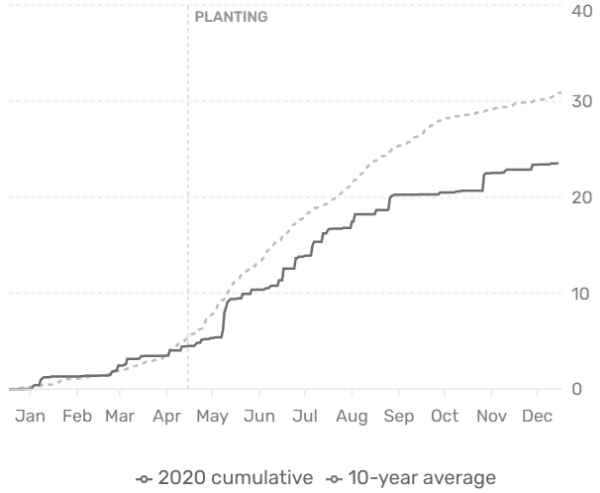
Evaluating Soybean Seed Treatments for Sudden Death Syndrome in Soybeans

Study ID: 0276185202001
County: York
Soil Type: Hastings silt loam
Planting Date: 5/1/20
Harvest Date: 9/25/20
Seeding Rate: 130,000
Row Spacing (in): 30
Variety: Pioneer® P31A22X
Reps: 8
Previous Crop: Seed Corn
Tillage: Spring tillage, row cultivation, hilling
Herbicides: ***Pre:*** 5 oz/ac Sonic® at planting ***Post:*** 1.5 pt/ac Ultra Blazer®, 1.33 pt/ac Brawl™, and 26 oz/ac Durango® on 6/12/20; 6 oz/ac Targa® on 6/23/20
Foliar Insecticides: 5 oz/ac Hero® on 7/25/20
Foliar Fungicides: 5 oz/ac TOPGUARD® on 7/25/20
Fertilizer: 150 lb/ac MESZ®

Irrigation: Pivot, Total: 3"
Rainfall (in):



Soil Tests (November 2019):

Soil pH	Soluble Salts	Excess Lime	Organic Matter	Nitrate – N	Nitrate lb N/ac	Mehlich P-III	Sulfate-S ppm	Ammonium Acetate (ppm)				CEC me/100g	% Base Saturation				
1:1	1:1 mmho/cm	Rating	LOI %	ppm N	(0-10")	ppm P	S	K	Ca	Mg	Na		H	K	Ca	Mg	Na
6.9	0.16	NONE	2.7	2.4	7	44	8.3	251	2358	276	40	14.9	0	4	79	15	1
7.0	0.18	NONE	3.0	3.6	11	26	6.7	324	2566	323	32	16.5	0	5	78	16	1

Introduction: Sudden death syndrome (SDS) is caused by the soil—borne fungus *Fusarium solani f. sp. glycines*. 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 treatment is justified; therefore, on-farm research projects like this one are needed. Additionally, as new seed treatment products become available, evaluations such as this one are needed to help producers evaluate the impact of various treatments. The field in this study has historically had SDS present. The variety used in the study has good SDS resistance, with a company score of 8 out of 9. This study evaluated three seed treatment packages.

A: Base soybean treatment contains CruiserMaxx® and Vibrance® (thiamethoxam, mefenoxam, fludioxonil, and sedaxane).

B: Base soybean treatment plus BASF ILeVO® (fluopyram) at a rate of 2.14 oz/100 lb seed.

C: Base soybean treatment plus Syngenta® Saltro® (pydiflumetofen) at a rate of 1.29 oz/100 lb seed.

Because of the relationship between soybean cyst nematode (SCN) and SDS, samples were taken on May 11 and August 19 in each treatment and replication to estimate initial and mid-season population densities, respectively (Table 1). SCN eggs were extracted and used to calculate the SCN Reproduction factor (Rf) for each treatment. Sudden death syndrome severity and incidence were visually estimated on August 28 and September 4 and used to calculate the SDS Severity Index (Table 1). Early and late season stand counts were also collected (Table 2). Yield, grain moisture, and net return were evaluated (Table 2).

Results:

Table 1. SCN and SDS ratings for baseline, baseline plus ILeVO®, and baseline plus Saltro® treatment.

	SCN Initial Population (P_i)[z] May 11, 2020	SCN Mid-Season Population (P_m)[y] Aug. 19, 2020	SCN Reproduction Factor (Rf)[x]	SDS Disease Severity Index[wv] Aug. 28, 2020	SDS Disease Severity Index[zv] Sept. 4, 2020
Base Treatment	536 A	1716 A	3.6 A	6.4	9.5 A
Base Treatment + ILeVO®	396 A	1440 A	4.2 A	0.6 A	2.5 B
Base Treatment + Saltro®	330 A	629 A	2.3 A	1.1 A	1.2 B
P-Value	0.754	0.296	0.528	0.391	0.005

[z]Data were transformed before analysis with the following formula: Log(x+1).
[y]Data were transformed before analysis with the following formula: √(x+0.5).
[x]Rf=(P_m+1)/(P_i+1). Rf greater than "1" indicates SCN reproduction since the initial sampling date and Rf less than "1" indicates a decline in SCN population densities since the initial sampling date.
[w]Check treatment was excluded from analysis to correct for skewness/kurtosis.
[v]Calculated with the following equation: Index=((Incidence % * Severity Value)/9); the severity value was found with the SIUC Method for SDS Scoring. Plant Dis. 99:347—354. https://apsjournals.apsnet.org/doi/pdf/10.1094/PDIS-06-14-0577-RE

Table 2. Stand counts, grain moisture, yield, and net return for baseline, baseline plus ILeVO®, and baseline plus Saltro® treatment.

	Early Season Stand Count (plants/ac)	Harvest Stand Count (plants/ac)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Base Treatment	114,625 A*	127,250 A	11.9 A	83 B	776.69 AB
Base Treatment + ILeVO®	114,750 A	126,375 A	12.0 A	86 A	790.28 A
Base Treatment + Saltro®	112,375 A	123,000 A	11.8 A	83 B	763.45 B
P-Value	0.768	0.175	0.256	0.006	0.023

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre corrected to 15.5% moisture.
‡Marginal net return based on $9.50/bu corn, $12/ac for check seed treatment (CruiserMaxx® and Vibrance®) that all treatments received, $15/ac additional for ILeVO® seed treatment, and $14/ac additional for Saltro® seed treatment.

Summary:

- There were no stand count or grain moisture differences between the soybean treatments.
- Yield was 3 bu/ac higher for the ILeVO® treatment. The ILeVO® treatment resulted in a $26.83/ac higher net return than the Saltro® treatment.
- Initial SCN population densities in the plots ranged from 120 to 1,280 SCN eggs per 100 cm^3 (~6 in^3) soil. There were no differences between the treatments on SCN reproduction in this trial.
- ILeVO® and Saltro® seed treatments both reduced SDS Disease Severity Index compared to the base treatment. Overall, SDS severity and incidence were fairly low across the field.

Sponsored by: University of Nebraska Lincoln

In Partnership with: Nebraska CornBoard; Nebraska Soybean Checkoff; Nebraska Corn Growers Association; Nebraska Dry Bean Commission

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