On-Farm Evaluations of ILeVO Seed Treatment in Iowa

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Introduction

The soybean cyst nematode (*SCN*), *Heterodera glycines*, and sudden death syndrome (SDS), caused by *Fusarium virguliforme*, are two of the major soybean yield robbers in Iowa. In 2015, it is estimated by Iowa State University that nearly 205.7 million kg were lost due to SCN and 493.7 million kg were lost to SDS in Iowa. Surveys done by the Iowa Soybean Association and Iowa State University showed that SCN can be found in about 75% of Iowa fields.

Primary management practices to control SCN and SDS is to use resistant soybean varieties and seed treatments have become available in recent years. ILeVO is one of the primary chemical nematicides available to farmers today. The active ingredient of ILeVO is fluopyram, which protects soybean from the SDS pathogen and has a secondary benefit of decreasing SCN reproduction.

The objective of this study was to evaluate the efficacy of ILeVO seed treatment to control SDS and SCN levels and to increase soybean yield.

Methodology

Two treatment on-farm replicated strip trials were conducted by farmers working with the Iowa Soybean Association On-Farm Network in 2015 and 2016.

Treatments:

1. ILeVO plus base seed treatment (ILeVO)
2. Base seed treatment (Base)

All seed treatments were applied to soybean varieties with SCN (PI88788) resistance that were rated as having good tolerance to SDS.

In 2015, 15 on-farm ILeVO trials were located in the northern 2/3 of Iowa. In 2016, 12 on-farm trials were located across Iowa (Fig 1). Each trial had at least 4 treatment replications.

Soil samples for SCN counts were taken in early-summer and at harvest in 2015 and 2016. SDS ratings were taken late-summer in both years. Sampling areas within the fields for all data collection were kept constant. Georeferenced yield data were collected for the on-farm strip trials with farmers' combines equipped with GPS yield monitors.

Yield data, log transformed SCN count and SDS rating values were analyzed using mixed effects linear model analysis. Distribution of yield responses were generated using parameters for the location and replication random effects simulated 1000 times.

The soybean cyst nematode females are the small white lemon shaped objects (cysts) attached to the soybean root.

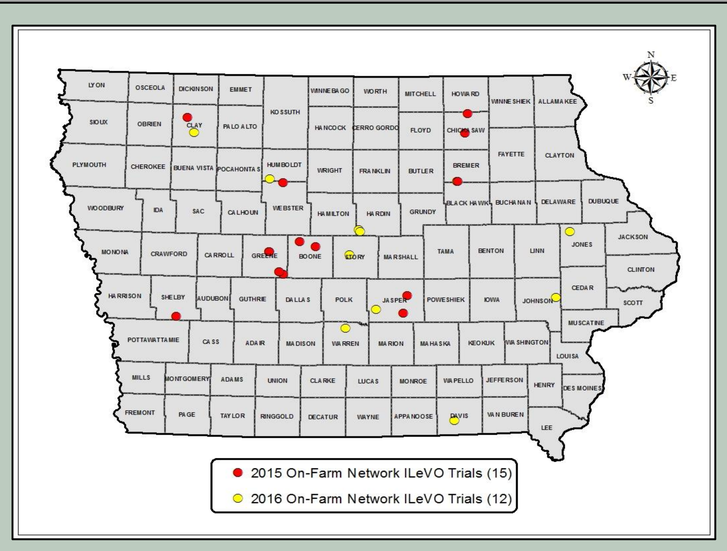


Figure 1: Locations for ILeVO soybean seed treatment (fungicide/nematicide) trials in Iowa in 2015 and 2016.

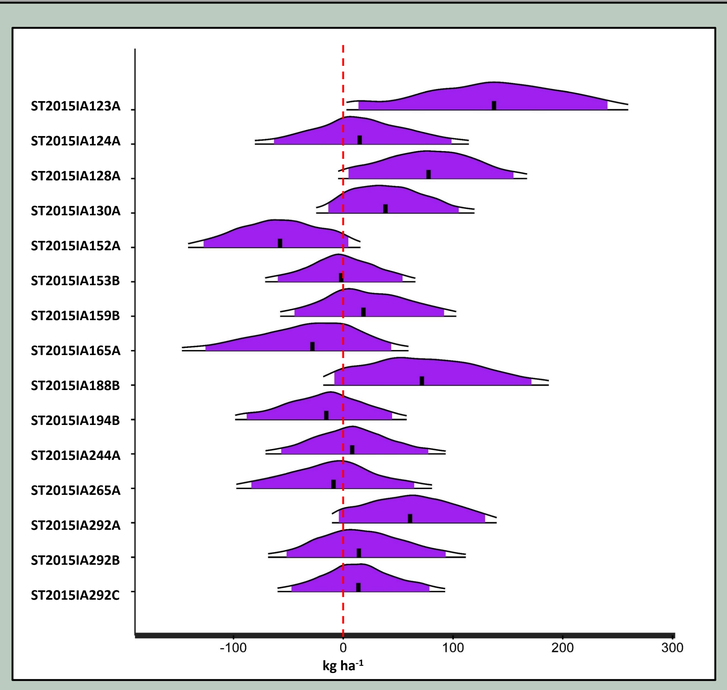


Figure 2: 90% confidence interval for the distribution of soybean yield responses to ILeVO in each of the 15 on-farm trials in 2015.

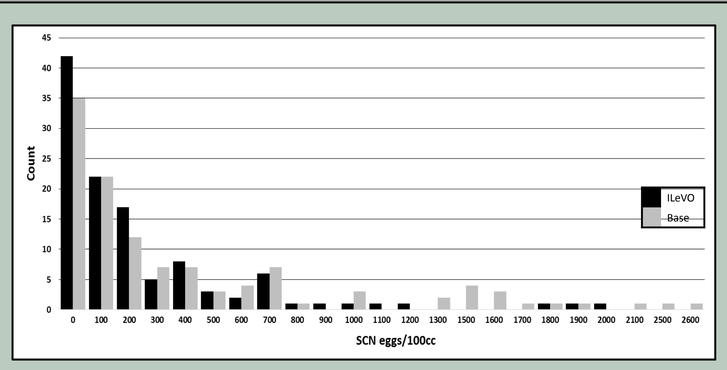


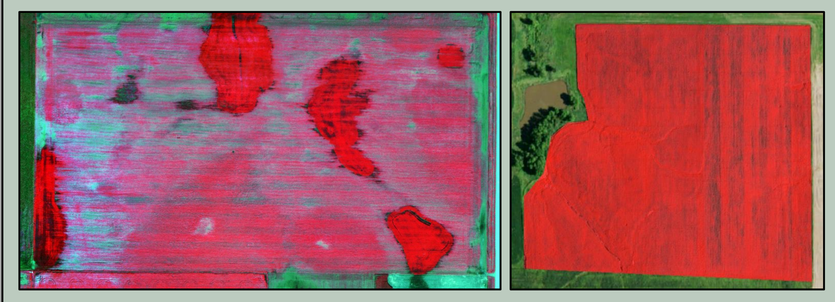
Figure 3: Histograms of SCN egg counts in ILeVO and base treatments for all 2015 on-farm trials.

Table 1: Observed SDS Incidence, Severity and Disease Index rating values collected within 4 trials in 2015 and 6 trials in 2016. Locations with no observed SDS were omitted from analysis.

	Average SDS disease ratings in 2015 and 2016					
	Incidence (%)		Severity (%)		Disease Index	
	ILeVO	Base	ILeVO	Base	ILeVO	Base
2015	7.0	10.1	1.9	2.3	4.1	5.5
2016*	7.8	12.6	1.9	2.5	3.2	6.4

*2016 data showed statistically significant reduction in Incidence, Severity and Disease Index

Left Observed SDS at field level
Right Foliar symptoms of SDS in on-farm trial



Left Color Infrared (CIR) imagery for ILeVO vs Base treatment soybean on 9/9/2015 for trial ST2015IA128
Right CIR imagery for ILeVO vs Base vs Untreated soybean taken on 9/2/2015 for trial ST2016IA0041

Results

Across all trials in 2015, the average soybean yield difference between ILeVO and base treatment was 38 kg ha^{-1}, with 90% CI from 14 to 62 kg ha^{-1}. In 5 of 15 trials the distributions of yield responses were on the positive side of the zero yield response line (Fig. 2).

On average the ILeVO treatment reduced SCN egg count measured in the fall by 32% but the overall SCN population across all trials was relatively small (Fig. 3).

In 2015, average SDS rating values tended to be lower with ILeVO (Table 1). In 2016, the ILeVO treatments significantly reduced SDS incidence, severity and disease index.

Conclusions

- ILeVO, a fungicidal and nematicidal seed treatment, produced a relatively small but statistically significant yield response of 38 kg ha^{-1} across 15 trials conducted in 2015.
- Although the general nematode population was relatively low, ILeVO significantly reduced SCN egg counts measured in the fall.
- In 2016, ILeVO significantly reduced SDS disease assessment metrics.
- 2016 yield and SCN data are still being collected.

Acknowledgments

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