Wheat Diseases and Their Control in a No-till Management System

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Oklahoma State University
Low- or no-till affects impacts disease incidence/severity via increased residue on soil surface that affects **pathogen inoculum** and/or **alters the soil environment** (moisture/temperature)
The Disease Triangle

Host

Environment

Pathogen

Courtesy of J.P. Damicone
Some Diseases – No or little effect

Leaf rust

Striped rust

Loose smut

Common bunt

WSBM & WSSMV

WSMV

Courtesy Dr. Jeff Edwards, OkSU

Courtesy Dr. Stephen Harrison, LSU
Aphids: Barley Yellow Dwarf Virus

Aphids: BYDV

Decreased disease

Increased residue is less attractive to aphids

Photo credit: extension.entm.purdue.edu
ROOT DISEASES

Strawbreaker foot/root rot is **decreased** due to residue inhibiting spore dispersal to seedlings.

Strawbreaker foot root (eyespot)
ROOT DISEASES

Dryland root rot is **decreased** because the soil environment becomes more cool and moist.

Dryland root rot caused by *Fusarium*

Courtesy of Dr. B. Bowden, USDA-ARS, Manhattan, KS
ROOT DISEASES

Sharp eyespot (Rhizoctonia root rot) and Pythium root rot are increased due to the soil environment becoming more cool/moist & inoculum is increased.

Sharp eyespot caused by *Rhizoctonia*

Poor seedling stand due to *Pythium* root rot
Take-all root rot is increased because the soil environment becomes more cool/moist & inoculum is increased.
Effect of seed treatments on ground cover in Oklahoma in 2009

Drs. Jeff Edwards & Hunger, OkSU
Yield response to Raxil and Gaucho seed treatments in Oklahoma in 2008

Dr. Jeff Edwards, OkSU
Foliar Diseases: Powdery Mildew

- Powdery mildew
- Increased disease
- Increases pathogen inoculum
FOLIAR DISEASES
Septoria leaf & Stagonospora glume blotch

- Septoria leaf blotch – note “pycnidia” (black specks)
- Stagonospora glume blotch

Increased disease
Increased pathogen inoculum
Foliar Diseases
Tan Spot

Lesions on leaves

Resting bodies on straw

Tan spot  Increased disease  Increases pathogen inoculum
Percentage (%) tan spot severity as affected by management practices, cultivars, & fungicide

2145 = Susceptible
Overlay = moderately resistant
Crop Rotation is helpful with No-till

• If do not rotate crops in a no-till system, there likely will be problems over time with tan spot, septoria, powdery mildew, etc

• Even with rotation, a disease such as Fusarium head blight can occur in a wheat-corn rotation

Photo credit: Oklahoma Conservation Commission

Fusarium head blight (aka scab)
Effect of wheat-sorghum rotation on tan spot severity

Effect of wheat-sorghum rotation on wheat yield

Wheat Foliar Fungicides in Oklahoma
(Not all are yet labeled for use on wheat)

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate (oz/A)</th>
<th>PHI(^a) (days/GS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRIAZOLE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilt – Syngenta</td>
<td>4</td>
<td>10.5</td>
</tr>
<tr>
<td>Alto – Syngenta</td>
<td>3.0-5.5</td>
<td>30</td>
</tr>
<tr>
<td>Folicur – Bayer CropScience</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Prosaro – Bayer CropScience</td>
<td>6.5-8.2</td>
<td>30</td>
</tr>
<tr>
<td><strong>STROBILURIN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headline – BASF</td>
<td>6.0-9.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Evito – Arysta LifeScience</td>
<td>2-4</td>
<td>40</td>
</tr>
<tr>
<td>Aproach – DuPont</td>
<td>6-12</td>
<td>45, 14, 7/10.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>straw, hay, forage</td>
</tr>
<tr>
<td><strong>MIXTURES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quilt – Syngenta</td>
<td>14</td>
<td>45/10.5</td>
</tr>
<tr>
<td>Quilt Xcel – Syngenta</td>
<td>10.5-14</td>
<td>30</td>
</tr>
<tr>
<td>Stratego – Bayer CropScience</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>Stratego YLD – Bayer CropScience</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>TwinLine – BASF</td>
<td>7-9</td>
<td>30/10.5</td>
</tr>
<tr>
<td>Priaxor – BASF</td>
<td>??</td>
<td>??</td>
</tr>
<tr>
<td><strong>PYRAZOLE – AMIDE &amp;/or MIXED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertisan – DuPont</td>
<td>??</td>
<td>??</td>
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</tbody>
</table>

\(^a\)PHI = pre-harvest interval; number of days required between last application & harvest.

Generics are available for Tilt and Folicur

This information is provided only as a guide. It is the responsibility of the pesticide applicator by law to read and follow all current label directions. No endorsement is intended for products listed, nor is criticism meant for products not listed.
Split Application of a Fungicide – on spring wheat in North Dakota

Dr. Marsha McMullen, North Dakota St. Univ

- Yield increases of 2-7 bushels IF environment favorable for disease; greater return if have wheat stubble present and the it is a susceptible variety
Split Application of a Fungicide

Wheat Growth Stages

4-5 leaf Stage = Feekes 2

Tillering stage
Wheat Disease Control with Fungicides - 2011

Fungicides
- applied on 16-Mar* (GS 6), 05-Apr** (GS9), & 12-Apr (GS 10.1)
- PM rated on 01-Apr; LR rated on 19-May
Yield (bu/A) & test weight (lb/bu)

Fungicides applied on 16-Mar* (GS 6), 05-Apr** (GS 9) and 12-Apr (GS10.1)

BUT for Hdline FB Twinline, it was a half rate of Twinline
Summary of Effects of Tillage on Wheat Diseases

- No- or low-till increases residue that affects disease by:
  - increasing pathogen inoculum
  - altering the soil environment (cooler, more moist soil)
- Rotate crops and have a plan for the rotation
  - generally a rotation to a legume is best
- Consider reactions of varieties to diseases
  - e.g., a variety with some resistance to tan spot, septoria, etc.
- Use a seed treatment to help stand establishment
- Use fungicide to help with foliar disease control, especially in continuous wheat