



USDA-CSREES 2006 National Water Quality Conference

Irrigation Scheduling Tool for Citrus Production using Estimated Daily Reference Evapotranspiration

With a crop value of \$738 million in 2004, citrus is one of the most important agricultural crops in Florida. Nearly 40% (81,000 ha) of Florida citrus is grown on Entisols along the central Florida ridge area. These soils typically consist of uncoated sand with low organic matter content, thus have very limited water and nutrient retention capacities. These deep sandy soils have water holding capacities of $0.04 - 0.09 \text{ cm}^3 \text{ cm}^{-3}$, hydraulic conductivity of $> 50 \text{ cm h}^{-1}$, and cation exchange capacities of $1-5 \text{ cmol kg}^{-1}$. Most central Florida soils lack confining soil layers that can prevent N leaching and are considered "vulnerable soils". Currently critical issues for citrus production in Florida include: 1) increasing competition between agricultural, commercial, and residential use of limited water supplies, and 2) nitrate contamination of some aquifers less than 50 m deep. An irrigation scheduling tool based on daily evapotranspiration (ET) supplied by the Florida Automated Weather Network was developed for mature citrus tree production in this region of Florida. Daily reference ET was calculated using the FAO Penman-Monteth equation and soil water contents were measured at 4 depths in various citrus groves to determine the accuracy of the water balance model which generates the irrigation schedules. Growers irrigated in accordance with the model generated schedules. Correlation coefficients for the regressions of estimated to actual soil water contents varied from site to site, but were generally greater than 0.8. Corresponding RMSE was less than $0.005 \text{ cm}^3 \text{ cm}^{-3}$ indicating good agreement between model estimates and sensor data. Utilization of this tool by citrus growers should reduce pressure on the available water supplies and can potentially reduce nitrate leaching caused by over irrigation.

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