Fusarium HEAD BLIGHT

The Most Devastating Fungal Disease Of Wheat In Western Canada

BATTLE RIVER IMPLEMENTS

AGRONOMY UPDATE
March 2017

Producers in east-central Alberta have long been aware of Fusarium Head Blight (FHB), but it has always been considered more of a problem for eastern Saskatchewan and Manitoba than for our area. However, recent surveys and the visual evidence in our fields in 2016 indicates that this may be changing. FHB is the most devastating fungal disease of wheat in western Canada – it's coming to our fields and we need to learn how to deal with it.

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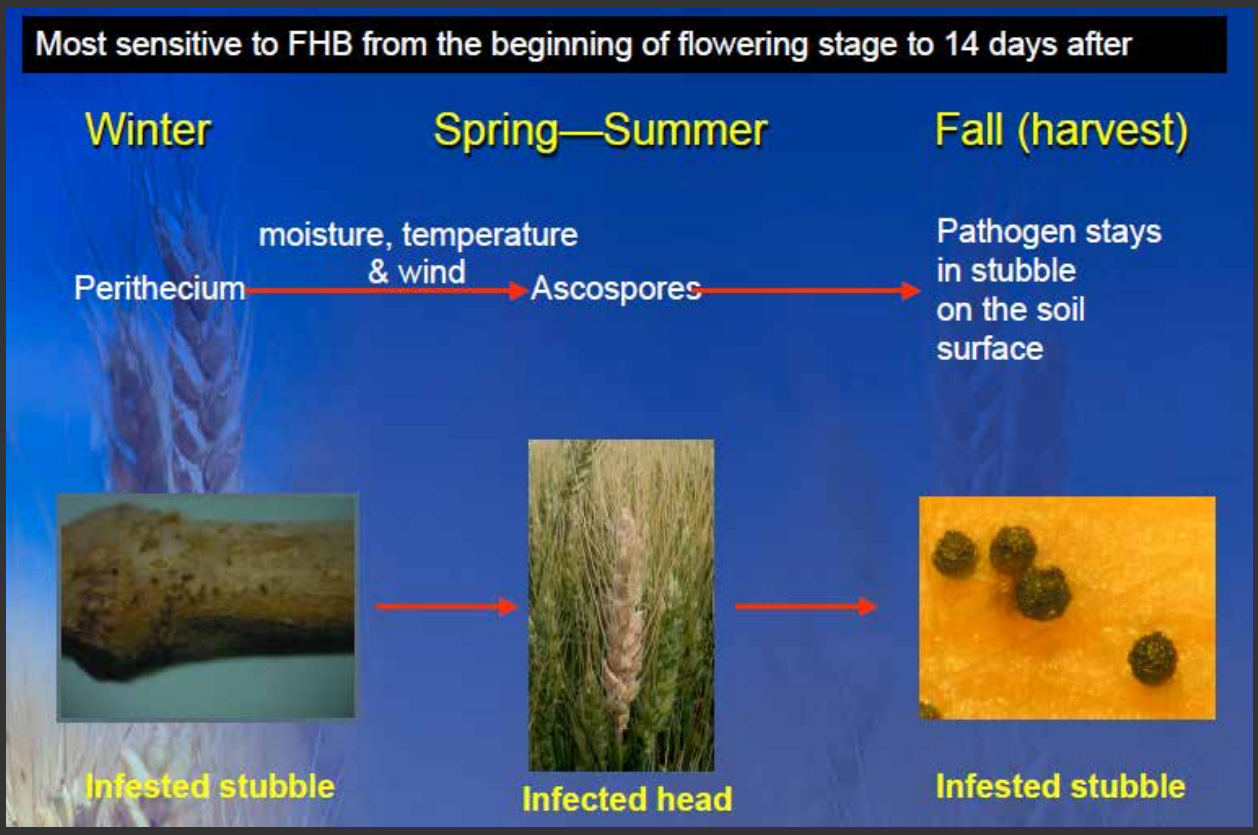
The first step to managing any disease is to understand what it looks like and how it spreads, so let's start with a description of the disease and its lifecycle. FHB shows up in wheat as premature bleaching of the florets, orange or white pustules on the glumes, and "tombstone" kernels in the grain sample. The disease can also use corn, barley and oats as a host.

Bleaching of Florets

Orange or white pustules on glumes

Tombstone kernels in wheat sample



Life cycle of Fusarium Head Blight

According to the Alberta Ag website "The main pathogen that causes FHB typically overwinters in crop and grass residues on or in the soil, as well as in seed. Seedlings can become infected at emergence. Wind-borne spores are formed in fruiting structures formed on old infested crop residues and are then spread by wind to infect florets when the grain is at the flowering stage. Warm, moist weather worsens the infection. A second rain-splashed spore stage can form on infected head tissue." While many species of fusarium may contribute to FHB, it is Fusarium Graminearum that causes most of the damage and is of the most concern to the industry.

THE IMPACT OF FHB

So what is the impact of this disease in Western Canada? A recent estimate by Dr. Dilantha Fernando of the University of Manitoba puts the economic impact of lost yield and quality, as well as lost marketing opportunities at around $1 Billion annually. These losses are mostly caused by the mycotoxins that are produced by the fungal infections. These mycotoxins are found in the harvested seed and form stable compounds that are not easily broken down during storage, milling, processing or cooking. The two main mycotoxins produced by a fungal infection from Fusarium Graminearum, are Deoxynivalenol (DON), which has a couple of different derivatives (15-ADON and 3-ADON for those who are counting) and nivalenol (NIV). These compounds are toxic to people and livestock at very low rates. Even at rates of around 1 ppm, the toxin causes appetite loss and reduces the rate of gain for livestock. The picture on the next page is of 2 hogs from the same litter, fed the exact same ration, except for one thing – one of these pigs had low doses of mycotoxins caused by FHB in its ration. It is not hard to see the effect!

There are also other mycotoxins that can be produced by FHB – in fact a new one was just identified at Carmen, Manitoba in 2016. It has also been confirmed that the "type" of DON mycotoxin we are seeing is evolving into an even more toxic "chemo type" as well as producing chemo types that we don't presently have the ability to effectively detect, leading to concerns about the safety of human consumed wheat products. The fact that the species of fusarium and the types of toxins they are producing seem to be evolving

Fruiting body that produces spores

Deoxynivalenol (DON)

7.5% reduction in feed intake for every 1 ppm DON found in the diet

is a concern. This has an impact on how we need to manage the disease, the levels of DON that may be acceptable at the grain elevators in the future, and may even impact our worldwide reputation as a reliable source of safe wheat.

So, that defines the scope of the problem. What can you as a producer do to limit the impact of this devastating disease on your farm? Unfortunately, there is no simple cure or magic bullet that is going to isolate your farm from the disease. What you can do will sound very familiar; the same agronomic principles that apply to managing herbicide resistance and limiting the spread of clubroot are also what works best here. So here are the things you need to keep in mind in order to manage Fusarium Head Blight:

1. **Clean Seed** – always have your seed tested for Fusarium Graminearum. According to research, (Gilbert et al, 2003) Fusarium infected seed does not directly lead to FHB. However, it will produce a stand that is more uneven and less healthy, making it more susceptible to diseases. The uneven staging will also make it harder to time fungicide applications. According to Alberta Agriculture's Fusarium Graminearum Management Plan, infected seed should never be planted.

2. **Good genetics** – while there are no resistant varieties of spring wheat, the levels of resistance is improving and the best time to start using varieties that are rated MR is before there are significant levels of inoculum in the field. Hopefully there will be resistant varieties available soon, as Emerson, the first winter wheat variety with FHB resistance, was recently registered.

3. **Crop rotation** – tight rotations combined with direct seeding leaves more of the stubble of the susceptible crop available as an overwintering habitat for the disease and increases the disease pressure on the field. A longer rotation, combined with residue management practices that will cut the straw into smaller pieces for faster breakdown will limit the ability of the pathogen to survive in the field long term. However, remember that the spores from fusarium species can travel for several kilometers by wind – so even if you are practicing good agronomic rotations, you can still get infections in your field.

4. **Timely applications of fungicide** - **the proper staging for treating FHB is from the time 75% of the heads are fully emerged to when 50% of the heads on the main stem are in flower.** Since this is a later application than what is best for cereal leaf diseases, there may be times that a second application of fungicide is considered. If this does happen, it is important to apply a fungicide with a different mode of action for each treatment. Just like herbicides, fungicides can quickly develop resistance

Timing for FHB Fungicide Treatment

All of these management practices can help reduce the levels of FHB in a field, but they will not eliminate the disease. And you need to employ all four methods to have a chance at managing the disease once it is established on your field. A reliance on fungicide alone will not be enough. And remember, weather is the main driving force behind infection levels. According to Manitoba Agriculture, "Weather patterns are by far the greatest factor in the recurrence of fusarium head blight. The disease is most likely to develop when the plants are flowering, temperatures range from 25-30 degrees C and moisture is continuous for 48 to 60 hours within three days after infection. Under these optimum conditions, crop management has little impact on fusarium outbreaks."

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Remember that Manitoba has been dealing with this disease for over 20 years and has learned many of the management lessons the hard way. The levels of disease they have in their fields is much greater than what we are seeing yet, so good agronomic practices still have the ability to impact disease levels to an extent no longer possible in the eastern Prairies. Now is the time to implement agronomic practices that will help keep the disease in check – or we will end up with FHB being as big a problem in Alberta as it is for Manitoba and eastern Saskatchewan.

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