Florida Citrus Advanced Technology Program

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

Instructions Complete the fields based on your project specs. When finished, save the form to your local disk using a unique name. Then, go to **http://research.fcprac.com**, and log in with your user name and password using Researcher Login in the lower left. Find this project title and click on **Submit a Report**. Update your profile information if needed, then upload this report as directed.

2009-2010 REPORT	CATEGORY (drop-down)	TODAY'S DATE (m/d/yr)
(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*	Management	6/20/10

WHAT IS THE "HEADLINE" FOR THIS REPORT (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Drip fertigation increases citrus nutrient efficiency by 10x and water efficiency by 4x in the first year

TITLE and CONTACT INFORMATION

Proposal Title Intensively managed citrus production systems for early high yields and vegetative flush control in the presence of greening and canker diseases

Principal Investigator Arnold W. Schumann	*PI Last Name* Schumann
Email schumaw@ufl.edu	*FDACS Contract Number* 72357
Phone (863) 956-1151	*Project Duration (years)* 3 *Year of Project* 1
Organization University of Florida - CREC	*Total Direct Funds (current year)* $225,180

REPORT UPDATE (650 words; provide details about your headline)

Irrigation and fertilizer practices in the Advanced Citrus Production System flatwoods site at SWFREC indicate potential for improved plant nutrition of three year old trees. Hamlin and Valencia trees were planted in 2006 at the flatwoods site at 151, 198 and 545 trees per acre on rootstocks Cleopatra mandarin (Hamlin) or Volkamer lemon (Valencia), Swingle citrumelo, and Flying Dragon; respectively. Irrigation/fertigation practices were daily drip fertigation (Drip OHS), daily irrigation and weekly fertigation with a strip shaped microsprinkler (Microsprinkler OHS) and a Grower Microsprinkler control with periodic irrigation based on soil depletion and monthly fertigation. Adequate tree nutrient status, root density in the irrigated zone and water conservation were three factors investigated in 2009. Leaf N , P and K content were similar for all treatments at the beginning of 2009 (January and March), however samples taken in June and September indicate that the Drip OHS and Microsprinkler OHS maintained leaf concentrations greater that those for the Grower Microsprinkler irrigation treatment. The exception to this is P, where no significant differences were found among treatment at any sample date. All treatments maintained average leaf nutrient concentrations in the optimum or high range. Root length density (RLD, root diameter <1mm) varied as a function of irrigation/fertilizer treatment ($p<0.05$), decreasing with depth ($p<0.0001$) and distance from the tree ($p<0.0001$). RLD was consistently higher for Drip OHS than the other two treatments. Prior to the start of the summer rainy season, Drip OHS significantly increased RLD by 13-90% for roots <3mm in diameter in both the irrigated and non-irrigated zones when compared with the conventional practice. After the rainy season, RLD in the Drip OHS plots were 19% and 112% higher than conventional practice in the non-irrigated and irrigated zones, respectively. These data indicate that RLD in the drip irrigation zone may not be greatly influenced by the rainy season as first speculated. Thus, irrigation methods such as drip which apply water and fertilizer frequently and in small pulses within a limited root zone offer a viable option for increasing root water and nutrient uptake efficiency compared with the microsprinkler based systems when the trees are small.

Total water used was greatest for the Grower Microsprinkler treatments plots and increased with planting density ranging between 10 and 18 inches. Water use was lowest for Drip OHS irrigation treatments at low (5 in yr-1) and moderate (6 in yr-1) densities compared with the Grower Microsprinkler treatments at the same densities (10 and 14 in yr-1, respectively). Thus, overall water use efficiency for the Drip OHS and Grower Microsprinkler treatments were 0.03 and 0.07 inches per tree, respectively. However, the highest water user was the high density planting with drip irrigation (19 in.). The reason water use increased about 3 to 4 fold for the drip treatment at high tree density is that each tree had the same number of drippers and thus water use was a function of tree density (i.e. 545 trees at high density, 151 and 198 at low and moderate densities). The relationship of increased water use with increased tree density existed for the microsprinkler treatments but not at the same ratio as tree density because the emitter output and pattern sizes were selected to give similar application rates on a gal. per area basis with little overlap.