

Fusarium

Fusarium graminearum, Fusarium Head Blight and the Alberta *Fusarium graminearum* Management Plan

Frequently asked questions

Background

Alberta is currently free from any Fusarium head blight outbreaks caused by *Fusarium graminearum*. If this fungal disease were to establish in this province, it would have major economic consequences for Alberta's cereal and animal feeding industries.

Fusarium head blight (FHB) is the most destructive fungal disease of barley and wheat in Canada. The occurrence and higher severity of FHB in cereal crops in western Manitoba and eastern Saskatchewan is cause for concern. The prevalence and severity of FHB in Manitoba and eastern Saskatchewan has caused major economic losses to producers and the grain export industry. This fungal disease greatly decreases yield and seed quality, and it generates mycotoxins (deoxynivalenol).

It is estimated that Manitoba now loses \$100 million annually due to loss of wheat and barley yield, reduced access to malt and hog feed markets, increased transportation costs associated with sourcing mycotoxin-free grain, and other impacts on end-use processing. Further movement west by this disease would be disastrous for the grain producing regions of western Saskatchewan and Alberta.

To help prevent the introduction and subsequent spread of this disease in Alberta, as well as to avoid the associated losses to Alberta's agriculture industry, *Fusarium graminearum* is officially named a pest under the *Alberta Agricultural Pests Act*.

1. What is the concern about *Fusarium graminearum*?

Fusarium graminearum is the fungus that causes Fusarium head blight. Fusarium head blight is a serious disease of small grain cereals. This pathogen also infects corn and a number of grasses.

1. Continued

There are currently **no effective control measures for this disease** once it is established in an area. There are **no resistant varieties** of wheat, barley, oats or other small grain cereals. Fungicides provide disease suppression at best, not disease control. The best control measure for Alberta producers is prevention.

Fusarium head blight causes significant losses in yield and quality. *Fusarium graminearum* also produces mycotoxins, particularly deoxynivalinol (DON), also known as vomitoxin, which causes feed refusal in animals and is a concern for the human food chain.

Fusarium head blight causes \$100 million a year in losses in Manitoba.

2. What are the symptoms of Fusarium head blight?

The common symptom is the blighted or bleached heads. Partially blighted heads are most common, and the head blight symptom is most easily recognized in wheat. The symptoms are more difficult to recognize in barley.

The grains in blighted heads often do not fill properly. Kernels can be shriveled and bleached, and these Fusarium damaged kernels, or FDK, are also known as tombstone kernels.

3. What is the Alberta *Fusarium graminearum* situation?

Fusarium graminearum is not common in Alberta cereal fields. Extensive surveys have determined that *Fusarium graminearum* is present only at trace levels in Alberta.

Further introduction of this pathogen will increase the presence of *Fusarium graminearum* in Alberta.

4. What is the *Fusarium graminearum* situation in the prairie provinces?

Research on the occurrence of *Fusarium graminearum* in the prairie provinces was conducted as early as 1940. At that time, it was determined that *Fusarium graminearum* was a minor pathogen at most and was not likely to cause significant problems for cereal producers.

Things have changed. The situation leading to the current devastation caused by *Fusarium graminearum* began to develop in Manitoba in the early 1980s. The disease began to build and cause losses in Manitoba wheat and barley fields. In the early 1990s, the disease grew out of control, causing terrible losses in Manitoba. The disease has remained a problem ever since and is spreading; it is now well established in southeastern Saskatchewan.

5. How does *Fusarium graminearum* spread?

Short distance spread occurs via the dispersal of spores that are blown from one cereal field to the next. Long distance spread occurs through the transportation of infected cereal or grass material. *Fusarium graminearum* is also seed borne and remains viable in grain intended for use as seed or feed. Cereal straw or grass hay can also be infected with *Fusarium graminearum*.

6. Won't Alberta's distinct environment keep *Fusarium graminearum* out of the province?

Alberta's environment provides the same conditions of temperature, humidity and moisture that have been present during *Fusarium graminearum* outbreaks in Manitoba, Minnesota, North Dakota, Ohio and Indiana. The environment in Alberta is **NOT** a barrier to *Fusarium graminearum*.

7. If *Fusarium graminearum* is spread via grain and crop residue, how come this disease is not already causing serious losses in Alberta? Doesn't Alberta import large quantities of cereal grain for feed?

It is true that Alberta is an importer of feed grains in support of our livestock industries, and it is true that infected grain has been brought into Alberta in recent years. We know that when infected grain is fed to cattle, *Fusarium graminearum* is killed by the cow's digestive system.

Our current situation with trace levels of *Fusarium graminearum* is likely a result of some good fortune and the bulk of the *Fusarium graminearum* in infected feed grain being killed as it was fed to cattle. Spilled grain, infected cereal seed, straw and grass hay represent a significant risk for *Fusarium graminearum* to escape into Alberta's agricultural land base. It is important to take immediate action to prevent the build-up of this pathogen while we still have the opportunity.

8. I've been told that *Fusarium graminearum* is eventually going to come to Alberta anyway; it's inevitable, so why bother trying to do anything about it?

It has been estimated that the field-to-field spread of *Fusarium graminearum* from Manitoba will eventually bring this disease to Alberta in about 10 to 20 years. It is important to recognize that every year that we prevent this disease from establishing in our province, we save approximately \$100 million. Prevention will help protect our industries from this disease until adequate control measures and resistant cereal varieties are developed.

9. What is the connection between *Fusarium graminearum* and corn?

Corn is a host of *Fusarium graminearum*, but the crop does not suffer much yield loss to this disease. The development and expansion of *Fusarium graminearum* in areas that primarily grow small grain cereals has been accelerated by including corn in the crop rotation. The number of *Fusarium graminearum* spores that can develop on corn residue is ten times greater than the number of spores that develop on small grain cereal residue.

10. How can the Alberta agricultural industry protect itself from this pest?

PROTECTION THROUGH PREVENTION. *Fusarium graminearum* represents a serious long-term threat to Alberta's agricultural industry. The environment will support the development and spread of this disease, and our cereal varieties are very susceptible to the disease. The only practical control option currently available is to prevent the establishment of the pathogen in high numbers in Alberta by limiting the amount of *Fusarium graminearum* that comes in contact with our fields. This option is the approach taken in the Alberta *Fusarium graminearum* Management Plan.

11. What are the key management strategies of the Alberta *Fusarium graminearum* Management Plan?

There are three key components to this plan:

- **First**, there is a zero tolerance for the presence of *Fusarium graminearum* in cereal grain intended for use as seed. This target is intended to prevent the introduction of seed borne *Fusarium graminearum* into cereal crops.
- **Second**, all feed grain must be handled responsibly (best management practices), such that the opportunity for *Fusarium graminearum* infected grain to contact the soil is minimized and that any spilled grain is collected and composted. Infected hay and straw are also to be handled in accordance with the best management practices. Any *Fusarium graminearum* in infected material that is composted so that the material reaches 60 to 70 °C is killed.
- **Third**, there is a zero tolerance for field infections of *Fusarium graminearum*. Infected crops will be destroyed, and the field will be taken out of cereal production for three years. This practical approach will be taken to eradicate *Fusarium graminearum* from the field.

12. The Alberta *Fusarium graminearum* Management Plan talks specifically about seed grain and feed grain; what about grass hay and cereal straw?

The importation of *Fusarium graminearum* infected grass hay and cereal straw into Alberta also represents a considerable risk for the introduction of *Fusarium graminearum* into Alberta's fields. Using straw as bedding material is a particularly high-risk practice because it places infected residue in direct contact with the soil.

Hay and straw must be handled in accordance with the best management practices for feed grain. Active measures must be taken to minimize the amount of infected grass hay and straw that contacts the soil, and any spilled grass hay and straw must be cleaned up and composted. The number of bedding sites should be minimized. Bedding straw must be collected and composted in early spring.

13. What happens to *Fusarium graminearum* when infected grain, hay and straw are fed to cattle?

Fusarium graminearum on infected feed material is killed when it passes through the digestive system of cattle.

14. How are the management strategies enforced?

The Alberta *Agricultural Pests Act* provides the legislative authority to enforce control for declared pests in Alberta. *Fusarium graminearum* has been a declared pest since 1999. Enforcement of pest control is delegated to the local municipalities and is carried out by the Agricultural Fieldmen.

The focus of the Alberta *Fusarium graminearum* Management Plan is awareness, not enforcement. The Agricultural Fieldmen will be working with producers to ensure they have the information to protect themselves and their neighbours from the effects of *Fusarium graminearum*. However, the Agricultural Fieldmen have the full authority to carry out the enforcement of control measures.

15. Why have some counties adopted a zero tolerance policy towards *Fusarium graminearum* even in feed grain, hay and straw when the provincial policy is for best management practices in feed grain, hay and straw?

The provincial policy is presented in the Alberta *Fusarium graminearum* Management Plan and establishes the minimum standard for *Fusarium graminearum* management that must be followed throughout the province under the authority of the *Alberta Agricultural Pests Act*.

15. Continued

Counties and municipalities have the authority to increase the level of disease control measures as they see fit. The zero tolerance policy of individual municipalities is enforced under the authority of the *Alberta Agricultural Pest Act*.

16. What powers of enforcement do the Agricultural Fieldmen have?

The *Alberta Agricultural Pests Act* states “A local authority of a municipality shall take active measures to prevent the establishment of, or to control or destroy pests in the municipality.” As Agricultural Fieldmen are responsible for enforcing the *Agricultural Pests Act*, they have broad powers to ensure the control measures for *Fusarium graminearum* are enforced.

If an Agricultural Fieldman is of the opinion that land, property or livestock contains or is likely to contain a pest, or should be protected against a pest, he or she can issue a notice. This notice will name the pest and any specific measures to be taken to prevent the establishment of or to control or destroy the pest within a specified time.

For example, if an individual is seeding cereals without a laboratory certificate demonstrating that the cereal seed was tested and found to be free of *Fusarium graminearum*, the Agricultural Fieldman can impound the seed and equipment until such time as a laboratory certificate is produced. If the seed tests positive for *Fusarium graminearum*, an Agricultural Fieldman can order the seed destroyed and can require that the field be taken out of cereal production for three years.

If a feeding operation is not handling feed grain in accordance with the best management practices and the presence of *Fusarium graminearum* is confirmed on the site, an Agricultural Fieldman can place a stop order on the activities of the operation until the operation complies with all the requirements of the best management practices or any other control measures specified.

In a zero tolerance county, an Agricultural Fieldman who confirms the presence of *Fusarium graminearum* in a load of hay or straw could order the load to be destroyed.

17. What are the best management practices for handling *Fusarium graminearum* infected feed grain, and where can I find them?

The best management practices for handling *Fusarium graminearum* infected feed grain are the control procedures outlined for feed grain in the *Alberta Fusarium graminearum* Management Plan. The best management practices also apply to hay and straw. The best management practices outline the control measures that limit the possibility of *Fusarium graminearum* moving from infected feed grain, hay or straw and establishing in Alberta's fields.