Managing Stripe Rust In Winter Wheat In Western Canada

JM Lobo* and HR Kutcher
Department of Plant Sciences
University of Saskatchewan
Outline

• Winter wheat
• Stripe rust
• Disease control
• Objectives
• Results
• Conclusions

Credit: Realagriculture.com
Winter Wheat

• Higher yield potential than spring wheat (15 to 40%)
• Reduced herbicide use
• Workload evenly distributed
• Less disturbance to wildlife
Stripe Rust

*Puccinia striiformis* f. sp. *tritici* Eriks

• Yellow-stripes along the leaf blades
• Favoured by cool conditions and high moisture
• Can be dispersed by wind over long distances
• Can reduce yield up to 35%
Disease Control

- Agronomic practices
  - Plant spacing
  - Eradication of alternate host
- Cultivars
  - Resistant or moderately resistant
- Fungicides

Credit: CIMMYT
Objectives

Use of fungicide and fungicide timing to control stripe rust on four cultivars of winter wheat, assess cultivar resistance
Methodology

• Location and year: Saskatoon 2014

• Cultivars:
  • Osprey, Bellatrix (S)
  • Moats, Radiant (R)

• Fungicide: metconazole and pyraclostrobin (40 g and 65 g a.i/ha)

• Treatments:
  • Check
  • Fall
  • Spring
  • Both
A = actual amount of tissue occupied by pustules (Cobb scale)

B = equivalent damage to leaf (Modified Cobb)

* If A = 18.5% area occupied by pustules, this is equivalent to B = 50% damage to the leaf

Rust Severity Assessment Key
Stripe Rust at Saskatoon in 2014
Susceptible cultivars

Unsprayed Fall Spring Both
Bellatrix Osprey

Disease Severity (%)

Unsprayed Fall Spring Both

Distances between bars indicate differences in disease severity.

Bellatrix:
- Unsprayed: a
- Fall: a
- Spring: b
- Both: b

Osprey:
- Unsprayed: a
- Fall: a
- Spring: b
- Both: ab
### Yield at Saskatoon 2014

#### Susceptible cultivars

<table>
<thead>
<tr>
<th></th>
<th>Unsprayed</th>
<th>Fall</th>
<th>Spring</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bellatrix</strong></td>
<td><img src="https://example.com/graph1.png" alt="Graph" /></td>
<td><img src="https://example.com/graph2.png" alt="Graph" /></td>
<td><img src="https://example.com/graph3.png" alt="Graph" /></td>
<td><img src="https://example.com/graph4.png" alt="Graph" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Unsprayed</th>
<th>Fall</th>
<th>Spring</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Osprey</strong></td>
<td><img src="https://example.com/graph5.png" alt="Graph" /></td>
<td><img src="https://example.com/graph6.png" alt="Graph" /></td>
<td><img src="https://example.com/graph7.png" alt="Graph" /></td>
<td><img src="https://example.com/graph8.png" alt="Graph" /></td>
</tr>
</tbody>
</table>

**Legend:**
- **a** indicates a significant difference compared to the unsprayed treatment.
- **b** indicates a significant difference compared to the fall and spring treatments.

**Note:** The graphs display yield (Kg/ha) for different treatments and seasons.
Stripe Rust at Saskatoon in 2014
Resistant cultivars

Disease Severity (%)

Unsprayed  Fall  Spring  Both  Unsprayed  Fall  Spring  Both
Moats       Radiant

0  10  20  30  40  50  60  70  80  90  100
Yield at Saskatoon 2014
Resistant cultivars

<table>
<thead>
<tr>
<th>Moats</th>
<th>Unsprayed</th>
<th>Fall</th>
<th>Spring</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield (Kg/ha)</td>
<td>b</td>
<td>ab</td>
<td>a</td>
<td>ab</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Radiant</th>
<th>Unsprayed</th>
<th>Fall</th>
<th>Spring</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield (Kg/ha)</td>
<td>b</td>
<td>b</td>
<td>ab</td>
<td>a</td>
</tr>
</tbody>
</table>
Emergence counts

Bellatrix
Osprey
Moats
Radiant

Plants/m²

Fall
Spring

* *
Conclusions

• Bellatrix and Osprey are the most susceptible cv to stripe rust and yield is affected

• Spring time is the most effective to control stripe rust on winter wheat

• Resistant cultivars can yield as much as susceptible cultivars with fungicide treatment
Acknowledgments

• Cereal and flax pathology lab
• Summer students
Questions?

It's 100% whole wheat. It's good for you.

How am I supposed to make a sandwich with this?

100% Whole Wheat

Linda Causey 2007