Effect of Delaying Initial Irrigation on Cotton Using the Mobile Crop Water Use Application

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Introduction

- Cotton remains an important crop for SE Missouri producers, although the number of acres fluctuate each year.
- The first irrigation of the season is often delayed to allow for pesticide application or other field operations.
- The Crop Water Use application (CWU) is a mobile irrigation scheduler that calculates daily evapotranspiration from a network of electronic weather stations located across Missouri.
- Using the CWU, irrigation delays were tested to determine the effect on yield and rooting depth to cotton.

Objective

- To investigate the impact of delaying the initial irrigation using the CWU and determine the effects on cotton to yield and intended rooting depth.

Materials and Methods

Site Information

- Field tests were conducted in 2013 and 2014 at two locations:
  - **Portageville, MO**: Silt Loam – Furrow Irrigated
    Estimated 61 cm rooting depth
  - **Clarkton, MO**: Loamy Sand – Sprinkler Irrigated
    Estimated 46 cm rooting depth

Treatment Information

- Non-Irrigated
- No Delay: CWU Rec
- 1st Delay: CWU Rec – 1st irrigation
- 2nd Delay: CWU Rec – 1st and 2nd irrigation
- 3rd Delay: CWU Rec – 1st, 2nd, and 3rd irrigation

Data Collection

- Soil moisture using watermark sensors (Figure 1)
- Plant height and number of nodes (Figure 4 & 5)
- Yield – Lint cotton (Figure 2 & 3)

Figure 1. 5 Watermark soil moisture sensors installed at depths of 15, 31, 46, 61, and 76 cm to validate rooting depth.

Results and Discussion

No Delay CWU Rec at Clarkton resulted in the only significant difference between treatments.

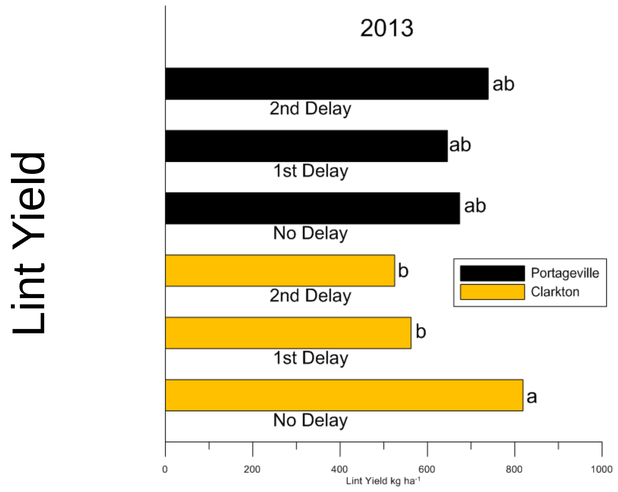

Figure 2. Effect of delaying first irrigation to cotton (PhytoGen 375) on lint yield at Clarkton and Portageville, MO in 2013. Treatments with the same letter are not different (LSD $_{0.05}$).

No significant difference at Clarkton or Portageville across all treatments.

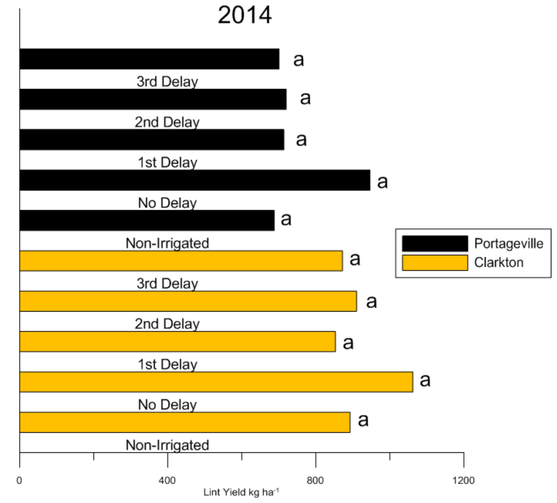

Figure 3. Effect of delaying first irrigation to cotton (PhytoGen 375) on lint yield at Clarkton and Portageville, MO in 2014. Treatments with the same letter are not different (LSD $_{0.05}$).

At Clarkton, plant height was uniform across irrigation treatments, except for the No Delay, CWU Recommendation.

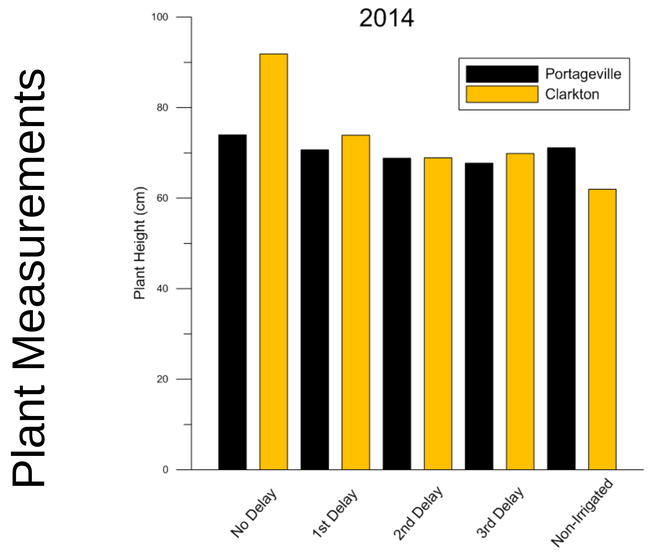

Figure 4. Effect of delayed irrigations to cotton plant height collected at harvest.

Cotton plants at Clarkton produced 2-4 more nodes than cotton at Portageville.

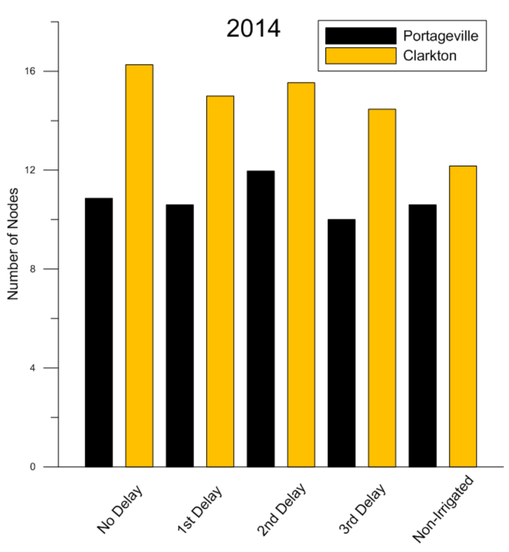

Figure 5. Effect of delayed irrigations to cotton number of nodes at harvest.

Conclusions

- **CWU Rec. treatments generally resulted in the greatest yield across all years on loamy sand at Clarkton, MO.**
- **Portageville, MO showed a lesser response from delayed irrigation, corresponding well with available-water-holding capacity of the soil.**
- **This study found that CWU is sensitive to rooting depth and soil texture selection.**
- **Soil moisture sensors helped validate the estimated rooting depth selected in the CWU.**

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