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On-Farm Corn and Soybean Fungicide Demonstration Trials

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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, Approach® at 6 oz/acre was applied to two corn hybrids at R1 (Table 3). In soybean Trial 1, Approach® 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
Approach® 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 no significant yield increase with the Approach® 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 ≤ 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.

<table>
<thead>
<tr>
<th>Exp. no.</th>
<th>Trial</th>
<th>County</th>
<th>Hybrid</th>
<th>Row spacing (in.)</th>
<th>Planting date</th>
<th>Planting population (seeds/ac)</th>
<th>Previous crop</th>
<th>Tillage</th>
</tr>
</thead>
<tbody>
<tr>
<td>170141</td>
<td>1</td>
<td>Sioux</td>
<td>Pioneer PO157AM &amp; PO937AM</td>
<td>30</td>
<td>5/6/17</td>
<td>35,000 &amp; 30,000</td>
<td>Oats</td>
<td>Conventional</td>
</tr>
</tbody>
</table>

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

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

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

<table>
<thead>
<tr>
<th>Exp. no.</th>
<th>Trial</th>
<th>Treatment</th>
<th>Yield (bu/ac)a</th>
<th>P-valueb</th>
</tr>
</thead>
<tbody>
<tr>
<td>170141</td>
<td>1</td>
<td>Aproach at 6 oz/ac at R1 on Pioneer PO937AM</td>
<td>257 a</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No fungicide on Pioneer PO937AM</td>
<td>268 a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aproach at 6 oz/ac at R1 on Pioneer PO157AM</td>
<td>216 b</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No fungicide on Pioneer PO157AM</td>
<td>217 b</td>
<td></td>
</tr>
</tbody>
</table>

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 2017.

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

\(^a\)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.