



# KNUTH FARMS

# CASE STUDY FOUR

**Multi-Hybrid Planting  
for Spatial Soybean  
Seed Treatments**



# STUDY No. 4

## Multi-Hybrid Planting for Spatial Soybean Seed

### Treatments

#### INTRODUCTION

Sudden Death Syndrome (SDS) is caused by the soil borne fungus *Fusarium solani* f. sp. *glycines*. While this is a relatively new disease for Nebraska soybean farmers, there are several locations in the state where significant percentages of fields are being affected. In fields where SDS is present and soybean cyst nematode is also present, the disease can be more severe. There are not clear guidelines to determine at what point a field will have enough increase in yield to justify treatment and, therefore, on-farm research projects like this one are needed.

ILeVO® is a seed treatment marketed by Bayer CropScience for SDS and also has nematode activity (label below). This field was selected due to the presence of SDS in the 2014 soybean crop. Two treatments were selected to test the efficacy of the ILeVO® seed treatment.

A: Standard soybean treatment (for this study PPST2030)

B: Standard soybean treatment plus ILeVO at a rate of 1.18 fl oz/140,000 seed unit

The additional capabilities of the Multi-Hybrid planter allow for site specific application of ILeVO in the portions of the field that historically show the effects of SDS. This site specific application of ILeVO can reduce input costs while still effectively managing SDS pressure.

<b>GROUP 7 FUNGICIDE</b>	
<b>A systemic seed treatment for use on soybean for the protection against damage caused by early season plant pathogenic nematodes. As a soybean seed treatment provides protection from seedling infections by <i>Fusarium virguliforme</i>, the causal agent of Sudden Death Syndrome.</b>	
<b>ACTIVE INGREDIENT:</b>	
FLUOPYRAM: <i>N</i> -[2-[3-chloro-5-(trifluoromethyl)-2-pyridinyl]ethyl]-2-(trifluoromethyl)benzamide*	48.4%
<b>OTHER INGREDIENTS:</b>	51.6%
Contains 5 lbs FLUOPYRAM per gallon (600 g FLUOPYRAM per liter)	<b>TOTAL: 100.0%</b>
*(CAS Number 658066-35-4)	
EPA Reg. No. 254-1167	

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## Multi-Hybrid Planting for Spatial Soybean Seed

### Treatments

**Study ID:** 078155201704

**County:** Saunders

**Soil Type:** Filbert silt loam, Fillmore silt loam, Nodaway silt loam, Pohocco silty clay loam, Tomek silt loam, Yutan silty clay loam

**Planting Date:** 5/16/17

**Harvest Date:** 10/17/17

**Population:** 140,000

**Row Spacing (in):** 30

**Hybrids:** P31T11

**Reps:** 17

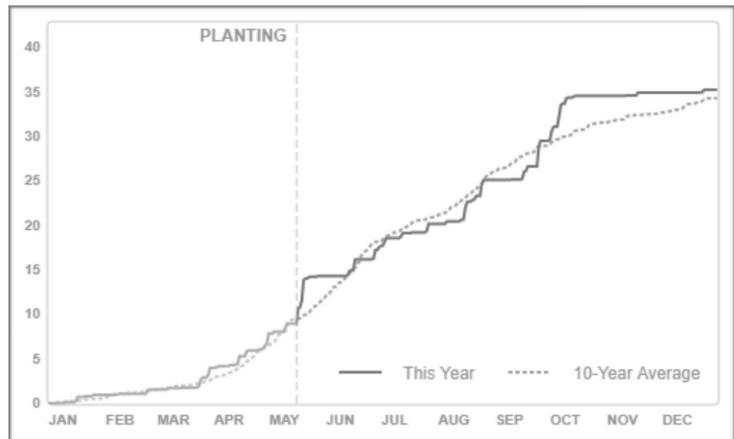
**Previous Crop:** Corn

**Tillage:** Conventional Till

**Seed Treatment:** non, other than those being studied

**Irrigation:** Pivot

**Rainfall (in):** see graph



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#### Management Zone Creation

Historical yield data was used to cluster data into management zones representing distribution of SDS in the field. (Figure 1). These zones were assessed for SDS disease levels and final yield results.

#### Results:

Yield of ILeVO treated and untreated seed were evaluated. Data were analyzed using the GLIMMIX procedure in SAS 9.4 (SAS Institute Inc., Cary, NC).

Disease levels were low through harvest at this field site, therefore no disease ratings were collected during the growing season.



Figure 1. Zone prescription for soybean treated with standard treatment (dark grey) and ILeVO (light grey).

Treatment	Standard Treatment + ILeVO®	Standard Treatment	P-Value
<i>Yield (bu/ac) †</i>			
SDS Zone	66 A	65 A	0.963
Standard Zone	65 A	65 A	0.949
P-Value*	0.9631	0.9494	
<i>Marginal Net Return (\$/ac) ‡</i>			
SDS Zone	529.06	607.79	
Standard Zone	584.44	599.98	

†Bushels per acre corrected to 13% moisture.

\*Values with the same letter are not significantly different at a 95% confidence interval.

‡ Marginal Net Return based on \$9.25/bu soybeans, \$15.17/acre ILeVO seed treatment cost (\$10.19/oz).

## \*What is the P-value?

In field research studies we impose a treatment-this treatment may be a new product or practice that is being compared to a standard management. Both the treatments that we are testing and random error (such as field variability) influence research results (such as yield). You intuitively know that this error exists - for example, the average yield for each combine pass will not come out exactly the same, even if no treatments were applied. The P-Value reported for each study assists us in determining if the differences we detect are due to error or due to the treatment we have imposed.

- As the P-Value decreases, the probability that differences are due to random chance decreases.
- As the P-Value increases, we are less able to distinguish if the difference is due to error or the treatment (hence we have less confidence in the results being due to the treatment).

For these studies, we have chosen a cutoff P-Value of 0.1; therefore, if the P-Value is greater than 0.1 we declare that there are not statistically significant differences due to the treatments. If the value is less than 0.1, we declare that differences between treatments are statistically significant. When this is the case, we follow the yield values with different letters to show they are statistically different. The value of 0.1 is arbitrary- another cutoff could be chosen. However, as you increase your cutoff value, you increase the chance that you will declare that treatments are different when they really are not. Conversely, if you lower the P-Value, you are more likely to miss real treatment differences.

### **Source:**

Nebraska On Farm Research Network: Statistics 101 by Laura Thompson and Keith Glewen

# CASE STUDY SUMMARY

# SUMMARY

1

There was no difference in the standard + ILeVO versus standard treated seed in the SDS or standard zone.

2

Yield results were very similar across the whole field.

3

No visible SDS was detectible during the growing season.

4

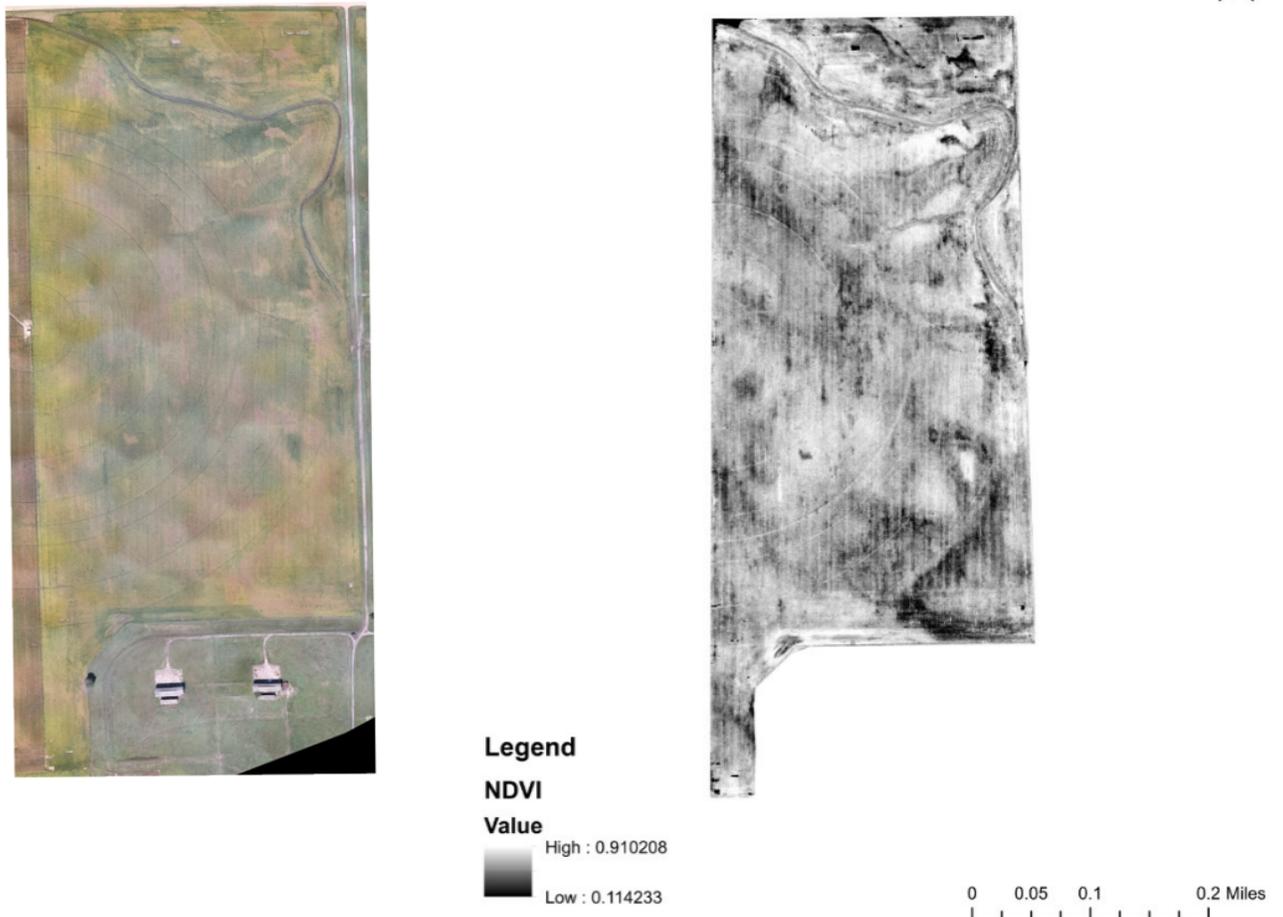
Some of the paired strips did yield higher individually with the ILeVO treatment, however these areas did not display symptoms of SDS. It is possible that the ILeVO treatment was yielding higher in portions of the field with higher levels of SCN, but more dense sampling of populations and analysis against treatment check strips would be needed to verify this theory.



More info on this study can be found on the University of Nebraska Cropwatch [Extension Blog](#)

[Click here](#) to directly access the full on-farm study

# Study 4, Figure 2



**Figure 2:** RGB (left) and NDVI (right) imagery of the field area.

Aerial imagery was obtained in late August (*Figure 2*). Neither RGB nor NDVI (normalized difference vegetative index) show distribution of SDS through the field. No levels of disease were detected during field scouting, consequently, no difference in treatments were visible in the aerial imagery.

This study sponsored in part by: Bayer CropScience LP



# Verifiable Crop Quality Through Regenerative Farming



Building the foundation of the future



SUSTAINABILITY



TRACEABILITY



QUALITY



DATA ANALYTICS

# ABOUT US

We focus on quality production by adopting new technology, implementing data analytics, pursuing sustainable farming systems and introducing traceability into the supply chain at the farm level. We are proud of what we grow and how we farm. By leveraging new farm technology and equipment to optimize and scale production. It enables us to do our best to steward well over the land and resources available. The technology allows us to make good decision because we now have data available and know-how to analyze and close the reporting loop in our efforts to optimizing water usage, equipment wear, and input usage, labor, energy consumption and how they play a synergistic role allowing us to increase efficiency and yield while reducing our carbon footprint in growing quality crops.

# IMPACTING AGRICULTURE THROUGH INNOVATION AND TEAMWORK

Farm studies are a partnership between Extension and producers to apply a scientific approach to critical questions. Farm studies take a known problem or hypothesis and provide technical assistance in setting up, implementing and analyzing replicated trials. At Knuth Farms we are proud to be in or have participated in 7 studies since 2013 and have leveraged that experience to make it easy for extension agents and Universities to work with our operation. We understand the importance of farm studies and value the opportunity to play a collaborative role impacting Agriculture through innovation and teamwork. Contact us for your next on-farm research project.

## ROLE IN FARM STUDIES

GPS and GIS have greatly enhanced the ability of site-specific crop management as well as provide the opportunity to track, collect and analyze spatial data for on-farm research. At Knuth Farms we actively pursue testing new technologies, that have the potential to affect our productivity, profitability, and sustainability. Partnering with industry and educators mitigates the risks involved with testing and accelerates learning and adoption of emerging Ag technology. Do you have new or beta stage technology? Bring us your technology to test in a real-world environment.

# OUR PARTNERS

Knuth Farms is an operation that fosters a collaborative effort to raise the bar on efficacy, quality, and yield all while we move towards regenerative farming goals improving soil health and optimizing nutrient density on every crop we grow. Growing for the right reasons means that we depend on partners to deliver well on the systems and equipment we depend on every day.

We are grateful for our partners that help us do what we do well.



# KNUTH FARMS

## Growing the best way for the right reasons

We are fourth generation farmers using modern farming equipment and Agricultural systems to produce the highest quality crops. People care about where their food comes from and that it is grown in a sustainable manner. At Knuth Farms we work hard to grow in a diversified regenerative way promoting healthy soils for a healthy planet.

## Yielding Quality through Innovation

We leverage the power of new technology to impact our operation as it influences agronomic practices, efficiencies, and insights, as well as economic decisions, affecting our farm. The way we grow shapes our role in the supply chain to deliver quality crops through a transparent and sustainable process from farm to table.



### AG SERVICES

Grazing acres, straw, stover, alfalfa, and sudan.



### SPECIALTY CROPS

Organic grains, forages, cover crops.



### COMMODITY CROPS

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## CASE STUDY

Design by e-webstrategy