



Task Force

Head Scab of Wheat and Vomitoxin

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There is a lot of head scab in the wheat this year in Indiana. Fairly severe scab (up to 15% of heads in a field) has been observed in a few fields in the area near Purdue, and reliable reports indicate that it may be worse in some fields in southern Indiana. Severity appears to be increasing almost daily. The persistent rainy weather we had a couple of weeks ago provided a favorable environment for infection. The warm weather since then favored continued development of the fungus in the spike, so that more and more spikelets become blighted each day. Farmers are advised to adjust their combines to get rid of shriveled grain, rather than have it mixed in with plump kernels. Trying to salvage small, shriveled kernels will just lower test weight, increase the frequency of "tombstone" kernels in the grain, and reduce the value of the crop at the elevator. Because of the potential for mycotoxins in scabby wheat, we have listed below the answers to several questions that wheat producers might ask.

What does scab look like?

Symptoms of scab are premature bleaching of individual spikelets, partial heads or whole heads. Florets may be bleached tan to white within green healthy portions of the head. Infected kernels are chalky white to pink and shriveled. A salmon-colored mass of fungus spores may be visible at the base of infected glumes. The disease reduces yields and test weight.

What is a mycotoxin?

Mycotoxins are naturally occurring chemicals produced by fungi (molds) growing on grain or grain products. Mycotoxins production may occur in the field or in storage. Mycotoxins can

be detrimental to the health of both animals and humans. Although thousands of molds are capable of growing on stored grain, only a few mold species produce mycotoxins. There are many different mycotoxins, but most are rare in Midwest grain. In Indiana, the mycotoxins of concern are: aflatoxin, vomitoxin (deoxynivalenol or DON), zearalenone, and fumonisin.

What is vomitoxin?

Vomitoxin is a toxin that may be produced by the scab causing fungus. The occurrence of scab does NOT automatically mean that vomitoxin is present, but high levels of scabby kernels in the harvested grain should be suspect. Vomitoxin can affect flavors in foods and baking quality. Vomitoxin can also affect the health of animals that consume contaminated grain.

Another mycotoxin, zearalenone, may also be produced under field conditions in Indiana. Zearalenone is an estrogenic mycotoxin. The concentrations of zearalenone are usually much lower than vomitoxin.

How does vomitoxin affect livestock?

Vomitoxin causes feed refusal and poor weight gain in livestock. Hogs are most sensitive to vomitoxin, even at one part per million contamination of hog feed. The toxin can also cause problems in horses, breeding and lactating animals, but at high concentrations. Cattle, sheep and poultry are more tolerant of vomitoxin. Diluting scabby wheat with normal quality grain may be a logical method of feeding wheat safely to on farm livestock.

What are safe levels of vomitoxin?

The Food and Drug Administration has established vomitoxin advisory levels as follows:

- 1 part per million (ppm) for finished grain products for human consumption.
- Cattle, over 4 months old: 10 ppm (providing grain at that level does not exceed 50 percent of diet).
- Poultry: 10 ppm (providing grain at that level does not exceed 50 percent of diet).
- Swine: 5 ppm (not to exceed 20 percent of ration).
- All other animals: 5 ppm (providing grains do not exceed 40 percent of diet).

Contact a veterinarian or feed specialist for further information on safe feeding levels of animals.

How can I determine if grain has vomitoxin?

The presence and amount of vomitoxin from scabby grain can only be verified through chemical analysis. There are a variety of commercial laboratories and quick test kits for mycotoxin analysis. For more information about the mycotoxin test kits contact your County Extension Educator and request publication BP-47 "Mycotoxins and Mycotoxin Test Kits". The Plant and Pest Diagnostic Laboratory at Purdue is also a source for assistance.

What effect does moisture content have on infected grain?

The fungus requires 22 to 25 percent moisture content to grow. At moisture levels below 18 percent, it is not likely that the scab fungus will continue to grow. Moisture content of scabby grain going into storage should be below 13 percent. There is no evidence of vomitoxin from scabby grain continuing to develop in storage, if grain is stored at appropriately low moisture.

The light, thin kernels caused by scab tend to accumulate in the center of a storage bin, and hot spots may occur if higher moisture fine material is present in the core as well. Using a cleaner to remove fines from the wheat before binning and a grain spreader to distribute scabby kernels more evenly will minimize spoilage risks. If a cleaner and a spreader are not available, the wheat should be cored as soon after binning as possible.

Drying will not reduce scab or vomitoxin levels but it does not increase infection either. When storing scabby grain, try not to mix it with good quality wheat.

Fields being double cropped with soybeans could be at higher moistures at harvest than in normal years. If the grain is being dried in-bin with unheated air, the grain moisture at harvest should be below 18 percent. With scabby grain, it may be necessary to increase the rate of air flow to decrease the drying time. This can be achieved by reducing the depth of grain in the drying bin below normal levels. For example, a grain depth reduction by 25% from 12 ft to 9 ft will increase the airflow through wheat from a 10 HP fan by 50%. If the harvest moisture is above 20 percent, it will be necessary to use heated air in either bin or column dryers.

For more information about drying wheat contact your County Extension Educator and request publication ID-96, "Double Cropping of Winter Wheat and Soybeans In Indiana" and Grain Quality Task Force fact sheet #11, "Drying Wheat to Prevent Spoilage and Sprouting".

