

Fusarium Head Blight (FHB) of Cereals



Agriculture and
Agri-Food Canada

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Agriculture and Rural Development

A Disease of Concern For Alberta!

Symptoms of fusarium head blight caused by *Fusarium graminearum*



Partially blighted wheat heads are most common



Healthy (right) and blighted wheat head (left)



Blighted wheat heads



Sporodochia

Blighted barley and wheat florets showing orangish sporulation (sporodochia)



Blighted wheat floret



Discoloured barley heads



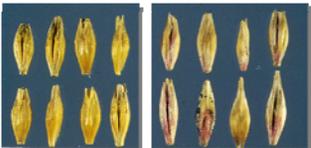
Fusarium Damaged Wheat



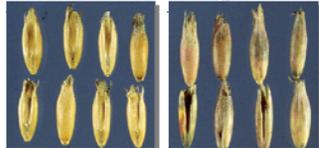
Healthy kernel, Fusarium damaged kernels, White kernels, Pinkish kernels

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 Fusarium Damaged Oats



Healthy kernels Pinkish kernels



Healthy kernels Pinkish kernels

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 monogastrics (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 infested 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

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



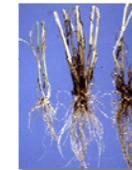
Premature ripening due to take-all root rot



Advanced ripening due to take-all (note sooty mold growth on dead tissue)



Blackened stem and roots confirm take-all root rot



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



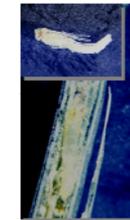
Blighted wheat head and sporulation due to another *Fusarium* species



Discolouration of barley heads due to spot blotch and net blotch



Wheat stem maggot will cause single stems to prematurely ripen



Wheat stem maggot inside stem



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

- Prepared by T.K. Turkington, AAFC, I. Evans, AAFRD, J. Calpas, AAFRD and L. Harrison, AAFRD (Updated February 2010, T.K. Turkington)
- 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, AAFRD) and variety guides for more information