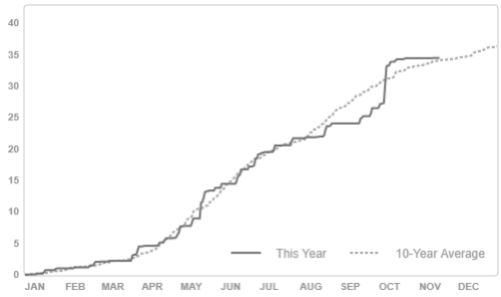
Starter Fertilizer on Soybeans

Study ID: 027025201701
County: Cass
Soil Type: Kennebec silt loam occasionally flooded; Judson silt loam 2-6% slopes
Planting Date: 4/8/17
Harvest Date: 10/26/17
Population: 165,000
Row Spacing (in): 15
Variety: AG4034
Reps: 3
Previous Crop: Corn
Tillage: No-Till
Herbicides: ***Pre:*** 2.25 oz/ac Canopy®, 4 oz/ac Sencor® DF, 1 oz/ac Sharpen®, 2 pt/ac Stealth™, and 3 pt/ac Tomahawk® 5
Post: 0.45 oz/ac First-Rate®, 1 pt/ac Battle Star®, 10 oz/ac Clethodim, and 4 oz/ac Resource®
Seed Treatment: Acceleron® Complete
Foliar Insecticides: None
Foliar Fungicides: None
Irrigation: None
Rainfall (in):



Soil Info:

O.M. (%)	C.E.C.	pH	P (ppm)	K (ppm)
3.1	16.3	7.1	21	244

Introduction:

Recommendations from industry, public institutions and growers in other states who are experiencing high yields often include the use of starter fertilizer as one of the factors for this accomplishment. This grower decided to validate this production input option on his own farm. Opti-Start Gold (product information below) was applied at a rate of 5 gal/ac as a starter fertilizer in a 2x2 placement (2 inches to the side of the furrow and 2 inches down into the soil.

GUARANTEED ANALYSIS	
Total Nitrogen (N) 5.4% Ammoniacal Nitrogen; 0.6% Urea Nitrogen	6.0%
Available Phosphate (P_2O_5)	20.0%
Soluble Potash (K_2O)	5.0%
Sulfur (S) 2.0% Combined Sulfur	2.0%
Manganese (Mn) 0.05% Chelated Manganese	0.05%
Zinc (Zn) 0.10% Chelated Zinc	0.10%

Derived from: Phosphoric Acid, Anhydrous Ammonia, Potassium Hydroxide, Urea, Ammonium Thiosulfate, Zinc Di-ammonium EDTA, Manganese Di-potassium EDTA .
Net weight 11 lb/gal at 68°F; pH 6.3

Product information from: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/OptiStart_Gold_Label.pdf

Aerial imagery was collected on September 3 to observe differences in plant vegetation. Aerial imagery was used to calculate the normalized difference vegetative index (NDVI). This index is indicative of overall plant biomass and greenness. True color imagery and NDVI are presented in *Figure 1*.

Results:

	Harvest Stand Count (plants/ac)	NDVI 09/03	Moisture (%)	Yield (bu/acre)†	Marginal Net Return‡ ($/ac)
Check	152,833 B*	0.635 A	11.5 A	46 A	407.70 A
Starter	160,167 A	0.624 A	11.5 A	47 A	397.04 A
P-Value	0.002	0.187	0.423	0.260	N/A

†Bushels per acre corrected to 13% moisture.
*Values with the same letter are not significantly different at a 90% confidence level.
‡Marginal net return based on $8.90/bu soybean and $4.55/gal for Opti-Start Gold.

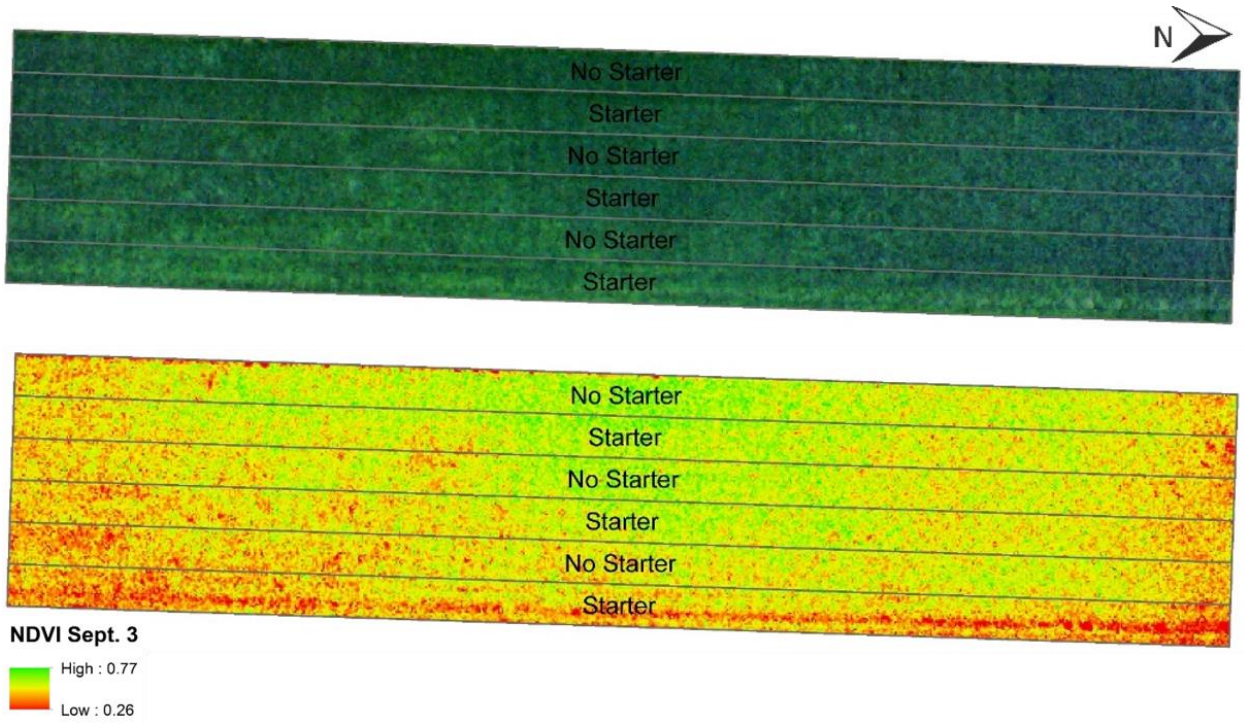


Figure 1. True color (red-green-blue) imagery (top) and NDVI (bottom) from September 3, 2017.

Summary:

- There was no yield increase for using starter fertilizer.
- Moisture and NDVI were the same for both the starter fertilizer treatment and the check.
- Because there were significant differences between starter and check harvest stand counts, we conducted a covariate analysis to test if the actual population affected yield. Including actual harvest populations as a covariate did not affect the analysis, so the analysis presented is the original yield presented.
- There was no statistical difference in net return.

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