Topic: Using the CROPGRO Model to Simulate Fresh Market Production, N Uptake, and N Leaching of Snap Bean as Affected by N fertilization and Irrigation.

Desire Djidonou, Kenneth Boote, Jim Jones, Jerry Bennett, Eric Simonne

With the increasing issues related to groundwater contamination by nitrate, Florida vegetable production faces serious challenge of maintaining high crop productivity while concurrently reducing the environmental consequences of intensive management practices. Computer simulation models have become a valuable management tools for assessing crop growth, yield and nutrient movement in plant and soil in relation to the weather, soil and management practices. In this study the response of nitrogen uptake, nitrate leaching and fresh market yield of snap bean (*Phaseolus vulgaris* L.) to varied fertilizer N rates and irrigation regimes was studied in field experiments and by evaluation with the CROPGRO model. In a two- season field study carried out in Gainesville, FL, snap bean was grown under three irrigation regimes (main factor) described as low, optimum and over-irrigated, and four nitrogen rates (37, 64, 111 and 149 kg ha^{-1}) as split-plot treatments within the irrigation regimes. During the experiment, data were collected on crop growth, yield, and plant nitrogen uptake. Also, soil cores were collected four times during each growing season at 30-cm increments to 1.2 m and analyzed for soil inorganic N (nitrate and ammonium) to evaluate N leaching. Simulated growth, yield, N uptake, and N leaching will be compared to observed growth, yield, N uptake and N leaching, as they are impacted by N fertilization amounts and differential irrigation. Upon completion of data analysis, the results of this study will provide valuable insight into the optimization of crop management (irrigation and fertilization) and assist the development of the Best Management Practices for Snap bean in particular and for Florida vegetable crops in general.
Key Words: CROPGRO, N leaching, nitrogen uptake, simulation, snap bean, Florida