

Wheat Disease Update – Fusarium Head Blight – 18-May-2009
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Fusarium head blight (also known as “scab” or “head scab”) has again appeared in northern and eastern Oklahoma. **The extent of the incidence and severity of Fusarium head blight (FHB) is not yet known, but producers need to be aware that the freeze in early April and excessive moisture over the last 6 weeks also can cause head discolorations similar to FHB.** Below is a description of this disease that should help to answer questions related to FHB if more of this disease occurs.

Cause & problems associate with FHB: FHB is caused by the fungus *Fusarium* (Figure 1), whose spores (Figure 2) infect wheat heads and developing kernels primarily during and after flowering. Infection of wheat heads (Figure 3) occurs when there are long periods (48-72 hours) of high humidity and temperatures ranging from 75-85 F. Infections can also occur at lower temperatures, but longer periods of high humidity are then required. Infection at flowering can result in sterility but often the end result is white, chalky-appearing shriveled seed (Figure 4). Entire or partial heads can be infected. This same fungus also can infect and kill seedling wheat in the fall (Figure 5) and causes Fusarium root rot (dryland root rot) observed in the spring (Figure 6).

The other major problem associate with FHB is the production of compounds called mycotoxins, among which DON (deoxynivalenol – also called ‘vomitoxin’) is the most common. Presence of *Fusarium* in wheat grain does not automatically mean that DON is present in wheat, so wheat infected with *Fusarium* frequently is tested for the presence and level of DON. DON is toxic to animals, with advisory levels set by the Food and Drug Administration as follows:

- 1 part per million (PPM) for finished grain products for human consumption.
- No standard for raw grain going into milling process.
- Cattle, over 4 months old: 10 ppm (providing grain at that level doesn’t exceed 50 percent of diet).
- Poultry: 10 ppm (providing grain at that level doesn’t exceed 50 percent of diet).
- Swine: 5 ppm (not to exceed 20 percent of ration).
- All other animals: 5 ppm (providing grains don’t exceed 40 percent of diet).

The Oklahoma Animal Disease Diagnostic Laboratory (OADDL) at Oklahoma State University does not directly test grain for the presence of DON because there has not been a need for this test in Oklahoma. However, OADDL will accept samples for such testing and send them to qualified labs that they know of in other states. If there is a need for such testing, OADDL can be contacted at 405-744-6623 for further information.

Use of wheat harvested from an FHB-infected field for seed: Grain harvested from a field with a high incidence of FHB can be used as seed but taking a number of precautions should be considered. First, adjusting the combine at harvest to remove light-weight FHB-infected seed is helpful. If this was not done, cleaning seed after harvest is a possibility. These steps will serve to remove the lighter and shriveled FHB-infected seed, but not all FHB-infected seed will be removed because some infections occur later in grain development and the kernels are close to full weight. If you know or suspect that you are planting seed infected with *Fusarium*, be sure the seed has a good test weight (at least 56 pounds) and a >85% germination rate. Treating seed with a chemical should also be considered as a number of seed treatments are labeled to suppress or partially control early

season *Fusarium* seed and seedling rots. This should increase seedling survival and facilitate stand establishment. These seed treatments include:

1. Gaucho XT @ 3.4 fluid oz per cwt (early season control).
2. Raxil MD @ 5-6.5 fluid oz per cwt (early season control or suppression).
3. Raxil MD EXTRA @ 5 fluid oz per cwt (early season control or suppression).
4. Raxil MD-W @ 5 fluid oz per cwt (early season control or suppression).
5. Dividend XL @ 2 fluid oz per cwt. (label states can be used from 1 – 2 fluid oz/cwt, but partial control of *Fusarium* is listed only at 1 oz/cwt).
6. Dividend XL RTA @ 10 fluid oz per cwt (label states can be used from 2.5 – 10.0 fluid oz/cwt, but partial control of *Fusarium* is listed only at 10 oz/cwt.).
7. Dividend Extreme @ 4 fluid oz per cwt (label states can be used from 1-4 fluid oz/cwt, but early season control of *Fusarium* is listed only at 4 oz/cwt).
8. Charter @ 3.1 fluid oz per cwt (controls seeding blights and suppresses early season infections caused by *Fusarium* crown rot and root rot.)
9. Charter PB @ 5.5 fluid oz per cwt (reduces seed and soil-borne seedling blights (*Fusarium* spp.).

Be sure to read the label with these or any seed treatment as there are restrictions related to times between planting and use of wheat for grazing. Also please note that with many of these seed treatments only the higher rates are listed as offering partial control of *Fusarium* or that control is indicated as “early season control.” Also keep in mind that all of these seed treatments also target other fungal diseases including bunts and smuts, etc.

Other steps to control FHB: Planting wheat seed from a FHB-infected field can affect germination and stand establishment in the fall because the same fungus that causes FHB also causes *Fusarium* seedling and root rot. However, it is important to remember that FHB in the spring results from infections that occur during flowering. Thus, prolonged humid conditions with warm temperatures in the spring favor FHB incidence and severity. The other factor that can greatly impact FHB incidence in the spring is residue in which wheat is planted. Corn, where *Fusarium* causes corn stalk rot, is highly susceptible to *Fusarium*. Thus, wheat planted into corn residue infected *Fusarium* is more likely to show FHB than wheat planted into other types of residue such as soybean. The following quote from a North Dakota State Fact Sheet (“Dealing with Scabby Grain, Vomitoxin,” M. McMullen, et al., September, 1994) indicates this:

“Studies in Ontario, Canada showed that the number of wheat heads infected with scab when corn was the previous crop was five to 10 times higher than when wheat was the previous crop. The number of wheat heads infected with scab when wheat was the previous crop was about 1.5 times higher than if the previous crop was soybeans.”

Keep in mind however, that wheat planted into residue from soybean or even into clean-tilled fields can still show significant levels of scab if favorable weather conditions exist in the spring as spores can move from other fields and *Fusarium* can survive to some extent on many crop and weed residues. Although resistance to FHB exists in wheat, the reaction of the hard red winter wheat varieties planted in Oklahoma to FHB is mostly unknown because we have not had to deal with FHB in the past.

FHB has not been a significant problem in Oklahoma, but with an increased incidence this past spring and with the potential of wheat-corn rotations increasing, producers should become familiar with this disease and take steps to avoid situations that greatly favor FHB. More information on FHB from states where this disease is significant can be found at:

1. <http://www.oznet.ksu.edu/path-ext/factSheets/Wheat/Wheat%20Scab.asp>
2. <http://www.wheatcab.psu.edu/>
3. <http://ohioline.osu.edu/ac-fact/0004.html>
4. <http://www.ag.ndsu.edu/pubs/plantsci/pests/pp1302w.htm>

5. <http://www.ag.ndsu.edu/pubs/plantsci/smgrains/pp1095w.htm>

For this update (often with photos), go to:

<http://entopl.okstate.edu/Pddl/advisory.htm> and look for the most recent Oklahoma State University Plant Disease and Insect Diagnostic Advisory Newsletter.

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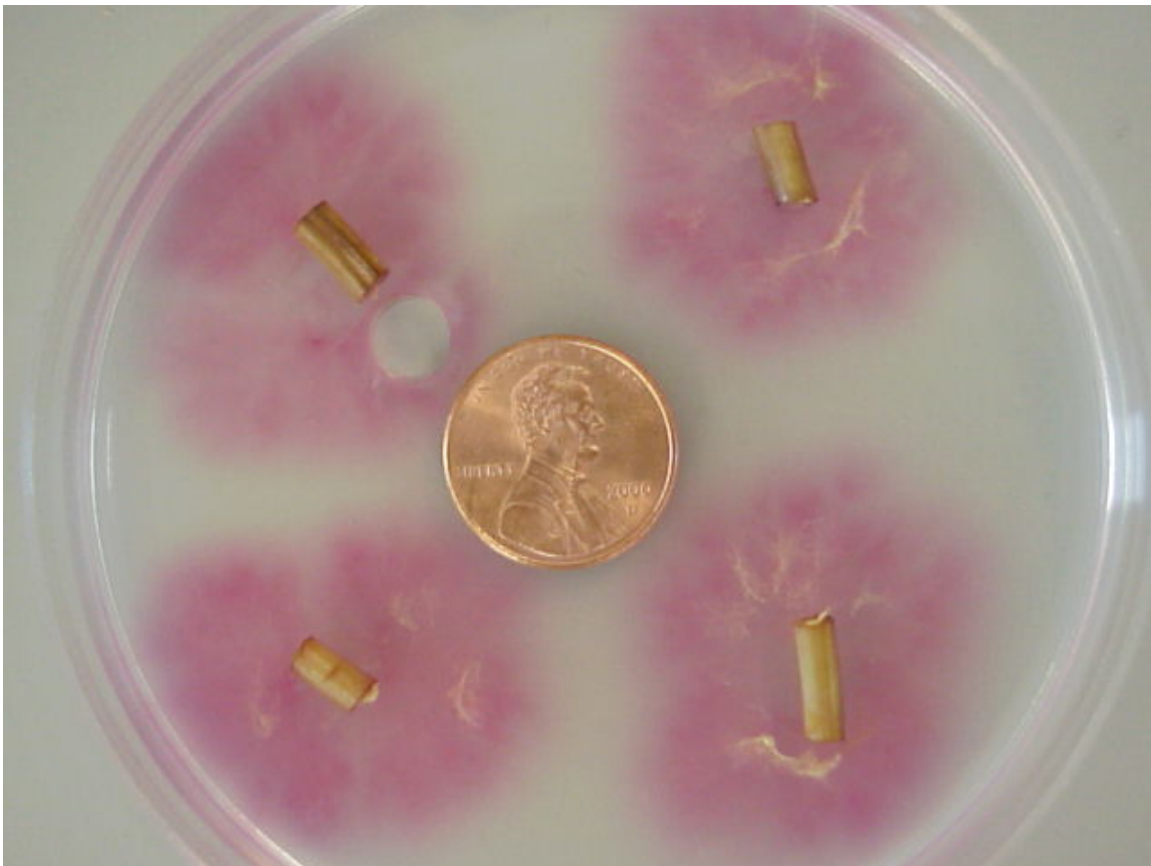


Figure 1 The fungus *Fusarium* growing from infected wheat stems (note reddish color often associated with *Fusarium*)



Figure 2 Spores of the fungus Fusarium



Figure 3 Wheat heads infected with Fusarium (head on left is partially infected; head on right is totally infected).



Figure 4 Wheat seed infected with Fusarium (healthy seed on top and bottom; note reddish color often indicative of presence of Fusarium).



Figure 5 Wheat seedlings in the fall with rotted roots due to Fusarium (note healthy seedling on right).



Figure 6 Wheat tillers infected with Fusarium and showing symptoms of Fusarium (dryland) root rot (not healthy stem on bottom).