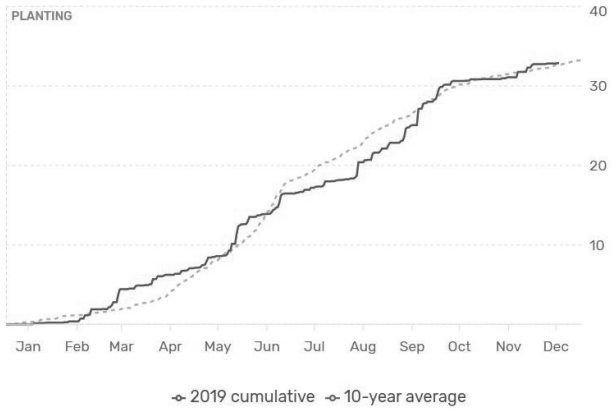
Soybean Benchmarking-Baseline vs Improved Soybean Practices

Study ID: 0926039201901
County: Cuming
Soil Type: Kennebec silt loam, overwash, occasionally flooded
Harvest Date: 10/16/19
Seeding Rate: 150,000
Row Spacing (in): 30
Variety: Midland Genetics® 2819E3
Reps: 5
Previous Crop: Corn, baled residue
Tillage: Conventional-Till
Herbicides: ***Pre:*** 2 pt/ac Treflan® ***Post:*** Enlist Duo®
Seed Treatment: CruiserMaxx®
Fertilizer: Manure on 10/15/18
Soil Tests (June 2019 - average of study area):

Irrigation: None
Rainfall (in):



Soil pH	Soluble Salts 1:1	Excess Lime	Organic Matter	Nitrate – N	Nitrate lb N/A	Mehlich P-III	Ammonium Acetate (ppm)				M-2 Sulfate	DTPA (ppm)				Boron	CaNO3 Chloride	CEC	% Base Saturation				
1:1	mmho/cm	Rating	LOI %	ppm N	(0-8")	ppm P	K	Ca	Mg	Na	ppm S	Zn	Fe	Mn	Cu	ppm	ppm Cl	me/100g	H	K	Ca	Mg	Na
6.7	0.19	None	1.3	12.4	30	74	388	1856	249	14	9.9	1.51	39.4	8.0	0.69	0.50	3.0	12.4	0	8	75	17	0

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, both the baseline and improved treatment were planted at a rate of 150,000 seeds/ac. The baseline treatment was planted on May 16 with no foliar fungicide or insecticide. The improved treatment was planted on May 6 with a fungicide (Priaxor®) and insecticide (Sniper®) on July 24.

Soybean cyst nematode tests for this field came back negative.

Results:

	Stand Count (plants/ac)	Test Weight (lb/bu)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Baseline: Late Planted, No Fungicide & Insecticide	131,689 A*	56 A	11.6 A	66 B	531.52 A
Improved: Early Planted, Fungicide and Insecticide	114,757 B	56 A	11.5 A	73 A	552.11 A
P-Value	0.083	0.621	0.74	0.006	0.137

*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 and $40/ac for fungicide, insecticide, and application for the improved treatment.

Summary:

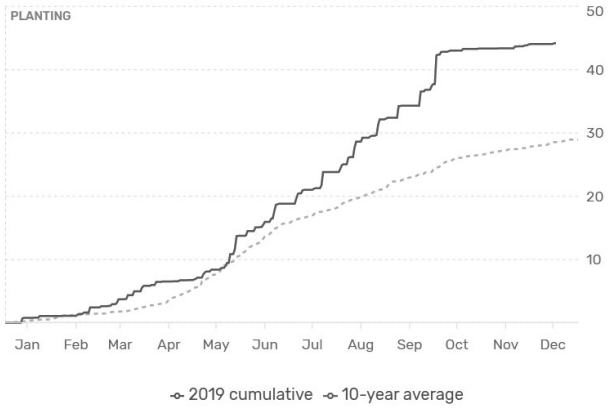
- Despite using the same seeding rate, stand counts were different between the two treatments.
- The improved treatment (early planting and fungicide and insecticide application) resulted in a 7.5 bu/ac yield increase. Marginal net return was not significantly different between the treatments.
- Treatment differences were not visible in aerial imagery at this site.

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

Soybean Benchmarking-Baseline vs Improved Soybean Practices

Study ID: 0917059201901
County: Fillmore
Soil Type: Crete silt loam 1-3% slope
Harvest Date: 10/23/19
Row Spacing (in): 30
Variety: Channel® 3519R2X
Reps: 4
Previous Crop: Corn
Tillage: No-Till
Herbicides: ***Pre:*** 4 oz/ac Fierce® XLT, 22 oz/ac XtendiMax®, 32 oz/ac glyphosate, and 12.9 oz/ac MOUNTAINEER® MAX on 5/14/19 ***Post:*** 22 oz/ac Roundup PowerMAX® and 6 oz/ac chlethodim with 17 lb dry AMS/100 gallon solution
Seed Treatment: Marauder® (inoculant) and Inovate® (fungicide and insecticide)

Fertilizer: None
Irrigation: None
Rainfall (in):



Soil Tests (Oct 2019 - average of each treatment):

	Soil pH	Soluble Salts 1:1	Excess Lime	Organic Matter	Nitrate – N	Nitrate lb N/A	Mehlich P-III	Ammonium Acetate (ppm)				M-2 Sulfate	DTPA (ppm)				CEC	% Base Saturation				
	1:1	mmho/cm	Rating	LOI %	ppm N	(0-8")	ppm P	K	Ca	Mg	Na	ppm S	Zn	Fe	Mn	Cu	me/100g	H	K	Ca	Mg	Na
Baseline	6.4	0.16	None	3.0	6.2	15	28	403	2457	351	31	15.6	1.32	62.5	17.1	1.09	21.5	24	5	56	14	1
Improved	6.3	0.15	None	3.3	6.2	15	21	397	2504	361	10	9.8	1.07	65.6	18.1	1.11	22.7	27	4	55	13	0

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 2 at a rate of 160,000 seeds/ac with no foliar fungicide or insecticide. The improved treatment was soybeans planted on May 3 at a rate of 130,000 seeds/ac with a foliar fungicide and insecticide application on July 31 with 10 oz/ac Affiance® and 4 oz/ac FanFare®.

Soybean cyst nematode tests for this field came back negative.

Results:

	Harvest 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	107,500 A*	57 A	10.7 B	75 B	551.19 B
Improved: Early Planted, Lower Seeding Rate, Fungicide and Insecticide	104,500 A	57 A	10.8 A	79 A	568.60 A
P-Value	0.734	0.591	0.058	0.016	0.057

*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, $49.45/unit seed ($56.51/ac for baseline and $45.92/ac for improved), $15/ac for fungicide and insecticide for improved treatment, and $6.94/ac for application of fungicide and insecticide on improved treatment.

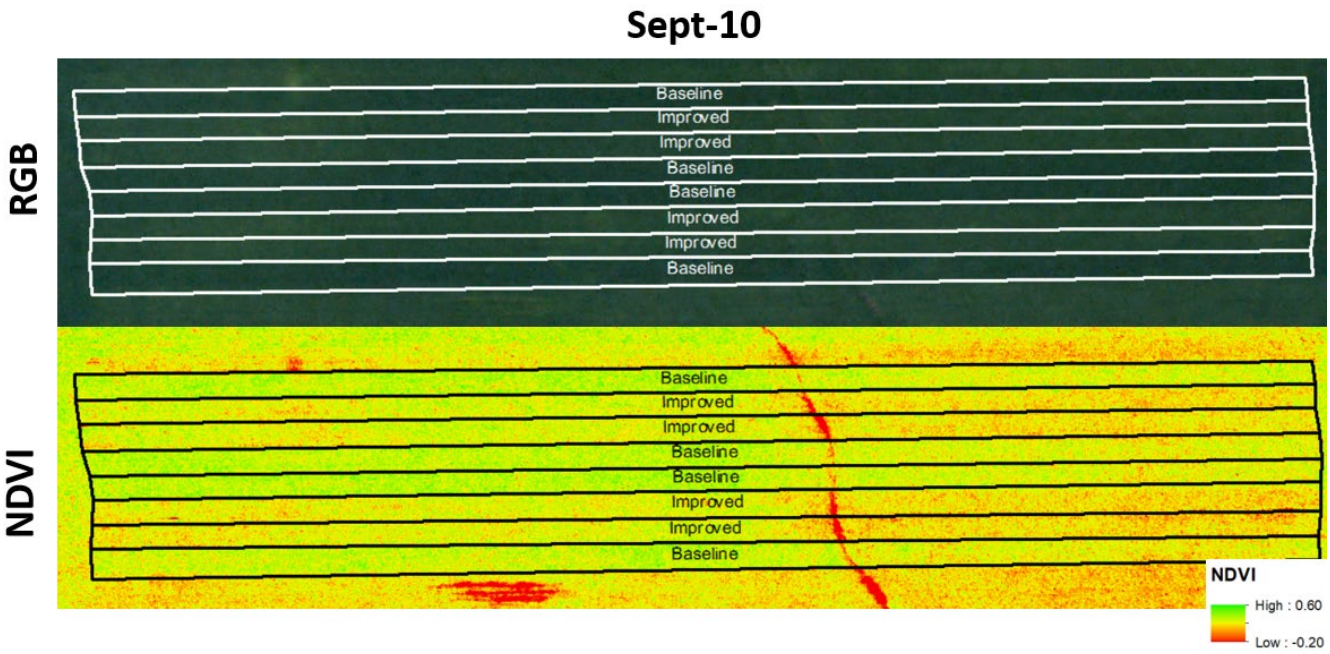


Figure 1. Aerial imagery from September 10 displayed as true color (top) and normalized difference vegetation index (NDVI) (bottom).

Summary:

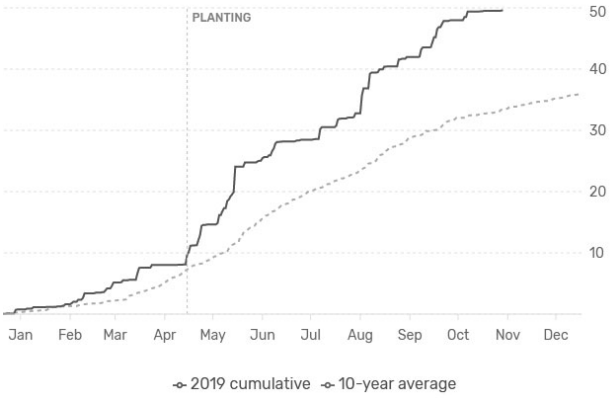
- Despite different seeding rates for the two treatments, stand counts at harvest were not significantly different.
- The improved treatment (lower seeding rate with early planting and fungicide and insecticide application) resulted in a 3.6 bu/ac yield increase and $17.41/ac increase in profit.
- Aerial imagery from September 10 showed the improved treatment was less green and had lower NDVI values indicating these plots were senescing earlier.

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

Soybean Benchmarking-Baseline vs Improved Soybean Practices

Study ID: 0821147201901
County: Richardson
Soil Type: Wabash silty clay loam, occasionally flooded
Harvest Date: 10/25/19
Row Spacing (in): 15
Variety: Pioneer® P40A47X
Reps: 4
Previous Crop: Corn
Tillage: No-Till, Strip-Till
Herbicides: ***Pre:*** 32 oz/ac Buccaneer® 5, 8 oz/ac dicamba, and 6 oz/ac Zidua® PRO on 4/16/19 ***Post:*** 32 oz/ac Buccaneer® 5, 10 oz/ac Outlook®, and 6 oz/ac Volunteer® on 6/12/19
Seed Treatment: None

Fertilizer: None
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	6.8	14.9	0.09	3	4.4	136	3.8	1.12	68.8	17.3	0.93	2156	258	7	11	2	72	14	0	40

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 5 at a rate of 160,000 seeds/ac with no foliar fungicide or insecticide. The improved treatment was soybeans planted on April 26 at a rate of 130,000 seeds/ac with a fungicide (4 oz/ac Priaxor®) and insecticide (4 oz/ac Hero®) application in mid-July.

Soybean cyst nematode tests for this field came back negative.

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	133,817 A*	55 A	12.3 B	65 B	473.02 B
Improved: Early Planted, Lower Seeding Rate, Fungicide & Insecticide	98,984 B	56 A	12.7 A	74 A	531.35 A
P-Value	0.038	0.245	0.002	0.001	0.002

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from yield monitor data. Bushels per acre corrected to 13% moisture.
‡Marginal net return based on $8.10/bu soybean, $49.45/unit seed ($56.51/ac for baseline and $45.92/ac for improved), $452/gal Priaxor®, and $138/gal Hero® ($18.44/ac for fungicide and insecticide for improved treatment), and $6.94/ac for application of fungicide and insecticide on improved treatment.

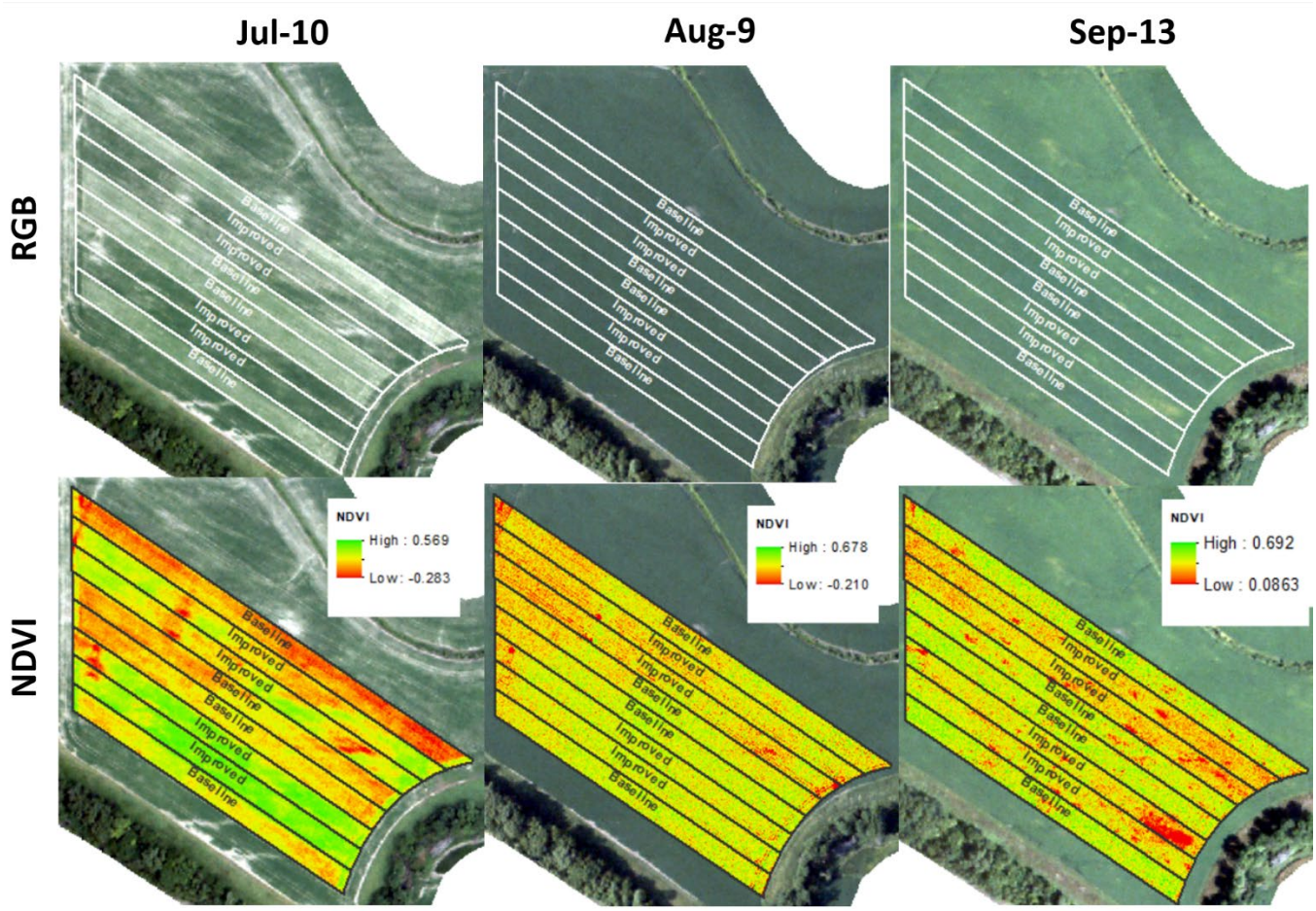


Figure 1. Aerial imagery from July 10, August 9, and September 13 displayed as true color (top) and normalized difference vegetation index (NDVI) (bottom).

Summary:

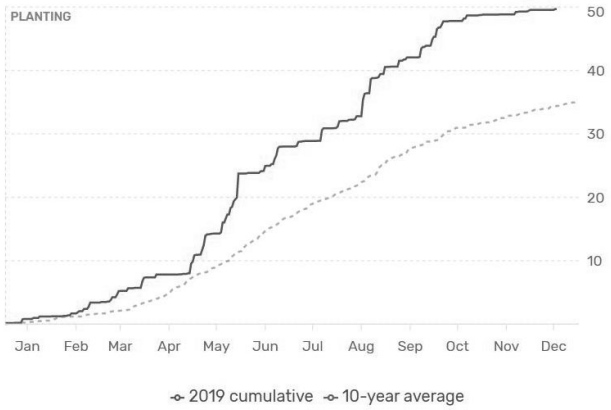
- The improved treatment (lower seeding rate with early planting and fungicide and insecticide application) resulted in a 9 bu/ac yield increase and a $58.32/ac increase in profit.
- Aerial imagery from July 10 showed the improved treatment was greener and had higher NDVI values compared to the baseline treatment. September 13 imagery showed the improved treatment was less green and had lower NDVI values compared to the baseline treatment, corresponding to earlier senescence for the early planted treatment.

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

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

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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.

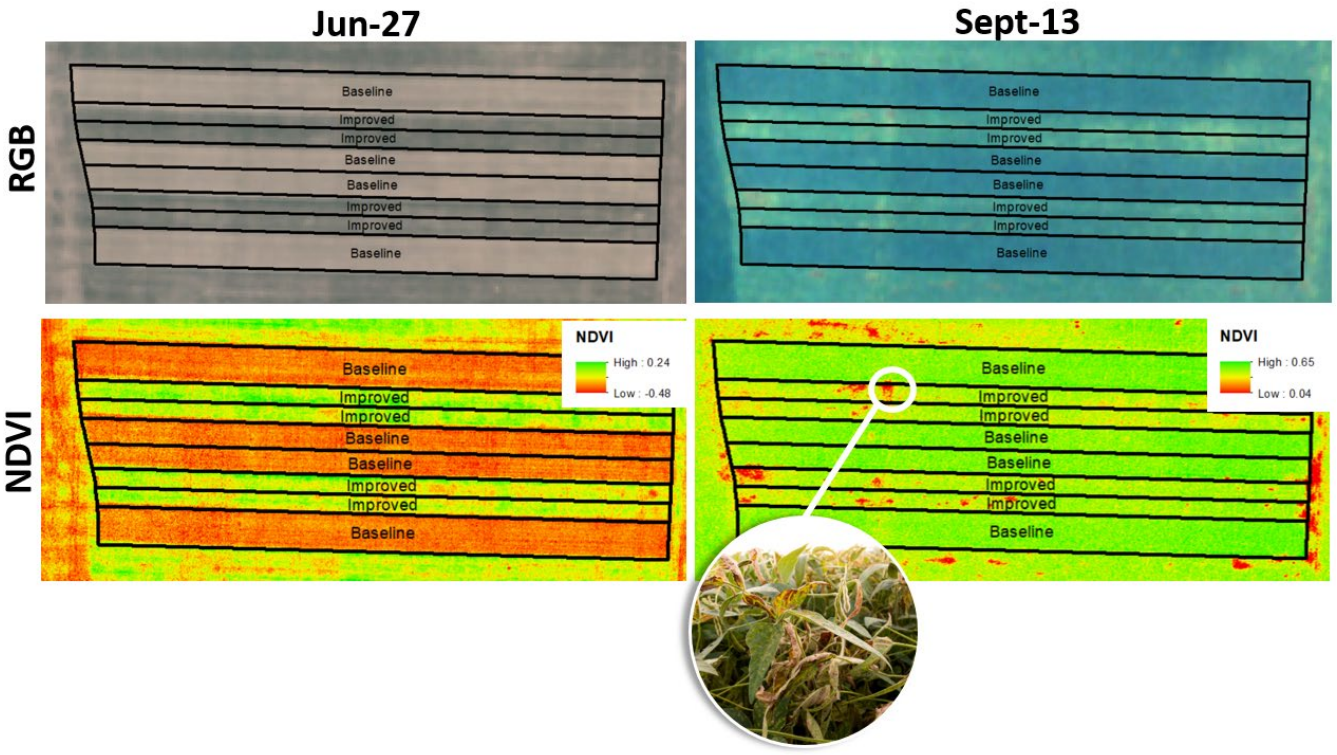

Figure 1. Aerial imagery from June 27 and September 13 displayed as true color (top) and normalized difference vegetation index (NDVI) (bottom).

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).

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