



HIGH YIELD IRRIGATED SOYBEAN MANAGEMENT STRATEGIES

TRIAL OVERVIEW

- Soybeans are an exceptional rotational crop for corn. However, consistent higher soybean yields are desired by many farmers.
- With this in mind, two research trials were conducted evaluating which components such as fertility and crop protection products in a soybean system have the greatest effect on increasing irrigated soybean yield.

RESEARCH OBJECTIVE

- The purpose of the first study (High Management) was to evaluate the effects of manageable inputs on an irrigated soybean crop. An additional study (Nitrogen Fertility) was conducted to evaluate the application of nitrogen (N) on soybean yield potential.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE (High Management)	Silt Loam	Corn	Strip-till	04/25/2016	09/23/2016	90	160,000 to 220,000
Gothenburg, NE (Nitrogen Fertility)	Silt Loam	Corn	Strip-till	05/06/2016	09/27/2016	90	160,000

SITE NOTES:

- High Management. The first soybean study (High Management) evaluated several high yield management practices and was planted on April 25, 2016. It was a randomized complete block design with four replications. At the strip-till timing, the low management treatment had 10 gallons of 10-34-0 applied on April 15, 2016. All other treatments had 23 gallons of 10-34-0, and 8.4 gallons of 12-0-0-26S applied on April 15, 2016 (Table 1).
- Nitrogen Fertility. The second soybean study (Nitrogen Fertility) was planted on May 6, 2015 and evaluated the effects of inoculation and fertilization. The study was a randomized complete block design with six replications. A fertilizer application of 10 gallons of 10-34-0 was made April 15, 2016 to provide a base rate of phosphorus (Table 2).

UNDERSTANDING THE RESULTS

Table 1. Treatments for High Management Study.

Number	Treatment	Description of Additional Management
1 (LM)	Low Management	30-inch rows; 160,000 seeds/acre; 40 lbs P ₂ O ₅ /acre
2 (FP)	LM + Fertilizer at Planting	Fertilizer at planting: 24 lbs S/acre 90 lbs P ₂ O ₅ /acre
3 (FB)	LM + FP + Fertilizer at Bloom	Fertilizer at mid bloom: 10-45-10 at 5 lbs/acre Manganese chelate 3 qt/acre
4 (NR3)	LM + FP + FB + N at R3	N at R3 growth stage: 60 lbs/acre as urea product
5 (InR3)	LM + FP + FB + NR3 + Insecticide	Insecticide at R3 growth stage: Hero® insecticide (5 oz/acre)
6 (TR)	LM + FP + FB + NR3 + InR3 + Twin Rows	Twin-row planted soybeans
7 (HLR3)	LM + FP + FB + NR3 + InR3 + TR + Fungicide	Fungicide at R3 growth stage: Headline® fungicide (5 fl oz/acre)
8 (ID)	LM + FP + FB + NR3 + InR3 + TR + HLR3 + Increased Plant Density	Planting population 220,000 seeds/acre
9 (CV5)	LM+FP+FB+NR3+InR3+TR+HLR3+ID+Cobra	Herbicide at V5 growth stage: Cobra® herbicide (12.5 oz/acre)

Table 2. Treatments for Nitrogen Study.

Treatments
No N or inoculation
Inoculation only
Inoculation + 60 lbs N/acre at R3
Inoculation + 60 lbs N/acre at planting
Inoculation + 60 lbs N/acre at planting and 60 lbs N/acre at R3



Table 3. Results for High Management Study.

Number	Treatment	Yield (bu/acre) LSD (0.1)=4.9	Cost addition/acre ¹	Running Total ¹
1 (LM)	Low Management	82.4		
2 (FP)	LM + Fertilizer at Planting	83	147 lbs/a 10-34-0 92 lbs/a 12-0-0-26s = \$54.54	\$54.54
3 (FB)	LM + FP + Fertilizer at Bloom	81.4	5 lbs/a 10-45-10 2 pts./a Manganese Chelate = \$14.65	\$69.19
4 (NR3)	LM + FP + FB + N at R3	81.4	130 lbs/a Urea = \$23.75	\$92.94
5 (InR3)	LM + FP + FB + NR3 + Insecticide	85.6	5 oz/acre Hero* insecticide = \$8.31	\$101.25
6 (TR)	LM + FP + FB + NR3 + InR3 + Twin Rows	85.7	Twin row spacing	\$101.25
7 (HLR3)	LM + FP + FB + NR3 + InR3 + TR + Fungicide	87.6	Headline* fungicide at 5 oz/a = \$13.60	\$114.85
8 (ID)	LM + FP + FB + NR3 + InR3 + TR + HLR3 + Increased Plant Density	92.4	60K additional seeds per acre = \$28.00	\$142.85
9 (CV5)	LM+FP+FB+NR3+InR3+TR+HLR3+ID+Cobra	91.4	12.5 oz/acre Cobra* herbicide = \$24.12	\$166.97

¹Costs used in Table: 10-34-0 \$520.00/ton; 12-0-0-26S \$340.00/ton; 10-45-10 \$1.43/lb; Urea \$355.00/ton; Hero Insecticide \$212.67/gal; Headline SC fungicide \$348.15/gal; Cobra herbicide \$246.98/gal; Seed \$65.33/140K; Manganese Chelate \$21.00/gal.

Table 4. Results for Nitrogen Study.

Treatment	Yield (bu/acre)
No N or inoculation	90
Inoculation only	93
Inoculation + 60 lbs N at R3 with inoculation	92
Inoculation + 60 lbs N at planting with inoculation	91
Inoculation + 60 lbs N at planting with inoculation and 60 lbs N at R3	93
LSD (0.1)	NS

- In the High Management Study, treatment 7 with the additional fungicide plus the previously added management factors and treatment 8 with the increased seeding rate had significantly greater yields than the low management treatment and provided the most yield benefit (Table 3).
- No fertilizer treatment increased yield in either study (Table 3 and Table 4). These results are similar to 2015. Even though the nitrogen management study was specifically placed in an area with low residual nitrogen in 2016, there was still no observed yield benefit. Reasons for this could be one or both of the following factors.
 - High organic matter level in the soil of 2.8% which allows for the mineralization of nitrogen over the growing season.
 - Additional nitrogen applied through the pivot in the irrigation water of approximately 15 lbs/acre.
- In addition, soil type may have a significant effect on whether late-season nitrogen applications influence yield. No soil effect was observed at the Gothenburg Learning Center on our silt loam soils; however, a positive impact may be observed on soils with high clay content.

WHAT DOES THIS MEAN FOR YOUR FARM?

- To reach the high end range of yield potential for soybeans, soybean crop needs should be evaluated on each field. High-yielding soybeans come from managing yield-reducing factors such as disease, insects, irrigation, weeds, nutrient deficiency, and cultural practices.

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