Managing Fusarium Head Blight in Wheat

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Introduction

Fusarium Head Blight (FHB) in Manitoba, occurs throughout all crop regions and can damage wheat crops whenever environmental conditions favor the disease. FHB of cereals, caused by the fungus Fusarium graminearum, causes yield losses due to floret sterility and the loss of light weight kernels during combining. Further economic impact is felt due to the effect of FHB on grain quality and food safety.

Three conditions are necessary for FHB to occur: presence of disease inoculum, a susceptible host, and environmental conditions favorable for infection and disease development. The severity of the disease in the field is a result of the interaction of all three factors. Weather patterns are by far the most important factor in the occurrence of FHB. If conditions remain warm and moist the pathogen can continue to sporulate and spread to other kernels or heads. Under optimum conditions, crop management may have little impact on FHB other than reducing the severity on yields and grades reductions.

Producers in Manitoba have found that applying a single management practice has often failed when weather conditions favor the development of FHB. Studies in the US have shown that the adoption of 2 or 3 of the management practices has had more success in reducing the severity of the disease than applying only one of the practices.

Table 1: Mean and Standard Deviation for Fusarium Head Blight of Wheat Fungicides tested in field trials

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>0</th>
<th>0.05</th>
<th>0.2</th>
<th>0.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prothioconazole + tebuconazole</td>
<td>0.5</td>
<td>0.05</td>
<td>0.2</td>
<td>0.8</td>
</tr>
<tr>
<td>FHB Index</td>
<td>0.5</td>
<td>0.05</td>
<td>0.2</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Conclusions

- Environment or the year accounts for most of the variation
- The effects of rotation alone are small compared to environmental effects, but avoid a corn-cereal rotation
- Tillage and FHB development in several studies show that: No-till < Conventional < Minimum
- Level of disease pressure may affect outcome of multiple strategies
- Value of multiple strategies greatest at: sites where FHB disease pressure greatest (but not overwhelming)

Summary:

Optimum management of Fusarium Head Blight in wheat and barley is best achieved with multiple strategies; a single strategy generally fails during epidemic conditions. Members of the management group of the US Wheat and Barley Scab Initiative established integrated management studies in 2007, across multiple regions and grain classes, to quantify the value of additive strategies for Fusarium head blight and deoxynivalenol reduction. Strategies studied were a combination of two or three of the following approaches: variety resistance, fungicides, and crop rotation. Results in the northern plains state of North Dakota indicated that the lowest field severity of Fusarium head blight and the lowest DON, and the highest yields and test weights were always achieved with multiple, rather than single management strategies.

References

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