Effect of Saltro Soybean Seed Treatment on Sudden Death Syndrome in Kansas in 2019

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Summary

Sudden death syndrome (SDS) is a disease caused by the soilborne fungus *Fusarium virguliforme*. This fungus prefers wet conditions and thus is usually most severe in irrigated fields. SDS tends to be most severe on well-managed soybeans with a high yield potential. It also tends to be more prevalent on fields that are infested with soybean cyst nematode (SCN) or planted early when soils are wet and cool. Historical yield losses from this disease are generally in the range of 1–25%. While there are differences in susceptibility between varieties, there are no varieties that are resistant to SDS. Fortunately, for the past several years, ILeVO (Bayer CropScience) seed treatment has shown to be effective at reducing the severity and yield loss to SDS, especially when used in combination with more tolerant varieties. A new seed treatment for SDS, Saltro (Syngenta Crop Protection), will be available to farmers for the first time in 2020.

Procedures

The objective of this study was to determine the effectiveness of seed treatments on sudden death syndrome (SDS) of soybeans. Irrigated soybeans were grown at the Kansas State University Kansas River Valley Experiment Field near Topeka, KS. The field was Eudora silt loam with pH at 6.4 and organic matter at 1.6%, and the previous crop was corn that was vertical tilled prior to planting. The field had a history of SDS. Varieties NK S39-R9X (four replications) and NK S35-K9X (two replications) were planted at 160,000 seeds/acre on May 16, 2019. Seed in all the treatments was treated with CruiserMaxx Vibrance seed treatment at 3.22 fl oz/cwt. Saltro alone, Saltro with Avicta, Saltro with Clariva, and ILeVO were included in the study. The study was a randomized complete block design with six replications, and plots were 10-ft wide × 30-ft long. Soybean cyst nematode (SCN) population at planting was very low at 43 eggs/100 cc of soil. Rainfall was supplemented with two irrigation events consisting of 0.61 inches each in the last week of July. Plant populations were counted at V1-2 and V2-3, and severity of SDS foliar symptoms were rated every five to six days after onset of symptoms from August 16 through September 3. Area under disease progress curves (AUDPC) were calculated from the four ratings. Grain was mechanically harvested to estimate the yield from the center two rows with a John Deere 3300 plot combine (October 6), and yield adjusted to 13% moisture. Analysis of the data was conducted using PROC GLIMMIX in SAS v. 9.4 (SAS Inst. Inc., Cary, NC), with significance declared at $P < 0.05$.

Results

Rainfall was above average every month of the growing season, with May (11.28 in.) and August (9.2 in.) precipitation almost three and five times the average, respectively. July (88°F) was the warmest month, especially during the last half, while August (85°F) was four degrees below average. There were no differences between the varieties for data collected, so they were combined for analysis. Foliar symptoms appeared relatively late (August 16) with soybeans at R4. The progression of symptoms increased rapidly, however, with individual plots at 40% by August 22. The plant population at V1 to V2 was slightly lower with the ILeVO treatment (Table 1), but there were no differences in population at V3 (data not shown). A strong negative correlation between AUDPC for SDS ratings and yield was observed (-0.7 Pearson coefficient, $P < 0.0001$). Saltro (1.52 fl oz/cwt) and ILeVO (2.17 fl oz/cwt) seed treatments greatly reduced the severity of SDS and increased soybean yield compared to the control. The addition of the Avicta and Clariva Elite Beans to Saltro did not alter the performance of Saltro on SDS and soybean yield.

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Table 1. Effect of soybean seed treatments on severity of Sudden Death Syndrome and soybean yield at Kansas River Valley Experiment Field, Topeka, 2019

Treatments	Plant population V1 to V2	Sudden death severity[y]	AUDPC[x]	Yield
	(Plants/a)	(%)		(bu/a)
Control	139,973 a[w]	46.2 a	395 a	59.5 c
Saltro 1.52 fl oz/cwt	141,167 a	12.6 b	66 b	71.8 ab
Saltro 1.52 fl oz/cwt + Avicta 6.2 fl oz/cwt	144,329 a	5.9 b	44 b	70.8 ab
Saltro 1.52 fl oz/cwt + Clariva Elite Beans 5.6 fl oz/cwt	141,425 a	9.0 b	48 b	71.1 ab
ILeVO 2.17 fl oz/cwt	122,259 b	12.2 b	70 b	66.2 b
P-value	0.039	<0.0001	<0.0001	<0.0001
CV (%)	8.8	57	77	8.2

[y] Disease severity was estimated on September 3 at R6.
[x] AUDPC = area under disease progress curve from August 16 - September 3.
[w] Data followed by the same letter or without letters within a column were not significantly different at $P < 0.05$.
CV = coefficient value.