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FUSARIUM HEAD BLIGHT REDUCES WHEAT SEED QUALITY

Don Hershman, Extension Plant Pathologist

Much of Kentucky experienced a damaging epidemic of Fusarium head blight (FHB) this spring. FHB, also known as head scab, significantly reduced yields and test weights in many fields across the state, but the worst damage occurred west of Interstate 65. Grain harvested from affected fields (Figure 1) commonly contained unacceptably high (2 to 20ppm) levels of the mycotoxin, deoxynivalenol (DON). DON contamination above 2ppm impacts grain marketability because of food and feed safety concerns.

Figure 1. Scabby grain on left has reduced germination and vigor compared to the healthy seed on the right.

Obviously, fewer bushels harvested, lower test weights, and lower prices received due to poor grain quality, have put a serious dent in the economics of wheat production this year. We have been through this before, however, and most farms survived and wheat production continued to be a viable farm enterprise. I expect we will recover from this FHB epidemic in like fashion.

The first step towards recovery is to plant the next wheat crop. To save money, many producers will opt to plant saved seed harvested from FHB damaged crops this fall. In fact, I am already beginning to receive questions about the impact of FHB and DON on seed quality. *Fusarium graminearum*, the fungus that causes of FHB, can significantly lower germination, as well as negatively impact seed vigor. Thus, great caution is advised if you are considering planting saved seed harvested from fields affected by FHB. Nonetheless, many FHB-compromised grain lots may still be a good source of seed as long as some attention is paid to some very important details, such seed cleaning, germination testing, and treating seed with a fungicide, when appropriate.

Although almost every wheat producer seems to understand that planting seed harvested from FHB-damaged crops requires special attention, many do have misconceptions about the impact of DON on seed quality, how *F. graminearum* behaves in storage, and the relationship between seed-borne *F. graminearum* and the potential for FHB to develop next spring. First, DON has NO impact on seed germination or stand establishment. In other words, seed quality concerns are solely a function of *F. graminearum* in and on the seed. If grain has high DON levels, the chances are

very good that *F. graminarum* levels will also be high, but DON in itself has no impact on the use of grain for seed purposes. DON is an indicator that there may be a seed quality problem. Secondly, *F. graminearum* will not develop further during storage. In fact, *F. graminearum* levels may actually decline in grain during long term storage (6-12 months). However, do not expect levels of the fungus to decline during short term storage. Lastly, planting seed contaminated with *F. graminearum* has NO impact, one way or the other, on FHB development next spring. The present discussion revolves entirely around achieving an acceptable stand of seedlings this fall.

Cleaning seed and having seed tested for germination are the first steps in dealing with potentially compromised seed lots. If germination is still not acceptable after cleaning, you should consider having a treated-germination test conducted. See the accompanying article on seed testing for more information. Numerous modern, and some older, fungicides have good to excellent activity against seed-borne *F. graminearum*. Seed with moderate germination problems can often be brought up to acceptable germination levels following treatment with a Fusarium-effective seed fungicide. Severely compromised grain, however, usually include a lot of dead seed (tombstones) and no amount of fungicide will bring dead seed back to life. Similarly, a seed that is still viable, but has greatly reduced vigor, is also unlikely to be helped much by a seed treatment fungicide. Thus, cleaning seed to remove as many tombstones and near-tombstones as possible, is the way to go, followed by seed treatment with Difenconazole, Fludioxonil, Imazalil, Tebuconazole, Thiabendazole, Triadimenol, or Tritconazole, if indicated. Check with your ag supply dealer and/or fungicide salesperson for more details on specific fungicides, rates and costs.

Before I close, I feel compelled to mention that some of the better seed quality this year will be associated with varieties that have at least some resistance to FHB. Conversely, some of the most compromised seed lots will be associated with varieties that are fully susceptible to FHB. Planting resistant varieties and applying a fungicide at early flowering are the main offensive weapons producers have to fight FHB and DON. I encourage you to consider planting a resistant variety this fall, even if it means having to buy seed rather than planting saved seed. To help with variety selection, consult the newly released 2009 UK Wheat Variety Test Report:

http://www.uky.edu/Ag/wheatvarietytest/

WHEAT SEED GERMINATION TESTING

Chad Lee, Plant and Soil Sciences

Wheat grain infested with *Fusarium graminearum*, the cause of Fusarium head blight (head scab) and harvested in 2009 may or may not be viable seed for planting this fall. Conditioning and germination testing will need to be carried out to determine the quality of potential seed lots. If germination initially tests very low, certain seed treatment fungicides may still be able to get the seed germination up to an acceptable level.

University of Kentucky Division of Regulatory Services tests wheat seed for germination. Each Kentucky farmer is eligible for one free germination test. The law states that the farmer must send a letter with the sample, saying that this is the free test sample for the year.

Tests for additional samples will be charged a small fee. Basic germination tests cost $7 per sample. Tests for both purity and standard germination cost $11 per sample. Treated germination tests, where the seed is treated with Raxil/Thiram prior to germination, costs $7 per sample. The treated test is advisable when seed wheat was harvested from a field with high levels of Fusarium head blight.

A germination test for wheat will take about 12 days during the summer months. The first five days are needed to eliminate transient dormancy in the seed and the next seven days are needed for the actual germination test.

If you wish to mail samples, Regulatory Services has complimentary seed envelopes. If you wish to deliver samples, Regulatory Services is open from 7:30 am to 5:00 pm. Samples can be dropped off at the facility after hours at a box at the back of the building. Carbon copies of the report are available and must be requested when the sample is submitted.

For more questions contact:

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If treated seed tests show favorable germination results, then seed treatment fungicides are recommended. Numerous seed treatment products have good to excellent activity against seed-borne Fusarium. These include, Difenconazole, Fludioxonil, Imazalil, Thiabendazole, Triadimenol and Tritconazole. Most available seed treatment products must be applied by approved certified seed conditioners having the appropriate equipment to thoroughly treat wheat seed with low fungicide rates.

WHY DO PRODUCERS NO-TILL WHEAT?

Lloyd Murdock—Extension Soils Specialist

No-tillage has been an important part of Kentucky agriculture for many years. Farmers have embraced the practice for many reasons. It first began as an erosion control practice. Something we really needed in our state. Farmers soon learned it had other benefits which fit well into their farming operations.

Wheat was the last major grain crop to be widely accepted by producers as a no-till crop. For many years only about 25% of the acreage was no-tilled. However, the last 3 to 5 years this percentage has increased greatly. A survey was taken at a January wheat meeting where about 25% of the planted wheat acreage was represented. The response indicated that 69% for the wheat was planted no-till. This is almost a 3 fold increase from just a few years ago.

Why are farmers planting so much more no-till wheat now? When they were asked what was the main reason that they use no-tillage, the responses were a bit surprising to me.

The Main Reason I No-Till Wheat:	
Reduces labor requirement	28.6%
Less Machinery Required	16.7%
More Timely Planting	16.7%
Erosion Control	16.7%
Increased Profits	11.9%
Reduced Stress	4.8%
Increased Yield of All Crops	4.8%

They could only pick one response, so they had to pick the one that was most important to them. It appears that the main reason that farmer's no-till wheat is for the ease of management. The practice allows them to manage this crop with less labor, machinery and stress at planting time. When you add these 3 responses, the total is 50%. Timely wheat planting is a result of less labor, machinery and tillages passes over the field. When this 16.7% is added into the other three reasons, the combined total is 67%. This means that 2/3 of the people planting wheat using no-tillage, like being able to plant the crop in a timely manner with less labor, machinery and stress.

No-tillage wheat results in improved soil quality and reduced erosion, which over time, can increase yields of all crops grown on the fields. These two benefits were identified as the most important by only 21.5% for the respondents.

Increased profit was most important to 11.9% of the respondents. Indicating that there is not much of an increased profit and/or it is secondary to the other benefits.

It appears that no-tillage wheat is most helpful to producers because it helps with and reduces the demands of their day to day management at a busy time of the year. They see the benefits immediately and daily. While the longer term benefits such as less erosion, improved soil quality and improved yields on all crops are less visible and the benefits are only realized over a period of years. These benefits are just as important and probably recognized by the respondents but not as immediate and easy to see.

I would like to thank the Kentucky IPM program for making this survey possible.

Look for an upcoming issue within the next week from Dr. Dave Van Sanford and Bill Bruening addressing how to select Fusarium Head Blight resistant wheat varieties.

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http://www.ca.uky.edu/ukrec/welcome2.htm

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