrigated groves are 25% in the spring and 50% in the fall and winter. If soil is allowed to become more depleted (i.e., get drier between irrigations), the number of annual irrigations decreases rapidly.

Spring irrigation is critical to tree health, fruit yield, and fruit quality.

For example, if one kept the soil well irrigated throughout the year (e.g., 25%:25% spring: fall depletion), removing very little water would trigger an additional irrigation. But if one changed from this very well irrigated to a drier 50%:75% (spring: fall) depletion with a 2-foot rooting depth, the average number of irrigations would decrease fourfold from 81 to 20. This simulation provides useful information on the relative importance of several factors determining the water status of citrus and annual water requirements.

Additional irrigation guidelines can be found at the FAWN Web site (**http://fawn.ifas.ufl.edu/**). To optimize fruit set and yield, growers need to maintain good irrigation, especially in the critical spring months. FLG