RETHINKING SEEPAGE IRRIGATION MANAGEMENT FOR HORTICULTURAL PRODUCTION IN FLORIDA

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Best management practices across Florida reduce water and nutrient leaving agricultural fields while maintaining crop yield and competitiveness of farming operations. Seepage is the mainstay for several horticultural commodities produced in Florida; approximately 320,000 ha of cultivated land are irrigated via seepage. Due to a spodic layer, the naturally occurring perched water table is artificially raised to just below the root zone to irrigate the crop. Seepage is relatively low-cost and low-maintenance compared to other available irrigation methods despite its much-reduced efficiency. Excessive application of water and nutrient run-off is an environmental concern. Alternative methods to improve seepage irrigation by enhancing water usage and nutrient efficiency of horticultural crops are increasingly available to producers through statewide cost-share. In northeast Florida, approximately 4,700 acres of agricultural land have been converted from seepage to drain tile irrigation; 1,650 acres converted to sprinkler irrigation and about 600 acres converted to subsurface drip for the water table control, with estimated water conservation of 525 million gallons per year. The potential water conservation of these alternative irrigation methods, when properly operated, can reach up to 50% compared to traditional seepage without compromising yield. Regardless of the irrigation method utilized, the precise manipulation of the water table level year-round is critical for increasing water conservation and nutrient retention in the root zone while promoting adequate soil moisture and aeration. Modeling the soil water retention curves using pedotransfer functions by correlating particle size distribution, bulk density, and organic matter content are used to establish the relationship between upward soil water flux and water table level. Precision irrigation scheduling can be achieved by adjusting the water table level during the different crop stages by matching upward soil water flux and crop evapotranspiration demand, in addition to reducing yield variability, and thus increasing crop resilience to adverse weather events.

PRESENTER BIO: Lincoln Zotarelli is an associate professor and extension specialist in the Horticultural Sciences Department. His research program focuses on developing best management practices for irrigation and nutrient management of vegetable crops.