Wheat Stem Rust

- *Puccinia graminis f.sp. tritici*

- Hosts: wheat, barley, other grasses.

- Minor losses for many years: barberry eradication and multiple resistance genes.

Field Study Methods


• Spring wheat variety ‘Baart’ (highly S to Pgt).

• Six fungicides / flat-fan vs. twin-jet nozzles.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>N/A</td>
</tr>
<tr>
<td>Dithane</td>
<td>2 lbs/A</td>
</tr>
<tr>
<td>Folicur</td>
<td>4 oz/A</td>
</tr>
<tr>
<td>Headline</td>
<td>9 oz/A</td>
</tr>
<tr>
<td>Prosaro</td>
<td>8 oz/A</td>
</tr>
<tr>
<td>Quilt</td>
<td>10 oz/A</td>
</tr>
<tr>
<td>Tilt</td>
<td>4 oz/A</td>
</tr>
</tbody>
</table>
Field Study Methods

• Natural inoculum (found in another nursery).

• Collected urediniospores and inoculated spreaders ~10 days before fungicide application.
Field Study Methods cont.

• Applied fungicides at Feekes 10.5 using CO2-backpack sprayer, 20 gal/A.

• Inoculated ‘Baart’ 48 hours after application.

• Nursery was lightly misted at night for 10 days.
Field Study Methods cont.

- Plots rated for leaf and stem rust at 14 days after inoculation: severity on lower, middle, and upper canopy tissues.

- Plots harvested: yield, test weight, etc.
Wheat Stem Rust Fungicide Trial Results (2008)
Stein and Gupta, SDSU.

Stem Rust (on stem tissues)

Results from a 2008 field study on wheat stem rust in Brookings, SD. Bars represent Tukey’s HSD, indicating significance. Treatments were applied at flowering. For more information, please contact Dr. Jeff Stein, Plant Science Dept., SDSU 605-688-5540, jeff.stein@sdsstate.edu.
Field Study Summary

- The modern products tested significantly reduced symptoms - triazoles were best.

- Nozzle type did not matter in this study. Note: not typical application speeds.

- Yield was very low for all treatments: heavy leaf rust early, late planting date, etc. Significantly higher for all modern fungicides (i.e. all but Dithane).

- Concerns: strobilurins & FHB/DON issue -> only one class of fungicides for use (tolerance).
Current Field Study

- Three states are participating: SD, MT (M. Burrows), IN (K. Wise). Small study in KS.

- Near complete list of products (12). Everything tested at 2+ locations.
  - Strobilurin: Headline and Gem.
  - Dual-MOA: Quilt, Stratego & Stratego Pro, and Twinline.
Acknowledgements

• People: Vivek Gupta (Ph.D. student) and Chris Nelson (Ag. Res. Manager).

• Funding: USDA-CSREES (Critical Issues), SD Wheat Commission, SD. Ag. Exp. Station.
Thank You.

Questions?
Other Projects

• “Poison plate” assay to determine impact of fungicides on urediniospore germination: strobilurins (<0.01 ppm) >> 2nd generation triazoles (2-4 ppm) > 1st generation triazoles (~15ppm).

• Infection model (temperature * RH) for use in risk advisory systems.

• Working with breeders on developing resistant germplasm (parents).