IMPACTS OF PASTURE, HAY AND ROW CROP MANAGEMENT SYSTEMS ON GROUNDWATER QUALITY AND QUANTITY IN THE SANTA FE RIVER BASIN, FLORIDA

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The Upper Floridan Aquifer, which is underlies all of north Florida, is threatened by over-pumping and nutrient enrichment. In the Santa River Basin, north Florida, agriculture has been identified as a large groundwater user and a primary source of nutrients in groundwater and the springs and rivers it feeds. Grazed pasture, hay and row crops are the major agricultural land uses in the Santa Fe basin, occupying approximately 12%, 4% and 5% of the basin area respectively. The main objectives of this study were to quantify the water and nutrient footprints for grazed pasture, hay and row crops in the Santa Fe Basin using the Soil and Water Assessment Tool (SWAT). SWAT was calibrated and validated using available experimental data for corn-peanut rotations (Zamora et al, 2018) and Bermuda grass (Graetz et al 2006; Overman et al, 1991), then used to evaluate yield, net groundwater recharge, and nitrate leaching over a range of management systems commonly used for each of these land uses. Results showed that for corn-peanut rotations different management systems produced approximately equivalent yields, but large variations groundwater recharge and nitrate leaching. For pastures different management systems produced approximately equivalent yields and groundwater recharge, but large variations in nitrate leaching. Hay management systems showed large variation in yields, but small variation in groundwater recharge and nitrate leaching. Results of this study should be useful for incentivizing growers to adopt management practices with lower water and nutrient footprints, and for estimating the land use and land management changes required to achieve aquifer, spring and river protection in the Santa Fe Basin.

PRESENTER BIO: Dogil Lee is a first year PhD student in the Agricultural and Biological Engineering Department at the University of Florida. His research interests include field and watershed scale modeling of the impacts of agricultural best management practices on water quality and quantity.