Fusarium Head Blight (FHB) of Cereals

A Disease of Concern For Alberta!

Symptoms of fusarium head blight caused by Fusarium graminearum

Impact of Fusarium Head Blight

- Reduced yield, thousand kernel weight, kernel plumpness, grade, and end-use quality characteristics
- Mycotoxin contamination of harvested grain
  - Chemicals produced by F. graminearum during host infection
  - Deoxynivalenol (DON) most common and important mycotoxin
  - Reduced feed intake and weight gain in monogastrikas (e.g., hogs)
  - Rejection of barley for malt

Managing Fusarium Head Blight

- Use healthy seed with no detectable levels of F. graminearum
  - Avoids introducing pathogen into areas where F. graminearum is not established on crop residues
- Increase seeding rates
  - More uniform and shorter flowering period for crop
    - More tillering means more variation in crop growth stage
  - Shortens the period the crop is flowering, which is the growth stage most at risk for infection
  - Minimizes the period during which irrigation should be limited
  - May help to improve fungicide performance as most if not all of the crop will be at the key growth stage for application
- Variety
  - Varieties with resistance are available, but do not eliminate the risk
  - Consult the annual provincial variety guide for more information
- Crop rotation
  - Continuous or short rotation cereals or corn allows for build up of infected residues
  - Avoid corn in rotation (use field pea, canola, etc.)
    - F. graminearum causes stalk and ear rot in corn
    - Infected corn residue can serve as a source of the fungus (inoculum)
  - Avoid planting next to a field with infected cereal or corn residues
- Stagger planting dates
  - Humid weather during flowering (anthesis) in wheat or heading in barley favors infection
  - Avoid having all cereals on farm flowering at the same time
- Irrigation management
  - Limit irrigation during the flowering period to help limit risk
- Fungicide application (wheat)
  - Provides suppression only and may only reduce mycotoxin level
  - Application prior to infection is critical
- Harvest management (combine adjustment)
  - Adjust combine to blow out light-weight infected kernels
    - Reduce damaged kernels, seed infection, and mycotoxin contamination
    - Not an option for barley and oats
  - May blow highly infected light-weight grain back on the field where it can act as a source of disease
- Post-harvest management
  - Thorough chopping, and uniform spread and distribution of straw
    - Encourages decomposition of infected straw in all cropping systems

Fusarium Damaged Wheat

- Healthy kernels
- Fusarium damaged kernels
- Not all Fusarium Damaged Kernels (FDK) will be pinkish. If kernels are infected with Fusarium graminearum they may contain the mycotoxin, deoxynivalenol (DON). A 5% level of FDK (by weight) with F. graminearum generally translates into 5 ppm DON.

Fusarium Damaged Barley

- Healthy kernels
- Pinkish kernels
- Fusarium Damaged Barley maggot will cause single stems to prematurely ripen
- Wheat stem maggot will cause single stems to prematurely ripen

Fusarium Damaged Oats

- Healthy kernels
- Pinkish kernels
- Barley grain overwintered in the swath can look moldy and even pinkish. These symptoms are not caused by F. graminearum, but by F. avenaceum, which does not produce DON

Disease symptoms that resemble fusarium head blight caused by F. graminearum

- Premature ripening due to take-all root rot
- Advanced ripening due to take-all (note sooty mold growth on dead tissue)
- Root rot caused by Fusarium spp. or C. sativus will cause premature ripening
- Copper deficiency causes patchy ripening. Roots are normal. Large areas may be affected
- Blighted wheat head and sporulation due to another Fusarium species
- Blotted and rotted kernels show orangish sporulation (sporodochia)
- Discolouration of barley heads and sporulation due to spot blotch and net blotch
- Healthy kernels
- Pinkish kernels

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• Photographs courtesy of the Western Committee on Plant Disease, and R.A Martin, I. Evans, R. Clear, A. Tekauz, J. Gilbert, and T.K. Turkington
• Consult provincial factsheets (e.g. Fusarium Head Blight of barley and wheat, Agdex 110/631-1, AAARDF) and variety guides for more information