On-Farm Corn and Soybean Fungicide Trials

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Introduction

An application of foliar fungicide to corn and soybean has become a popular input with many farmers in Iowa. The effect of fungicide on corn and soybean yield, however, can vary from year to year. Environmental conditions, such as rainfall and temperature, influence disease development, which will determine how a fungicide affects yield. Since environmental conditions vary from one year to the next, it is difficult to predict how and when to use a fungicide. The objective of these trials was to evaluate whether the application of a foliar fungicide would result in a yield increase in corn and soybean.

Materials and Methods

In 2015, there were 15 on-farm trials in Iowa that evaluated the effect of fungicide on corn yield (Table 1) and three trials that investigated the effect of fungicide on soybean yield (Table 2). All trials were conducted on cooperators' farms. Fungicide treatments were applied by ground equipment and were arranged in a randomized complete block design with at least three replications/treatment. Plot size varied from field to field depending on the field equipment. All plots were machine harvested for grain yield.

In eight trials (2, 4, 5, 6, 7, 9, 10, and 11), Stratego YLD® at 2-4 oz/acre, Priaxor™ at 4-8 oz/acre, or Aproach ® at 5 oz/acre were applied to corn at V5-V7. In four trials (1, 3, 8, and 12), Headline AMP® at 10 oz/acre, Aproach at 6 oz/acre, or Stratego YLD at 4 oz/acre were applied to corn at R1. In corn Trial 15, Stratego YLD at 4 oz/acre at R1 was compared with an application of Headline AMP at 10 oz/acre at R1. In two trials (13 and 14), Serenade® or Headline® were applied in-furrow at planting to corn.

In three trials, Avaris® 2XS at 10.5 oz/acre, Priaxor at 4 oz/acre, or Stratego YLD at 2 oz/acre, was applied to soybean at R1. Soybean Trial 3 also investigated the application of 50 lb/acre of K2O pre-plant vs. no K application. All treated strips were compared with an untreated control in each trial. Corn was evaluated for foliar diseases in mid-August in Trial 2.

Results and Discussion

There was not a significant yield increase with the fungicide in any of the eight trials with the applications made to corn at V5-V7, or two trials with the fungicide applied in-furrow (Table 3). There was a significant yield increase with the R1 fungicide applications to corn of Headline AMP at 10 oz/acre and Aproach at 6 oz/acre from 7 to 21 bushels/acre in Trials 1, 3, 8, and 12 ($P \leq 0.03$). However, with corn prices at less than $4/bushel, the fungicide application likely was profitable in only three corn trials (3, 8, and 12). In corn Trial 15, neither the corn sprayed with Stratego YLD or Headline AMP at R1 yielded significantly greater than the untreated control (Table 4).

There was a significant yield increase with the fungicide application of 3 to 4 bushels/acre in two of three soybean trials at $P \leq 0.03$ (Tables 5 and 6). However, with current soybean prices, it would likely take a yield increase of more than 3 bushels/acre to pay for the

fungicide application. In soybean Trial 3, no yield increase was seen with the potassium application (data not shown), which was probably expected with a soil test value of optimum to high.

Plant disease assessments made in corn Trial 2 indicated low levels of Northern corn leaf blight in both treated and untreated strips in mid-August. There was no yield increase with the fungicide application in this trial. Although plant disease evaluations were not made in the other trials, it is likely there was disease present in the corn and soybean trials where there was an economic response to the fungicide and little disease incidence in trials with little to no yield response to the fungicide. This indicates the importance of evaluating plant disease incidence and the likelihood of disease problems with current weather conditions and varieties selected to make decisions on the use of foliar fungicides to protect corn and soybean yield.

Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices in the 2015 fungicide trials on corn.

Exp. no.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/A)	Previous crop	Tillage
150111	1	Osceola	Dekalb DKC 49-72 RIB	30	4/25/15	33,700	Soybean	Conventional
150706	2	Washington	Pioneer P1023AM	30	5/1/15	34,000	Soybean	No-till
150145	3	Plymouth	Pioneer PO570 AMXT	30	4/28/15	35,000	Corn	Conservation
150401	4	Franklin	Golden Harvest G09E98-GT	30	4/30/15	35,000	Soybean	Conventional
150402	5	Wright	Pioneer PO193AMX & Dekalb 5082 Smart Stax	30	4/17/15	36,000	Corn	Conventional
150109	6	Lyon	Dekalb DKC5438	30	4/30/15	32,500	Corn	Conventional
150107	7	Osceola	Dekalb DKC 46-36	30	4/28/15	35,500	Soybean	Conventional
150156	8	Plymouth	Pioneer PO407 AMXT	30	4/28/15	35,000	Corn	Conservation
150102	9	Lyon	Dekalb 52-61 RIB	20	4/23/15	34,600	Soybean	Conventional
150127	10	Lyon	Pioneer PO297 AMXT	22	5/4/15	36,000	Corn	Conventional
150141	11	Osceola	Pioneer PO297 AMXT	30	4/30/15	VR 34,000	Soybean	Strip till
150172	12	Lyon	Ag Venture 5811	30	4/29/15	VR 35,700	Soybean	Conventional
150158	13	Osceola	Pioneer PO157	30	4/29/15	34,990	Soybean	Conventional
150159	14	Osceola	Pioneer PO157	30	4/30/15	35,150	Soybean	Conventional
150133	15	Sioux	Pioneer PO216AM	30	4/25/15	34,000	Soybean	Conventional

Table 2. Variety, row spacing, planting date, planting population, previous crop, and tillage practices in the 2015 fungicide trials on soybean.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/A)	Previous crop	Tillage
150306	1	Monona	Stine 28LF32	38 twin row	5/10/15	140,000	Corn	Spring light disk
150110	2	Osceola	Kruger K21801	30	5/2/15	150,000	Corn	Conventional
150146	3	Sioux	Pioneer P25T51R	30	4/28/15	140,000	Corn	No-till

Table 3. Yield from on-farm corn fungicide trials in 2015.

Exp. no.	Trial	Treatment	Rate (oz/A)	Application Timing	Yield (bu/A)			
					Fungicide	Control	Response	P-value[b]
150111	1	Headline AMP	10	R1	229	222	7	<0.01
150706	2	Priaxor	4	V5	192	192	0	0.83
150145	3	Aproach	6	R1	208	196	12	0.03
150401	4	Priaxor	8	V6	204	197	7	0.50
150402	5a[a]	Priaxor	8	V6	216	207	9	0.20
	5b[a]	Priaxor	8	V6	218	218	0	0.70
150109	6	Stratego YLD	2	V5	245	240	5	0.17
150107	7	Priaxor	4	V5	203	203	0	0.95
150156	8	Aproach	6	R1	213	203	10	0.01
150102	9	Stratego YLD	4	V7	224	223	1	0.89
150127	10	Stratego YLD	2	V6	200	199	1	0.72
150141	11	Aproach	5	V6	199	197	2	0.23
150172	12	Headline AMP	10	R1	171	150	21	0.01
150158	13	Serenade	32	In-furrow	221	220	1	0.15
150159	14	Headline	4	In-furrow	228	228	0	0.66

[a]Variety was DeKalb 50-82 Smart Stack in 5a and Pioneer PO193AMX in 5b.
[b] P-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 4. Yield from an on-farm corn fungicide trial in 2015.

Exp. no.	Trial	Treatment	Rate (oz/A)	Application timing	Yield (bushels/A)[a]	P-value[b]
150133	15	Control			229 a	0.15
		Stratego YLD	4	R1	230 a	
		Headline AMP	10	R1	235 a	

[a]Values denoted with the same letter within a trial are not statistically different at the significance level of 0.05.
[b]P-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 5. Yield from on-farm soybean fungicide trials in 2015.

Exp. no.	Trial	Treatment	Rate (oz/A)	Application timing	Yield (bu/A)[a]			P-value[b]
					Fungicide	Control	Response	
150306	1	Avaris 2XS	10.5	R5	68	66	2	0.28
150110	2	Priaxor Xemium	4	R3	75	72	3	0.03

[a]Values denoted with the same letter within a trial are not statistically different at the significance level of 0.05.
[b]P-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 6. Yield from an on-farm soybean fungicide trial in 2015.

Exp. no.	Trial	Treatment	Rate (oz/A)	Application timing	Yield (bu/A)[a]	P-value[b]
150146	3	Control			76 a	<0.01
		Stratego YLD	2	R3	79 b	
		Priaxor	4	R3	80 b	

[a]Values denoted with the same letter within a trial are not statistically different at the significance level of 0.05.
[b]P-value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.