

Agriculture et Agroalimentaire Canada

Cereal Disease Management

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Outline

- Seed, seedling and root rot diseases
- Stripe rust
- Fungal Leaf Spot (FLS) complex
- Physiological Leaf Spot (PLS)
- Fusarium Head Blight
- Fungicide timing for control of FLS

Seed rot, seedling blight, root rot





Stripe rust on wheat and barley

- Can be very severe
 - Rust spores blown in from US
 - Pacific Northwest
 - Overwintering
 - Some adaptation to resistant varieties
 - Now appear to be susceptible



Stripe rust resistance: key strategy



Regular scouting is critical!

- Key when growing variety with VP to F reaction
 - Are symptoms present in winter wheat the previous fall
 - Monitor winter wheat in spring
 - Keep an eye on fields
 - On a regular basis
- Follow updates





Stripe rust of wheat

- Foliar fungicide
 application
 - -Flag leaf protection
 - Protect leaves that are key to grain filling
 - Earlier applications may be needed
 - Where symptoms are widespread in a field
 - A flag leaf/head emergence stage application may still be needed



Typical Symptoms of Fungal Leaf Spot Diseases





Tan Spot

Red smudge

Leaf Yellowing Due to Abiotic Issues or Viral Diseases (two far right leaves)



Physiological leaf spotting

Dept. Ag. Western Australia

Burrows et al. 2009, MSU







Physiological Leaf Spotting

Light-induced PLS on leaves from winter barley cv. Anoa from shaded (left) and unshaded (right) field plots (GS 65).

http://wwwuser.gwdg.de/~instphyt/app /research/pls.html

Shaded Unshaded



Wu and Tiedemann (2002)

CDC Kestrel winter wheat

Courtesy of C.A. Grant et al.

K₂SO₄

KCI



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CDC Falcon also prone to PLS

Fusarium Head Blight

- Continues to cause downgrading issues for many fields in S. Alberta
- Becoming more established in areas further north?
- Difficult to manage
 - Stubble-borne and seed-borne disease
 - Spores travel large distances
 - Corn and durum wheat are excellent hosts
 - Narrow window for fungicide application
 - No strong resistance





Worst Case Scenario For Creating an FHB Problem

- No idea regarding seed infection
- No seed treatment done
- Grow highly susceptible variety
- Grow same cereal crop type for grain production several years in a row
- Farm located in moister regions of Alberta or where irrigation occurs
- Include corn in rotation with cereals

Using Fungicides to Manage Cereal Diseases

- Integrate all available knowledge into pest management
 - crop biology and growth stage
 - pathogen biology and disease cycle
 - weather conditions and forecast
 - field history, yield potential and yield target
 - economic thresholds
 - fungicide characteristics
- If you can't or don't have long, diverse crop rotations, you will need to lean more on other management tools like fungicides

Impact of Rotation

Disease Severity For CDC Earl Grown on Different Cereal Stubble, 1999



Impact of Rotation

Grain Yield of CDC Earl Grown on Different Cereal Stubble, 1999



Kasota – after one year



Kasota – after three years in a row

Turkington et al. 2005. Can. J. Plant Pathol. 27: 1-8.

Contribution to yield from upper leaves of the cereal canopy

Cereal growth stages and their importance to fungicide application, 2003, Colin Hacking and Nick Poole, Hi-Grain Update



Effect of fungicide timing

Figure 1.7-2. Growth stages of cereals.



Grain yield (bu/ac) and herbicide/fungicide treatment, Lacombe 2010



Herbicide/Fungicide Treatment

Grain yield (bu/ac) and herbicide/fungicide treatment, Melfort 2010



Herbicide/Fungicide Treatment

Grain yield (bu/ac) and herbicide/fungicide treatment, Scott 2010



Herbicide/Fungicide Treatment

Net blotch symptoms on Harrington barley at the 3 leaf stage (June 18th) at Melfort, 2004



Conclusions

- Know what you are dealing with

 Scouting, diagnosis/testing, record keeping
- Obtain and Integrate as much knowledge, and as many tools, as possible to optimize crop health and make decisions
- When using fungicides, spray decision and timing are most important
 - protect the part(s) of the crop that contribute to yield