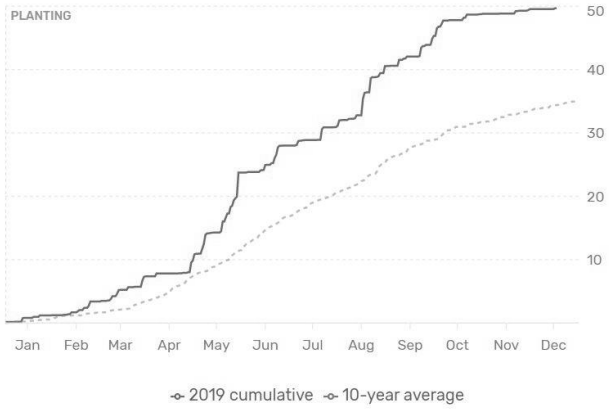
Soybean Benchmarking-Baseline vs Improved Soybean Practices

Study ID: 0416147201901
County: Richardson
Soil Type: Monona silt loam 1-6% slopes
Harvest Date: 10/19/19
Row Spacing (in): 15
Variety: Pioneer® P33A53X
Reps: 4
Previous Crop: Corn
Tillage: No-Till
Herbicides: ***Pre:*** 9 oz/ac Authority® Supreme, 24 oz/ac WeedMaster®, and 24 oz/ac glyphosate on 4/13/19 ***Post:*** 2.5 pt/ac Warrant®, 12.8 oz/ac Engenia®, 30 oz/ac glyphosate, and 8 oz/ac Volunteer® on 6/13/19
Seed Treatment: biological, Gaucho®, Lumisena™, rhizobia, EverGol® Energy

Foliar Insecticides: Entire field received 5 oz/ac Hero® on 6/20/19 for thistle caterpillars
Fertilizer: 51 lb K/ac as 0-0-60 on 4/15/19; 6.9 lb N/ac and 33 lb P/ac as 11-52-0 on 4/15/19
Irrigation: None
Rainfall (in):



Soil Tests (July 2019 - average of study area)

pH	BpH	CEC	1:1 S Salts	OM	Nitrate-N	K	S	Zn	Fe	Mn	Cu	Ca	Mg	Na	H	K	Ca	Mg	Na	Mehlich P-III
		meq/100g	mmho/cm	%	ppm	ppm									%					ppm
6.1	6.8	16.6	0.09	3.9	9	186	8.7	1.5	36.8	12.1	0.62	2421	297	8	9	3	73	15	0	28

Introduction: Analysis of producer survey data revealed: (1) an average yield gap of 20-30% between current farmer yield and potential yield as determined by climate, soil, and genetics, and (2) a number of agronomic practices that, for a given soil-climate context, can be fine-tuned to close the gap and improve soybean producer profit.

In Nebraska, three practices were identified as being important for improving yield and producer profit. These practices relate to planting date, seeding rate, and the use of foliar fungicides and insecticides. This study collectively tested the "baseline" practices versus the "improved" practices.

In this study, the baseline treatment was soybeans planted on June 1 at a rate of 160,000 seeds/ac. The improved treatment was soybeans planted on April 20 at a rate of 130,000 seeds/ac. Both treatments were sprayed with 5 oz/ac Hero® on June 20 due to thistle caterpillar presence and damage. On July 30, the improved treatment received a foliar fungicide and insecticide application of 4 oz/ac Priaxor® and 5 oz/ac Hero®.

Soybean cyst nematode tests for this field came back negative. Sudden death syndrome (SDS) was identified in this field and was found to be located primarily in the improved (early planted) treatment. The locations in the field with sudden death syndrome are apparent in aerial imagery (Figure 1).

Results:

	Early Season Stand Count (plants/ac)	Test Weight (lb/bu)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Baseline: Late Planted, Higher Seeding Rate, No Fungicide & Insecticide	146,667 A*	56 A	10.2 A	71 B	504.55 B
Improved: Early Planted, Lower Seeding Rate, Fungicide and Insecticide	110,167 B	57 A	10.3 A	83 A	591.98 A
P-Value	0.001	0.083	0.703	0.007	0.011

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre adjusted to 13% moisture.
‡Marginal net return based on $8.10/bu soybean, $59.24/unit seed ($67.70/ac for baseline and $55.01/ac for improved), $452/gal Priaxor®, and $138/gal Hero® ($19.52/ac for fungicide and insecticide for improved treatment), and $6.94/ac for application of fungicide and insecticide on improved treatment.

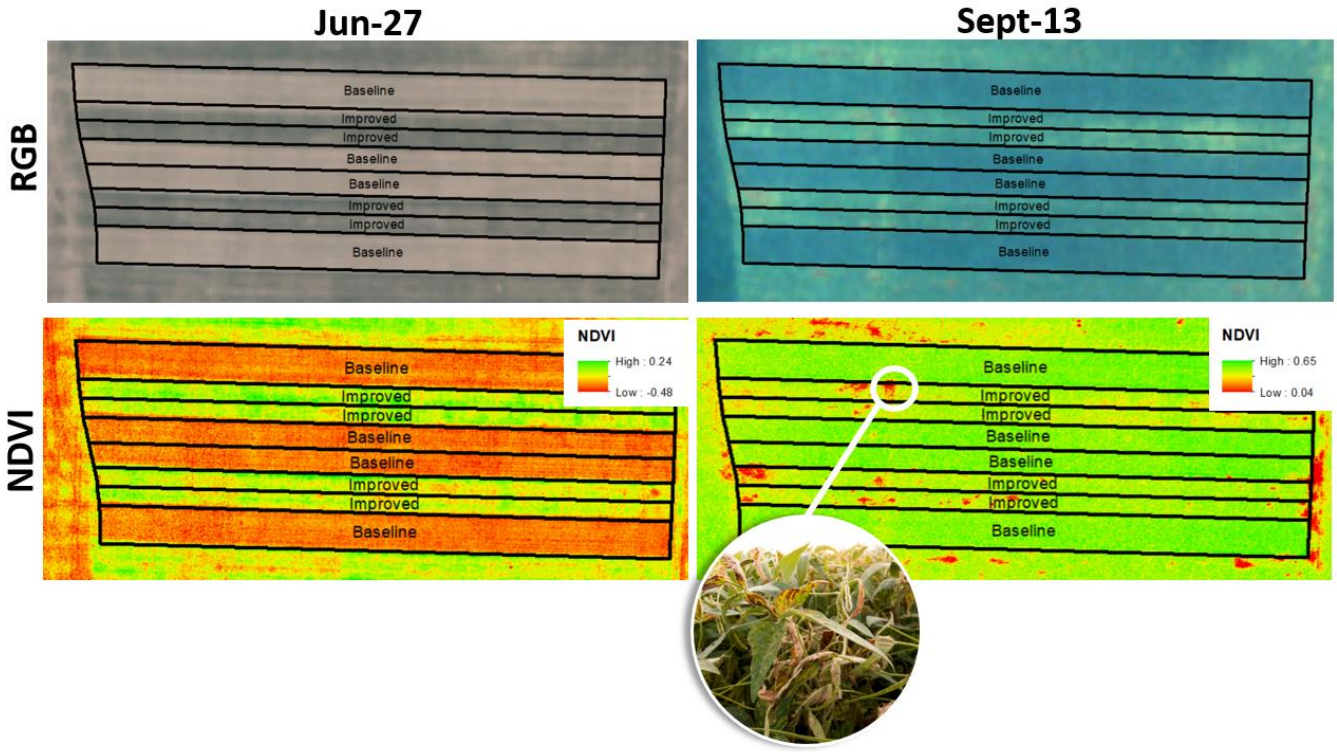


Figure 1. Aerial imagery from June 27 and September 13 displayed as true color (top) and normalized difference vegetation index (NDVI) (bottom).

Summary:

- The improved treatment (lower seeding rate with early planting and fungicide and insecticide application) resulted in a 12.5 bu/ac yield increase and a $87.43/ac increase in profit.
- Aerial imagery from June 27 showed the improved treatment was greener and had higher NDVI values compared to the baseline treatment. September 13 imagery showed the improved treatment was less green, had lower NDVI values, and had incidence of SDS (red spots in NDVI imagery).

This study was conducted in cooperation with a regional study funded by the North Central Region Soybean Research Program.