The Use of Smart Phone App for Irrigation Scheduling in Tomato Production

I.T. Ayankojo & K.T. Morgan

Photo credit: I.T. Ayankojo
Why SmartIrrigation (SI) App?

- Current UF/IFAS irrigation recommendation (Regional Eto gal/ac)

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- Present recommendation is not location specific
- SI Vegetable app schedule is location specific hence possibility for a higher level of scheduling accuracy

Zotarelli et al., 2016
How to Use SI Vegetable App
Objectives

➢ Overall goal was to evaluate a smart phone application (SmartIrrigation Veg.) in tomato production.

- Compare use of schedules on seasonal water use
- Evaluate use schedules on tomato biomass accumulation and yield
- Determine nutrient and water use efficiencies from scheduling methods
Experiment Location

- Arenic; Alaquods, Sandy, Siliceous, Hyperthermic
- Soil Series: Immokalee
- Annual rainfall: 40 in – 69 in
- Annual temperature: 68 °F - 79 °F
Methodology and Experimental Design

- Three seasons: Spring, fall, 2015 and Spring 2016
- Five treatments (rates) from two scheduling methods
- Total nutrient rate: 200 lb/ac of N and 224 lbs/ac of K
- Nutrient application: 25% pre-plant and 75% fertigation
- All treatments received equal amount of nutrient but different irrigation rates
- Two drip lines per bed

<table>
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<tr>
<th>Treatments</th>
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<tr>
<td>100% IFAS Rate</td>
<td>Yellow</td>
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<tr>
<td>66% App Rate</td>
<td>White</td>
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<tr>
<td>100% App Rate</td>
<td>Green</td>
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<tr>
<td>150% App Rate</td>
<td>Red</td>
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<tr>
<td>66% IFAS Rate</td>
<td>Blue</td>
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Results and Discussions: Irrigation Depths

- Irrigation water use spring and fall seasons

- Total irrigation was highest for 150% App and lowest for 66% app for all seasons

- Irrigation scheduling using App saves water compare to IFAS scheduling

- Total irrigation was lower for Fall season due to lower ET
Results and Discussions

Total Marketable Yield

- 100% App was significantly higher in total marketable yield in both seasons.
- Results indicate that irrigation schedule using App better reflects tomato water requirement in open-field production.
- Irrigation scheduling using App does not cause any reduction in tomato yield.
Water Use Efficiencies

- 100% App was more water efficient compare to 100% IFAS
- SI App saves water compare to IFAS schedule
- Lower values during spring season are due to increase in water application due to high temperature compared to fall
Nitrogen Use Efficiency

- 100% App was most N efficient at both seasons, although not different from 66% app during Fall season
- 100% IFAS 13 box per pound of N applied
- 100% App 18 box per pound of N applied
Soil Moisture Readings

100% App maintained soil moisture at a stable level compared to 100% IFAS
Soil Nutrient Movement with Irrigation

Increase in water application rate by 100% IFAS and 150% App results in nutrient leaching.
Conclusion

- Irrigation water use was lower for Apps compare to corresponding IFAS recommendation
- Water use efficiency was higher for App schedule compare to the IFAS schedule
- 100% App was most nitrogen efficient
- 100% App schedule resulted in greater yield compared with 100% IFAS
- SmartIrrigation Vegetable App can be used for a more precise irrigation scheduling in tomato production
Acknowledgements

- USDA for funding this research

- SWFREC where the research was conducted

- SWFREC Soil and Water Science Crew for their support
THANK YOU

Photo credit: T. Ayankoja