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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), Approach[®] 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

Approach[®] 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 | Approach 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 | |

^aValues denoted with the same letter within a trial are not statistically different at the significance level of 0.05.

^bP-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 | |

^aValues denoted with the same letter within a trial are not statistically different at the significance level of 0.05.

^bP-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.