On-Farm Corn and Soybean Fungicide 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 2016, there were eight on-farm trials in Iowa that evaluated the effect of fungicide on corn yield (Table 1), and three 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 four trials (1, 6, 7, 8), Aproach® at 6 oz/acre or Headline AMP® at 10 oz/acre were applied to corn at R1-R2. In Trial 2, Trivapro® at 14.6 oz/acre was applied to corn at V6, R1, and V6 and R1. In Trial 3, Preemptor SC® was applied to corn at V5 at 2 oz/acre and 4 oz/acre. In two trials (4 and 5), Headline® was applied in-furrow at 6 oz/acre. In soybean Trial 1, Cobra® was applied for white mold control at 2 oz/acre to soybeans at R1. In Trial 2, an application of Quilt Excel® at 10.5 oz/acre to soybeans at R5 was compared with an application of Trivapro® at 10.5 oz/acre. In Trial 3, Trivapro® at 14.6 oz/acre was applied to soybeans at R3. 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 corn at R1 had no effect on the yield in corn Trial 1 and in Trial 2, Trivapro® at 10 oz/acre applied to corn at R1 and applied twice to corn at V6 and R1 also had no effect on corn yield (Table 3). There was no significant yield increase with the fungicide application in Trials 2 and 3 with the applications made to corn at V5-V6, or in Trials 4 and 5 with the fungicide applied in-furrow. There was a significant yield increase of 7 to 8 bushels/acre with the applications to corn at R1 of Headline AMP® at 10 oz/acre in Trials 7 and 8 ($P < 0.01$), but no effect on yield in Trial 6.

The Cobra® application in soybean Trial 1 did not affect soybean yield (Table 4). Low levels of white mold were present in the field. Quilt Excel® applied at 10.5 oz/acre to R5 soybeans had no effect on soybean yield in Trial 2. Trivapro® at 10.5 to 14.6 oz/acre applied to soybeans at R3 to R5 had no effect on soybean yield in Trial 3, but increased yield by seven bushels/acre in Trial 2. The Trivapro®

application in soybean Trial 2 was the only fungicide application in corn or soybean that was likely profitable with current corn and soybean prices.

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.

Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices in the 2016 fungicide trials on corn.

Exp. no.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage
160101	1	Plymouth	Pioneer P0937AM	30	5/6/16	35,000	Corn	Conservation
160136	2	Sioux	Pioneer PO589AM	30	5/4/16	34,000	Soybean	Conventional
160712	3	Washington	Agri Gold 65-38vt2rib	30	4/23/16	34,000	Soybean	No-till
160121	4	Osceola	Pioneer PO216	30	4/17/16	33,100	Corn	Fall manure injection, spring field cultivate
160139	5	Osceola	Pioneer PO157	30	4/17/16	35,700	Corn	Fall manure injection, spring field cultivate
160402	6	Wright	Croplan 4199SSrib	30	4/16/16	35,000	Corn	Conventional
160414	7	Wright	Pioneer 9929AMX	30	4/16/16	35,000	Corn	Conventional
160415	8	Wright	Dekalb 5440rib	30	4/15/16	35,000	Corn	Conventional

Table 2. Variety, row spacing, planting date, planting population, previous crop, and tillage practices in the 2016 fungicide trials on soybean.

Exp. no.	Trial	County	Variety	Row spacing (in.)	Planting date	Planting population (seeds/ac)	Previous crop	Tillage
160120	1	Sioux	Kruger 2301	15	5/20/16	144,000	Corn	Conventional
160304	2	Monona	Stine 26RD02	Twin row 38	5/13/16	165,000	Corn	No-till
160136	3	Sioux	Pioneer P22T73R	30	5/20/16	140,000	Corn	No-till

Table 3. Yields for on-farm fungicide trials in corn in 2016.

Exp. no.	Trial	Treatment	Yield (bu/ac)[a]	P-value[b]
160101	1	Aproach at 6 oz/ac at R2	229 a	0.38
		Control	233 a	
160136	2	Control	248 a	0.49
		Trivapro at 14.6 oz/ac at V6	246 a	
		Trivapro at 14.6 oz at R1	252 a	
		Trivapro at 14.6 oz/ac at V6 and R1	249 a	
160712	3	Preemptor SC at 2 oz/ac at V5	243 a	0.53
		Preemptor SC at 4 oz/ac at V5	241 a	
		Control	242 a	
160121	4	Headline at 6 oz/ac in-furrow	241 a	0.94
		Control	241 a	
160139	5	Headline at 6 oz/ac in-furrow	238 a	0.91
		Control	239 a	
160402	6	Control	210 a	0.18
		Headline AMP at 10 oz/ac at R1	213 a	
160414	7	Control	218 a	<0.01
		Headline AMP at 10 oz/ac at R1	226 b	
160415	8	Control	224 a	<0.01
		Headline AMP at 10 oz/ac at R1	231 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 2016.

Exp. no.	Trial	Treatment	Yield (bu/ac)[a]	P-value[b]
160120	1	Cobra at 2 oz/ac at R1	72 a	0.19
		Control	71 a	
160304	2	Trivapro at 10.5 oz/ac at R5	71 a	<0.01
		Quilt Excel at 10.5 oz/ac at R5	68 ab	
		Control	64 b	
160137	3	Control	82 a	0.60
		Trivapro at 14.6 oz/ac at R3	83 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.