Management of Soil-Borne Diseases of Potato with Seed Piece and In-Furrow Fungicide Treatments

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Introduction
Soil-borne diseases like those caused by *Rhizoctonia solani* are common limiting factors in potato production areas. Seed treatments and in-furrow fungicides are some management options for Rhizoctonia stem canker.

Objectives
The objectives of this study are to determine the effects of seed piece treatment alone and seed piece treatment combined with in-furrow fungicide application on management of soil-borne diseases of potato.

Materials and Methods
The research plot was established in 2016 at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC). Four seed piece treatments combined with an additional in-furrow fungicide treatment were compared to a seed piece treatment only and a non-treated control for the management of stem infections caused by Rhizoctonia. A randomized complete block design with four replicates was established. Each treatment plot was 20-ft long and four rows wide with a 5-ft non-treated, in-row buffer between plots. Whole seed potatoes, cultivar ‘Atlantic’, were cut, treated, and stored at 45°F until planting. On May 26, potato seed pieces were planted at 12-inch spacing with 36-in row centers in an open furrow. After seed placement, fungicides were applied in-furrow in a 5- to 7-in band over the seed. At this time, *Rhizoctonia solani*-infested barley grain was applied in-furrow at a rate of 50 lb/ac. In-furrow rates listed in Table 1 were concentrated in the furrows. After application, the furrows were closed with the planter closing discs. The plot received fertility, weed control, and irrigation appropriate for potato production. Parameters measured were final stand counts, crop vigor, stem infection incidence, and final yield.

Results and Discussion
Treatments had no observable effects on final stands or on plant vigor. Rhizoctonia stem canker development was light, and there were no significant treatment effects on disease development. Treatments also had no significant effect on overall tuber yields. However, there was a trend in the data showing that treatments receiving in-furrow fungicide applications had reduced yields compared to the non-treated check and seed piece treatment only. Overall, yields were low by a factor of three to four because the experiment was completely defoliated by hail on July 27.

Acknowledgments
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Table 1. Management of soil-borne diseases of potato with seed piece and in-furrow fungicide treatments.

<table>
<thead>
<tr>
<th>Treatment, rate, and timing¹</th>
<th>Crop stand (40 row ft)</th>
<th>Vigor (1–10)²</th>
<th>Disease incidence (%)³</th>
<th>Tuber yield (cwt⁴/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>June 17</td>
<td>June 23</td>
<td>Sept. 1</td>
<td>Sept. 29</td>
</tr>
<tr>
<td>Non-treated check</td>
<td>25.8 a ⁵</td>
<td>8.5 a</td>
<td>15.0 a</td>
<td>67.9 a</td>
</tr>
<tr>
<td>Standard seed piece treatment A</td>
<td>24.0 a</td>
<td>9.3 a</td>
<td>10.0 a</td>
<td>74.0 a</td>
</tr>
<tr>
<td>Standard seed piece treatment A</td>
<td>Serenade® ASO (2 qt/ac) B</td>
<td>28.3 a</td>
<td>9.5 a</td>
<td>5.0 a</td>
</tr>
<tr>
<td>Standard seed piece treatment A</td>
<td>Serenade ASO (2 qt/ac) + Velum® Prime (6.7 fl oz/ac) B</td>
<td>25.0 a</td>
<td>8.5 a</td>
<td>5.0 a</td>
</tr>
<tr>
<td>Standard seed piece treatment A</td>
<td>Quadris® (8.7 fl oz/ac) + Velum Prime (6.7 fl oz/ac) B</td>
<td>32.0 a</td>
<td>8.5 a</td>
<td>5.0 a</td>
</tr>
<tr>
<td>Standard seed piece treatment A</td>
<td>Quadris (8.7 fl oz/ac) + Serenade ASO (2 qt/ac) + Velum Prime (6.7 fl oz/ac) B</td>
<td>28.3 a</td>
<td>8.8 a</td>
<td>15.0 a</td>
</tr>
</tbody>
</table>

¹Standard seed piece treatment=Emesto Silver (0.31 fl oz/cwt) + NuBark Mancozeb (1 lb/cwt). A=seed piece treatment; B=in-furrow application.
²Vigor takes into consideration size and color of plants where 1=no stand, 10=best looking plants in replicate block.
³The % of plant stems (five total) that had Rhizoctonia infection.
⁴cwt=hundredweight.
⁵Treatment means followed by different letters differ significantly (Fisher’s protected least significant difference, p≤ 0.05).

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