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**Evaluating nutrient and irrigation management practices in an avocado orchard**

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Abstract:

Avocado (*Persea americana* Mill.) production requires adequate water and nutrients for optimum yields. As the demands on water resources increase, greater knowledge is needed to develop production systems with reduced negative impacts on water resources, considering both volumes of water used and transport of agrochemicals into water supplies. The purpose of this study was to identify best management practices for irrigation and fertilization that would reduce nutrient leaching without substantially reducing the yields of Simmonds and Beta avocado varieties. The study was conducted at the Tropical Research and Education Center, Homestead, Florida, USA on a very gravelly loam calcareous soil (Krome very gravelly loam). The treatments were: 1) crop evapotranspiration (ET) irrigation with fertilizer standard rate (FSR); 2) ET irrigation with 50% FSR; 3) ET irrigation with 200% FSR; 4) soil water moisture at 15 cbar with FSR; 5) irrigation standard rate with FSR; 6) soil water moisture at 15 cbar with 50% FSR; 7) soil water moisture at 15 cbar with 200% FSR. Results indicated that significantly different water volumes ( $\hat{I} \pm 0.05$ ) were used between the treatments. Leached water volumes and nutrient concentrations (measured with bucket lysimeters) suggested that significant differences in nutrients leached existed among the treatments. The amount of N leached was more closely correlated with the amount of fertilizer applied whereas the amount of P leached was more closely correlated to the amount of water applied. Results from the first year of harvest suggest growers can reduce their water use by at least 90 percent and reduce P leaching by at least 68%, by implementing soil moisture based irrigation. The reduction in N leaching was not significantly different ( $\hat{I} \pm 0.05$ ) among treatments. Hence, economic and environmental advantages were observed with the soil moisture based irrigation system in an avocado orchard.

Impact Statement:

This project will result in more sustainable agriculture by providing growers with viable management practices for using less water, protecting water quality, and requiring less energy inputs while maintaining yields.

Category: Agricultural BMPs

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