Management of Fusarium Head Blight in Spring Wheat Cultivars with Fungicides
Venkat Chapara, Amanda Arens, and Andrew Friskop

Objective: To evaluate the efficacy of fungicides in single and sequential applications to manage Fusarium head blight (FHB) in hard red spring wheat (HRSW).

Methods:

Location: NDSU Langdon Research Extension Center.

Experimental Design: Randomized complete block with four replications.

Previous crop: Soybean

Cultivars of HRSW tested: WB Mayville and SY Ingmar

Planting: 1.2 million pure live seeds/A was planted on May 2, 2016. A border plot was planted between treated plots to minimize interference from spray drift.

Plot size: Seven rows at six inch spacing. 5 ft. x 20 ft., mowed back to 5 ft. x 16 ft.

Herbicides Applied: Axial XL (16.4 Fl. oz/A) + Huskie (15 Fl. oz/A) + Prowl H2O (36 Fl. oz/A)

Inoculation: Plots were inoculated by spreading corn spawn inoculum at around boot stage (Feekes 9-10) at the rate of 300 g/plot.

Disease development: Supplemental moisture was provided by running overhead irrigation from Feekes 9 to 11.25 at the rate of one hour per day to create conducive environment for FHB development.

Fungicide treatments: Fungicides were applied, with CO2-pressurized backpack sprayer with three nozzle boom (XR-8002) and the water volume used was 20 GPA. Fungicide application was made at Feekes 10.51(anthesis) on July 4 and repeated 4 days after the first spray (July 8, 2016).

Disease Assessment: FHB incidence was calculated by counting the number of heads showing FHB symptoms out of 50 heads that were rated for severity. FHB head severity was rated using 0-100% scale on arbitrary 50 heads, excluding two outer rows. FHB index (Index) was calculated using formula: Index = (SEV*INC)/100.

Harvest: Plots were harvested on August 24 with a small plot combine and the yield was determined.
**Data Analysis:** Statistical analysis was done using SAS. Fisher’s least significant difference (LSD) was used to compare means at $p (\alpha = 0.05)$. Actual means are presented in the table for simplicity of understanding.

**Results:**

Both the HRSW varieties had the lowest FHB incidence, severity, index, DON content, FDK, and yield when treated with the combination fungicide treatments applied at Feekes 10.51 and repeated 4 days after the first application (Table 1) followed by Prosaro alone and were significantly different from the untreated (inoculated and non-inoculated) checks.

Table 1: Fungicides tested alone and in combinations on two HRSW varieties at two application timings to manage Fusarium head blight and evaluation of their influence on yield and other grain characteristics: toxin (DON) content, FDK, and test weight.

<table>
<thead>
<tr>
<th>HRSW Variety</th>
<th>Fungicide</th>
<th>Dosage</th>
<th>Application timing</th>
<th>Fusarium Head Blight</th>
<th>DON (ppm)</th>
<th>FDK (%)</th>
<th>Yield (bu/A)</th>
<th>Test Weight (lbs/bu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WB Mayville</td>
<td>Uninoculated</td>
<td>...</td>
<td>...</td>
<td>Incidence (%)</td>
<td>Severity (%)</td>
<td>Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB Mayville</td>
<td>Proaso</td>
<td>6.5</td>
<td>Anthesis</td>
<td>54</td>
<td>21</td>
<td>11.5</td>
<td>6.2</td>
<td>10</td>
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<tr>
<td>WB Mayville</td>
<td>Proaso + Caramba</td>
<td>6.5 + 14</td>
<td>Anthesis + 4 days after anthesis</td>
<td>7</td>
<td>3</td>
<td>0.91</td>
<td>1.3</td>
<td>1</td>
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<tr>
<td>WB Mayville</td>
<td>Caramba + Folicur B</td>
<td>14 + 4</td>
<td>Anthesis + 4 days after anthesis</td>
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<td>0.94</td>
<td>0.9</td>
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<tr>
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<td>Prolinc + Folicur B</td>
<td>5.7 + 4</td>
<td>Anthesis + 4 days after anthesis</td>
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<td>7</td>
<td>0.78</td>
<td>1.4</td>
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<td>...</td>
<td>56</td>
<td>20</td>
<td>11.4</td>
<td>6.5</td>
<td>12</td>
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<td>...</td>
<td>48</td>
<td>12</td>
<td>6.02</td>
<td>3.8</td>
<td>5</td>
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<td>Anthesis</td>
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<td>0.91</td>
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<td>Proaso + Caramba</td>
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<td>0.77</td>
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<td>...</td>
<td>46</td>
<td>10</td>
<td>4.5</td>
<td>5.8</td>
<td>5</td>
</tr>
</tbody>
</table>

**Mean:**

- Incidence: 23
- Severity: 8
- DON (ppm): 50
- FDK (%): 2.8
- Yield (bu/A): 4
- Test Weight (lbs/bu): 50

**CV (%):**

- Incidence: 28
- Severity: 35
- DON (ppm): 3.1
- FDK (%): 35
- Yield (bu/A): 53
- Test Weight (lbs/bu): 13

**LSD (5%):**

- Incidence: 9
- Severity: 4
- DON (ppm): 2.3
- FDK (%): 1.4
- Yield (bu/A): 3
- Test Weight (lbs/bu): 9

**Note:** Untreated check (non-inoculated) received no artificial inoculum

**DON:** Deoxynivalenol

**FDK:** Fusarium Damaged Kernels

**Acknowledgements:** Bryan Hanson, Travis Hakanson and Lawrence Henry for their technical support