On-Farm Corn and Soybean Fungicide Demonstration Trials

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Introduction

An application of foliar fungicide to corn and soybean has become a common input for 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 whether a fungicide affects yield. Because 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 2017, there was one on-farm trial in Iowa that evaluated the effect of fungicide on corn yield (Table 1), and nine trials 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 per treatment. Plot size varied from field-to-field depending on the field equipment. All plots were machine harvested for grain yield.

In Trial 1, Aproach® at 6 oz/acre was applied to two corn hybrids at R1 (Table 3). In soybean Trial 1, Aproach® at 4 oz/acre was applied to soybean at R1 (Table 4). In Trials 2–9 Trivapro® at 14.5 oz/acre with or without Warrior® at 3 oz/acre was applied to soybean at V6 to R1. In all trials, the corn and soybean strips treated with a fungicide application were compared with untreated strips.

Results and Discussion

Aproach® at 6 oz/acre applied to two corn hybrids at R1 had no effect on the yield of either hybrid, but there was a significant difference in yield between the two hybrids in corn Trial 1 (Table 3). In soybean Trial 1, there was not a significant yield increase with the Aproach® application (Table 4). There was not a significant yield increase with the Trivapro® or Trivapro® plus Warrior® in Trials 3, 5, 6, 7, and 9. There was a significant yield increase of 4–5 bushels/acre with Trivapro® at 14.5 oz/acre in Trials 2, 4, and 8 ($P \leq 0.03$). The addition of Warrior® at 3 oz/acre did not result in a yield increase compared with the Trivapro® alone in Trials 2 and 8, and caused a significant yield reduction of four bushels/acre in Trial 4.

Although plant disease evaluations were not made in most of the trials, it is likely there was not much disease present in the corn and soybean trials where there was not an economic 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 in making decisions on the use of foliar fungicides in protecting corn and soybean yield.

NOTE: The results presented are from replicated demonstration trials. Statistics are used to detect differences at a location and should not be interpreted beyond the single location.

Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices in a 2017 fungicide trial on corn.

Exp. no.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage
170141	1	Sioux	Pioneer PO157AM & PO937AM	30	5/6/17	35,000 & 30,000	Oats	Conventional

Table 2. Variety, row spacing, planting date, planting population, previous crop, and tillage practices in the 2017 fungicide trials on soybean.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage
170142	1	Sioux	Pioneer P22T24X	30	5/13/17	140,000	Corn	No-till
170311	2	Monona	Stine 28L102	30	5/28/17	140,000	Corn	Fall disk, spring mulch finisher
170312	3	Monona	LG 2898LL	30	5/16/17	140,000	Corn	Spring disk and field finisher
170627	4	Cass	Epplys ESB25NRR	30	5/20/17	160,000	Corn	Disked
170628	5	Cass	Epplys ESB294NRR	30	6/10/17	160,000	Corn	Disked
170629	6	Cass	Asgrow 3231	30	5/14/17	155,000	Corn	Vertical tillage
170633	7	Montgomery	NK 28A	30	4/24/17	140,000	Corn	Disked
170614	8	Pottawattamie	Nutech 3000	30	5/18/17	150,000	Corn	Vertical tillage
170641	9	Cass	Epplys ESB29NRR	30	5/25/17	160,000	Corn	Disked

Table 3. Yield for an on-farm fungicide trial in corn in 2017.

Exp. no.	Trial	Treatment	Yield (bu/ac)[a]	P-value[b]
170141	1	Aproach at 6 oz/ac at R1 on Pioneer PO937AM	257 a	<0.01
		No fungicide on Pioneer PO937AM	268 a	
		Aproach at 6 oz/ac at R1 on Pioneer PO157AM	216 b	
		No fungicide on Pioneer PO157AM	217 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.

Table 4. Yields for on-farm fungicide trials in soybean in 2017.

Exp. no.	Trial	Treatment	Yield (bu/ac)[a]	P-value[b]
170142	1	Aproach at 4 oz/ac at R1	63 a	0.96
		Control	64 a	
170311	2	Trivapro at 14.5 oz/ac at V6	60 a	0.02
		Trivapro at 14.5 oz plus Warrior at 3 oz/ac at V6	60 a	
		Control	56 b	
170312	3	Trivapro at 14.5 oz/ac at V6	61 a	0.60
		Trivapro at 14.5 oz plus Warrior at 3 oz/ac at V6	60 a	
		Control	59 a	
170627	4	Trivapro at 14.5 oz/ac at V8	42 a	<0.01
		Trivapro at 14.5 oz plus Warrior at 3 oz/ac at V8	38 b	
		Control	37 b	
170628	5	Trivapro at 14.5 oz/ac at R1	38 a	0.47
		Trivapro at 14.5 oz plus Warrior at 3 oz/ac at R1	39 a	
		Control	38 a	
170629	6	Trivapro at 14.5 oz/ac at R1	70 a	0.60
		Trivapro at 14.5 oz plus Warrior at 3 oz/ac at R1	72 a	
		Control	70 a	
170633	7	Trivapro at 14.5 oz/ac at R1	71 a	0.18
		Trivapro at 14.5 oz/ac plus Warrior at 3 oz/ac at R1	75 a	
		Control	70 a	
170614	8	Trivapro at 14.5 oz/ac at R1	61 a	0.03
		Trivapro at 14.5 oz/ac plus Warrior at 3 oz/ac at R1	59 ab	
		Control	57 b	
170641	9	Trivapro at 14.5 oz/ac at V8	49 a	0.14
		Trivapro at 14.5 oz plus Warrior at 3 oz/ac at V8	48 a	
		Control	48 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.