

## SOYBEAN IRRIGATION MANAGEMENT

### TRIAL OVERVIEW

- Many farmers are faced with water restrictions and/or limited well capacity and need information on how to maximize soybean yield while using the least amount of water.

### RESEARCH OBJECTIVE

- The objective of this study was to evaluate soybean yield response when irrigation is delayed until the R3 and R4 growth stages and with less water applied compared to soybean yields when supplied with full irrigation initiated earlier in the season.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE	Hord Silt Loam	Corn	Strip-Till	05/14/2016	09/21/2016	85 bu/acre	160,000 seeds/acre

#### SITE NOTES:

- Three different 2.4 RM soybean products were used in this study.
- Five different irrigation treatments were tested plus a dryland control (Table 1): Full irrigation (100% FI), two treatments above full irrigation to verify that full yield potential was actually achieved with the 100% FI treatment, and two treatments below full irrigation initiated at R3 or R4 to evaluate the effect of delayed and deficit irrigation on soybean yield.
- The study was set up as a randomized split-plot with irrigation amount as the whole plot and soybean product as the subplot with three replications.
- The irrigation system was subsurface drip with drip tapes buried 10 to 12 inches deep and spaced 40 inches apart.

### UNDERSTANDING THE RESULTS

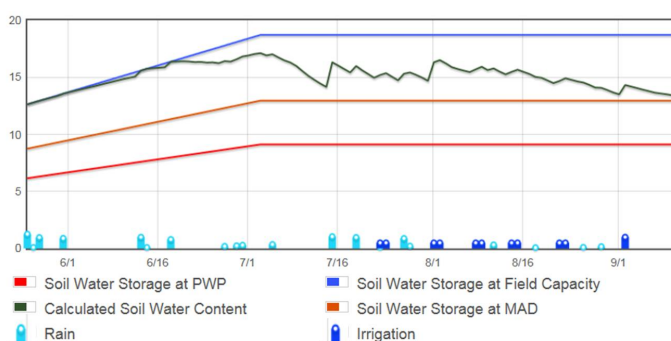


Figure 1. Soil Water Chart for the 100% FI Treatment

Irrigation Treatment	Inches Applied	Application Timing	Avg. Yield (bu/acre)
150% FI	8.5	Irrigation was applied to equal 150% of the FI treatment, beginning on July 23	87
125% FI	7	Irrigation was applied to equal 125% of the FI treatment, beginning on July 23	87
100% FI	6	Full Irrigation: Irrigation was applied to maintain soil water above 40% maximum allowable depletion, beginning on July 23	87
75% FI	4	Irrigation was applied to equal 75% of the FI treatment, beginning on August 1 (at R3)	84
50% FI	3	Irrigation was applied to equal 50% of the FI treatment, beginning on August 8 (at R4)	85
Dryland	0	Non-irrigated control	73
LSD (0.1)	--	----	2.1

Table 1. Irrigation Treatment Effect on Yield

- No differences in yield were observed between the soybean products; therefore, yields from the three products were combined for each treatment. However, the irrigation treatments did have a significant effect on yield and were analyzed individually (Table 1).
- Above average rainfall lead to relatively high yields in all plots. Of this rainfall, 20.7 inches was received from mid-April through July; however, rainfall in August and September was only 0.7 and 0.6 inches, respectively.
- The 50% FI treatment yielded 97% of the 100% FI treatment while using 3 inches less water.
- As shown in Figure 2, the dryland treatment (left) showed earlier senescence while the 50% FI treatment (middle) and the other treatments (right image shows the 150% FI treatment) showed similar senescence, indicating that the dryland field (non-irrigated control) experienced late-season stress but the irrigation treatments did not experience the same level of stress.



Figure 2. Late-season Stress was not Observed in the Irrigation Treatments

- For those farmers with limited water supplies or allocations, a majority of the soybean yield can be captured if timely irrigation is made during the R4 growth stage when growing conditions are adequate to meet the needs of the soybean crop early in the season.

#### LEGAL STATEMENT

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