2024 Soybean White Mold Product Impact on Yield

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Objectives were to demonstrate yield impact of white mold fungicide products in soybean, display white mold fungicide product portfolios from five industry collaborators, and provide unbiased evaluation of entries to allow growers to benchmark competitive performance of white mold fungicide products on the market. Growers should use the data set as a guide to visit with their crop consultants or local suppliers to determine a white mold fungicide, if any, that may provide the greatest white mold suppression and return on investments based on local supplier pricing and availability of products.

MATERIALS AND METHODS

Experiments were conducted on a fine-textured webster-clay loam soil with 5.8% organic matter and a 6.6 soil pH near Renville, Minnesota, in 2024. Spring tillage was a field cultivator at 3" depth. BASF 1822E3 soybean was seeded 1.25 inches deep on 30-inch row spacings at 158,000 seeds per acre on May 15, emerging May 23. Study was kept weed free with a preemergent application (PRE) of Outlook on May 14 followed by a postemergence application of Enlist One, Roundup Powermax II, Zidua SC, and Class Act NG on June 1. A second postemergence application of Enlist One, Class Act NG, Section 3, Liberty 280 Sl and MSO was applied on June 27. Endigo ZCX was applied at 4.5 fl oz for aphid control on July 30. Whitemold treatments were applied at growth stages R1, R2, R3, and 14DAA (14 days after the R1 application). Both applications "C"(R3) and "D"(14DAA) occurred on the same day. All treatments were applied with a bicycle sprayer at 20 GPA through AIXR11002 air-induction flat fan nozzles pressurized with CO_2 at 40 psi to the center two rows of four row plots 35 feet in length.

In season white mold evaluations were recorded as a numerical severity rating 0-3 and percent incidence on 20 plants per plot. The numerical severity rating scale was 0=no sign of disease, 1=disease present on main stem, 2=disease present on main stem and lateral branches, and 3=plant is wilted or dead. Percent incidence was calculated as the total number of plants (out of 20 rated) that had a numerical rating greater than "0". Percent incidence and numerical severity rating were combined in an equation common to the industry represented as a "Severity Index" score. Severity index is a scale of 0-100 and is calculated as Dx=%incidence(as a whole number)*numerical severity average (of 20 plants)/3 with the higher values being more severe. Yield data were collected on September 25 utilizing a Hege 160 two-row small plot research combine equipped with a HarvestMaster large plot weigh hopper. The middle two rows of the four-row plot were harvested and samples were taken with moisture and test weights recorded using a Perten 5200-A moisture tester. Experimental design was a randomized complete block with 4 replications. Data were analyzed with GLM procedure of SAS (Statistical Analysis Software, SAS Academic Studio October 30, 2024, SAS Institute, Inc.) at alpha=0.10 and differences are determined with 90% confidence; meaning, if the study was repeated 100 times, that 90 times out of 100 we would expect treatments that are statistically similar (within one LSD value of each other) to continue to be similar.

Table 1. Application information for Renville white mold fungicide trials in 2024.

Description	R1 Growth Stage	R2 Growth Stage	R3 Growth Stage	14DAA
Application Code	A	B	C	D
Date	July 3	July 8	July 17	July 17
Time of Day	8:30 AM	3:30 PM	9:00 AM	9:00 AM
Air Temperature (F)	66	77	67	67
Relative Humidity (%)	85	67	78	78
Wind Velocity (mph)	3	4	4	4
Wind Direction	SW	NW	NW	NW
Soil Temp. (F at 6")	64	75	66	66
Soil Moisture	Good	Good	Good	Good
Cloud Cover (%)	20	80	10	10
Crop Growth Stage (avg)	R1	R2	R3	R3

RESULTS AND DISCUSSION

Soybean white mold severity index scores, moisture, and yield were evaluated across four replications with each treatment appearing once within each replication to mitigate impact of field location and environment on the data set, however, with the magnitude of the study, plot geographical location appeared to have an impact on harvest moisture in replications 2 and 3 which were impacted by stunting from very wet soil conditions between June 10 and July 30. Despite environmental effects, severity index score data was still able to determine significant differences between treatments. Data table has been displayed in descending order of yield data (Table 2). There were no significant differences in the 7DAA data, this is likely due to baseline existing infection as fungicides are a proactive solution to white mold suppression rather than reactive. All treatments were significantly better than the untreated checks at 14DAA, however, no treatment outperformed another treatment. At the 21 DAA evaluation timing, Treatment 13 significantly outperformed treatment 1 but this may be attributed to random error as treatment 1 was the top yielder.

Harvest moisture was statistically greater for treatments 3 and 6 which appeared predominantly on the right side of the study, which was less impacted by soybean stunting earlier in the growing season, allowing plots to appear to have better plant health. In regards to soybean yield, Endura at 6.0 dry ounces per acre applied at R1 followed by Priaxor at 4.0 fluid ounces per acre applied at R3 had the greatest yield; however, it was statistically similar to ranked treatments 2 through 10. All treatments yielded statistically similar to the untreated check, this could potentially be due to the lower infection during the late-season drought conditions and soybean canopy not occurring until mid-August which may have created a less than ideal late season environment for the fungus to thrive in. There was stunting from sitting water in portions of reps 2 and 3; thus, overall uniformity of the study was less than expectation.

Table 2. White mold fungicide impact on white mold severity, soybean yield, and moisture in 2024.

			App.				Harvest		
	Treatment	**Rate**	**Code[a]**	**7DAA**	**14DAA**	**21DAA**	**Moisture**	**Yield**	**Company**
#		oz/A* or fl oz/A					%	Bu/A[b]	
1	Endura+NIS / Priaxor+NIS	6*+0.25%v/v / 4+0.25%v/v	A / C	0.08	0.31	1.92	13.45	66.48	BASF
2	AZterknot+VCP-035 / Azterknot+VCP-035	8+4 / 8+4	A / C	0.17	0.54	1.79	13.6	65.27	Vive
3	AZterknot+VCP-035	14+4	B	0.04	0.21	0.85	14.78	63.14	Vive
4	Delaro+NIS	8+0.125%v/v	A	0.1	0.35	1.29	13.53	61.86	Bayer
5	AZterknot+VCP-035	8+4	B	0.06	0.75	1.1	11.25	61.3	Vive
6	VCP-035	4	B	0.04	0.44	1.71	17.75	59.86	Vive
7	Delaro Complete+NIS	8+0.125%v/v	A	0.04	0.52	1.17	12.48	58.9	Bayer
8	Untreated Check	-	-	0.49	2.15	4.17	12.23	58.48	-
9	Endura+NIS / Endura+NIS	6*+0.25%v/v	A / D	0.19	0.73	1.36	13.18	58.2	BASF
10	Endura+NIS	6*+0.25%v/v	A	0.17	0.77	1.67	11.6	57.58	BASF
11	Endura Pro	20	A	0.12	0.81	1.52	12.63	55.54	BASF
12	Aproach Prima+Aproach+NIS / Aproach Prima+Aproach+NIS	6.8+3+0.25%v/v / 6.8+3+0.25%v/v	A / D	0.52	0.44	1.17	12.63	54.71	Corteva
13	Miravis Neo+Masterlock / Miravis Neo+Masterlock	13.7+6.4 / 13.7+6.4	A / C	0.12	0.42	0.67	12.5	54.51	Syngenta
14	Delaro Complete+NIS	8+0.125%v/v	C	0.21	0.71	0.85	13.7	53.07	Bayer
15	Delaro Complete+NIS / Delaro Complete+NIS	8+0.125%v/v / 8+0.125%v/v	A / C	0.25	0.42	1.44	12.95	52.87	Bayer
16	Viatude+NIS / Viatude+NIS	16+0.25%v/v / 16+0.25%v/v	A / D	0.31	0.65	1.08	13.18	52.42	Corteva
17	Aproach+NIS / Aproach+NIS	9+0.25%v/v / 9+0.25%v/v	A / D	0.19	0.44	0.96	12.4	52.34	Corteva
	LSD (0.1)			**NS**	**0.72**	**1.17**	**2.83**	**10.26**	

[a]Application codes refer to the information in Table 1.

[b]Bu/A=Soybean yield is corrected to a moisture of 13.5%. Same letters next to values are statistically similar values at alpha=0.1.

CONCLUSION

Despite environmental effects, severity index score data was still able to determine significant differences between treatments and the untreated check indicating product response, while moisture differences were most likely due to plot orientation. The addition of more than one product or application timing, did not appear to have a significant advantage to yield. This data set concluded that adding a fungicide application to soybeans reduced secondary white mold infection as compared to the untreated check.

Growers should use this data set as a guide to visit with their crop consultants or local suppliers to determine an appropriate fungicide program, if any, that may provide the least amount of yield loss from white mold and the best return on investment based on their white mold disease pressure and on local supplier pricing and availability of products.

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