Towards Best Management Practices in Florida Tomato Production: Irrigation, Nutrition and Modeling

Date: Friday, March 27, 2020
Time: 3:00 pm – 4:00 pm
Location: N/A - Live Stream & Recording Via Zoom

Tomato is a well-studied crop in Florida. However, studies addressing current challenges in the areas of nutrient and irrigation management, environment, and cultural practices would be required to 1) adjust crop requirements to the present high-efficient production condition and 2) understand the potential effects of changing climate on productivity. To address these challenges, field and laboratory experiments coupled with computer simulations were conducted over multiple seasons in Immokalee, FL. The studies revealed that nitrogen (N) application rate above 179 kg ha\(^{-1}\) may not improve tomato yield in south Florida. The results also indicated that application of pre-plant N fertilizer improved tomato biomass accumulation and yield compared to N application at 100% fertigation. Regulated deficit irrigation (RDI) increased tomato root growth with no yield loss compared to full irrigation (FI). Lower irrigation application for the RDI resulted in greater water use efficiency compared to the FI. The study also indicated that the reduced ceiling (RC) model was more accurate than the standard (ST) model for GDD estimation for tomato crop in south Florida. Based on the results from this study, the recommended temperature regime for the estimation of GDD under the climatic and growth conditions in south Florida was 7°C and 32°C for base and ceiling temperatures respectively. The study also clearly demonstrated that under the current daylight condition in south Florida, the addition of daylength had minimal effects on growing degree day (GDD) model accuracy in predicting tomato growth and development. Similarly, Pearson’s regression coefficient between tomato growth or biomass accumulation and GDD was higher compared to the calendar day method. Therefore, the accuracy of stage-specific nutrient and irrigation application timing in tomato production could be significantly improved using GDD model compared to the calendar-day method. The study also revealed that tomato production in south Florida is subjected to heat stress especially during the Fall growing season with elevated temperatures. The primary effect of higher temperature in tomato crop was yield reduction from lower pollen viability and fruit set. With the predicted increase in global temperatures in the future, any further increase in temperature suggests a greater reduction in tomato productivity, especially in south Florida. Therefore, adjusting planting dates to periods that allow for a relatively lower temperature regime would be critical to maintaining the sustainability of the tomato industry in Florida.

This seminar can be viewed live via this link: Ibukun “Timothy” Ayankojo. Viewers of the live stream may now ask questions by clicking on the message icon at the bottom. Questions will be read at the end during the question and answer portion. In addition, all seminars are archived for viewing on our SWSD Seminar Page.