ASSESSING CITRUS CROP COEFFICIENTS FOR OPTIMIZING WATER USE AND SUSTAINING ENVIRONMENTAL QUALITY

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Citrus production in Florida accounts for about 60% of national production. Recently, there has been a decline in fruit production and citrus acreage largely due to a disease called citrus greening, and partly due to increasing urbanization and hurricane damage. Citrus greening cripples tree performance by aggravating root loss, accelerating defoliation and limiting tree metabolism. Studies have shown that treed affected by citrus greening might use about 20 to 35% less water than healthy trees. We have been conducting field studies to determine the appropriate coefficients (K_c) for trees affected by citrus greening using the modified Penman-Monteith method (using the Florida Automated Weather Network, FAWN) and the stem heat balance method. Irrigation is non-limiting since the trees are irrigated twice a day. We also determined soil moisture distribution patterns in the root zone using the HS-10 capacitance sensors. Observations on leaf area index (LAI), canopy size and root density were also conducted and fluctuate throughout the year. LAI and canopy size increase in summer and decrease at other times of the year suggesting that K_c might follow that pattern. The root density is elevated in May and September and dampens in other times of the year, which might affect the potential for uptake. Soil moisture distribution measured at 0-15 cm, 15-30 cm, 30-45 cm and 45-60 cm showed that moisture content remained at or slightly above field capacity and did not reach saturated moisture content. Transpiration measured using stem heat balance method showed high values, as expected, in summer compared to other seasons of the year. These results show that adjustments in the K_c values are needed for the trees affected by citrus greening to reflect changes in crop cover and root length density and also citrus varieties, root stock and planting density.

PRESENTER BIO: Dr. Kadyampakeni is an assistant professor of Soil and Water Science at the University of Florida with more than 10 years' experience in implementing projects on water and nutrient management, environmental sustainability and environmental modeling. He has led several projects on soil water quality, water and nutrient management and conservation.