1. The role of fungicides in controlling Fusarium head scab in wheat

There are three new fungicides on the market now that can provide some degree of control of Fusarium head scab in wheat: Caramba, Folicur (and generic tebuconazole), and Prosaro. In 2008, we tested these fungicides for control of Fusarium head scab on several wheat varieties with varying degrees of resistance.

This was a field trial near Manhattan. The plots were inoculated by spreading corn grain colonized by Fusarium on the soil surface in three separate applications about two weeks apart beginning four weeks prior to heading. During heading and flowering, plots were sprinkler irrigated during the overnight hours. The fungicides were applied at Feekes Growth Stage 10.5 (fully headed) in 20 gallons of water per acre.

<table>
<thead>
<tr>
<th>Variety (and Fusarium head scab rating)</th>
<th>Fungicide</th>
<th>Rate (oz/acre)</th>
<th>Avg. % diseased spikelets (May 30-June 9)</th>
<th>Grain yield (bu/acre)</th>
<th>% Scabby kernels</th>
<th>DON (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truman (MR)</td>
<td>None</td>
<td>--</td>
<td>9.9</td>
<td>56.2</td>
<td>2.5</td>
<td>14.4</td>
</tr>
<tr>
<td></td>
<td>Prosaro</td>
<td>6.5</td>
<td>2.7</td>
<td>72.7</td>
<td>0.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Karl 92 (MS)</td>
<td>None</td>
<td>--</td>
<td>35.1</td>
<td>27.9</td>
<td>36.3</td>
<td>22.9</td>
</tr>
<tr>
<td></td>
<td>Prosaro</td>
<td>6.5</td>
<td>23.7</td>
<td>34.6</td>
<td>23.8</td>
<td>23.7</td>
</tr>
<tr>
<td>Overley (S)</td>
<td>None</td>
<td>--</td>
<td>52.5</td>
<td>22.1</td>
<td>53.8</td>
<td>41.8</td>
</tr>
<tr>
<td></td>
<td>Prosaro</td>
<td>6.5</td>
<td>35.1</td>
<td>30.5</td>
<td>42.5</td>
<td>33.3</td>
</tr>
</tbody>
</table>
The inoculation of this plot resulted in a severe Fusarium head scab infection. The fungicides were able to significantly reduce the % diseased spikelets in all varieties, and the % scabby kernels in all varieties except Tomahawk. The fungicides also significantly increased grain yields in all varieties except Tomahawk.

In terms of reducing DON (deoxynivalenol) concentrations in grain to acceptable levels, the fungicides were not as effective. Applying Prosaro, Caramba, or Folicur to Overley, for example, only reduced DON concentrations from 41.8 ppm to 27.9-35.4 ppm, far above the acceptable level of 2 ppm.

Based on these results, it takes a combination of fungicides and more resistant varieties to reduce DON concentrations to acceptable levels. More resistant varieties seem to show higher benefits from fungicide application for Fusarium head scab than susceptible varieties, in terms of DON reductions.

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2. Troubleshooting a wheat development problem in western Kansas

One of the main topics recently has been the effect of recent cold temperatures on wheat growth and development. Even before the hard freezes in late March and early April, it was apparent that some wheat had been injured by cold temperatures. A good example of this kind of problem was found in Scott County in March. A description of the problem and possible causes follows.

Field History:
This irrigated field was planted to wheat in 2007 with an average yield of 70 bu/ac. It was grown in a no-tillage situation and was harvested with a draper header. The following year, a 220 bu/ac no-till corn crop was grown. This year, the producer went back to no-till wheat. The initial stand was good, and the wheat was off to a great start. However, in mid-February, some damage to the wheat crop was noted. The wheat did not recover, and by mid-March, the following picture was taken showing an aerial view of the wheat crop damage.
After going to the field, a heavy residue mat was found as a result of the highly productive previous crops. The residue from the 2007 wheat crop did not decompose much due to dry conditions over the last year. The following picture illustrates that the crown development occurred above the soil surface in the crop residue. When the cold February temperatures came, the crown that developed in the residue was severely damaged by the freeze. Some areas of the field also had crop residue pushed into the seed slice, resulting in an opening that allowed additional seedling injury.
The producer was able to use a handheld GPS unit to correlate problem areas in the field with previous crop yields and planter speed. From this, he made some general conclusions. His comments follow:

- In most areas where the wheat was dead, the crown was elevated slightly above the soil surface. The crown was growing in heavy residue, not soil.
- In some places where the crown was slightly below the soil surface, it was packed with decaying wheat residue from the 2007 wheat crop.
- Interestingly, the residue from the 2007 wheat crop (70 bu/acre) appears to have caused more problems than the 2008 corn residue.
- In some areas, it appears we can pick out the combine tracks from the 2007 wheat harvest. The combines used on the field were not especially good at residue distribution.
- In nearly every case, the seed was planted 1.5 - 2” deep.
- We exported the planting speed shape file to a handheld/GPS. We couldn’t correlate planting speed to poor stands in any area.
- After studying the aerial imagery closer, we can see that where the irrigation pivot ran from March 6-March 10, there is less winterkill. The temperature dipped to 8 degrees on March 11 and stayed below 20 degrees for several nights. Irrigation resumed on March 14. Although some initial damage was present on the 3rd week of February, the watering from Mar 6-10 saved a lot of wheat. Most of the more severe damage occurred from March 10-March 13.

Conclusions:
- Crown development in previous crop residue, at or above the soil surface, was the primary cause of the cold injury.
- It doesn’t appear that planting depth was related to crown placement.
- Residue does not insulate the crown as well as soil.
- Wet residue and wet soil insulate the crown much better than dry residue and soil.
3. Post-freeze insect activity on wheat and alfalfa

Producers should be scouting wheat and alfalfa fields closely for aphids and other insects after the recent hard freezes.

Wheat: Be on the lookout for bird cherry-oat aphids. After the freeze damage in 2007, bird cherry-oat aphids were a big problem on wheat. Sugars can build up in the leaves and stems of damaged plants, and this attracts aphids. In addition, the freeze has killed some beneficial insects that feed on aphids. Whether it will pay to spray for aphids will depend on the condition of the crop and the outlook for recovery, however.

Alfalfa: Watch out for increased pea aphid and alfalfa weevil activity, for the same reasons as explained for wheat. The beneficial insects have been hurt by the freeze, leaving an opportunity for pea aphids to thrive. Several alfalfa fields were sampled on April 8 (two days after the record-breaking freezing temperatures). All alfalfa weevil larvae collected were still 1st instars, however about 1/3 were dark brown to black and dead. Several lighter brown individuals were still alive. However, many larvae were apparently just hatching, or had recently hatched. The cool-cold temperatures slowed weevil development and consequent feeding for a while. Hatching will probably continue intermittently during warmer temperatures (above 48 °F) for the next couple of weeks, thus extending the scouting / treatment window. Remember, insecticides are not as effective below 50 °F, so as temperature fluctuations continue these alfalfa fields need to be closely monitored for weevil infestation and insecticide effectiveness.

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4. Wheat Diagnostic School in Garden City, May 13-14

The Southwest Research and Extension Center (SWREC) in Garden City will hold its 2009 Wheat Diagnostic School on May 13 and 14, starting at 8:00 a.m. Topics and presenters will include:

- Wheat, Growth, Development, and Staging
  - By Jim Shroyer and Brian Olson
- Cover Crops and Crop Rotations
  - By John Holman
- Entomology
  - By Philip Sloderbeck
- Weed Control and Herbicide Injury
  - By Curtis Thompson and Dallas Peterson
• Wheat Planting Date, Seeding Rate, and Tillage
  o By Kraig Roozeboom and Jeanne Falk
• Grazing Wheat
  o By Jeff Edwards, OSU
• Nitrogen Fertilizer with Seed and as Topdress
  o By Kent Martin and Dorivar Ruiz-Diaz
• Sprayer Calibration and Nozzles
  o By Bob Wolf
• Wheat Diseases
  o By Eric De Wolf
• Weed Identification
  o By Dallas Peterson and Curtis Thompson

Pesticide applicator and certified crop consultant credits are currently pending approval. This school is open to everyone interested in wheat production. To ask about the cost of the school and to preregister, please call contact Kent Martin at kentlm@ksu.edu or call 620-275-9164.

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These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, or Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader 785-532-0397 jshroyer@ksu.edu