

# Corn Molds/Mycotoxins Extending the Misery of 2009 Harvest for Some Producers

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Mycotoxins are metabolites of fungus that can affect the quality of grain. They are most frequently associated with fungal infection that occurs before harvest, but can also be produced in grain during storage. The most common mycotoxins that affect corn include aflatoxin, zearalenone, and vomitoxin (also known as DON). Aflatoxins are associated with *Aspergillus* species of fungi that are more common during dry years; zearalenone and vomitoxin are produced by *Fusarium* species such as *Gibberella*, more related to wetter weather.

**Why This Year?** Most corn fields have a very low incidence of ear rots in a typical year. The growth and development of most crop diseases is highly related to environmental conditions, especially temperature and moisture. The 2009 growing season was especially wet and cool over much of the corn-growing areas of the U.S. In some cases producers noticed ear mold varying from field to field and even from one part of a field to another, likely influenced by hybrid, previous crop, tillage practices, and even small temperature, moisture, and humidity differences across a field.

**Detecting Mycotoxins in Grain** A chemical analysis is required to verify the presence and amount of mycotoxins in infected grain. Visual observation of ear mold indicates only that mycotoxins could be present. It is also possible that mycotoxins could be present with no visual indication of mold. With aflatoxin, ultraviolet light (a “black light”) will cause most, but not all contaminated grain to fluoresce with a greenish-yellow glow. The glowing substance is not aflatoxin but an associated compound, so the ultraviolet test should only be used as an indication. The presence of many other mycotoxins, including zearalenone and vomitoxin which are of concern in 2010, are not detectable with a black light.

**Marketing** The first step for producers is to determine the toxin level(s) in their corn. If they have low levels they may be able to find buyers who are offering premiums. With high levels, producers should contact their primary buyer(s) for their discount schedules, and compare these with schedules obtained from other buyers in the area. Many buyers indicate they are willing to work with their customers to find the best outlet for corn with high mycotoxin levels. As an example, hauling grain to areas where vomitoxin is not a problem may be a good solution. Other buyers have shipped corn with higher levels of vomitoxin to some livestock operations which were able to utilize those levels.

**Blending to Manage Concentrations** For commercial animal feed, the FDA has ruled it is illegal to blend corn that exceeds the legal limit for aflatoxin. While the FDA currently has no explicit regulations that prohibit blending corn with high levels of vomitoxin, there are currently discussions about whether this should be an area of FDA enforcement.

**Discounts** Mycotoxin discounts vary by buyer, the level where the discounts start, the rejection level, and the actual discounts. Six grain buyers (including grain elevators and ethanol plants) in Indiana were contacted in early February 2010, and asked about their discount schedules for vomitoxin (DON) specifically, shown below. Information from these six buyers provides some guidance regarding the range of discounts, but other buyers will have different discount schedules, so producers need to contact their buyers to obtain current schedules.



For some buyers contacted the discounts start at 3 ppm of vomitoxin whereas other buyers start applying discounts at 5 ppm. Rejection levels range from 7 to 15 ppm, although some have no rejection level but impose large discounts. Currently there are a few buyers offering premiums for corn with low vomitoxin. NOTE: All discount schedules are subject to change, so it is important to check with buyers before contracting or delivering corn to ensure discount schedules are still valid before contracting or delivering corn.

### Discount Schedules for Vomitoxin in Corn from Six Indiana Buyers, February 2010

Compiled by Corinne Alexander and Chris Hurt, Purdue Agricultural Economics

DON (ppm)	Buyer 1	Buyer 2	Buyer 3	Buyer 4	Buyer 5	Buyer 6
Discount, \$/bu						
0-0.9	0	0	0	0	+0.18	+0.15
1-1.9	0	0	0	0	+0.13	+0.10
2-2.9	0	0	0	0	+0.06	+0.05
3-3.9	-0.05	-0.05	0	0	0	0
4-4.9	-0.10	-0.10	0	0	0	0
5-5.9	-0.15	-0.15	-0.05	-0.05	-0.04	-0.05
6-6.9	-0.20	-0.20	-0.10	-0.15	-0.08	-0.10
7-7.9	-0.25	reject	-0.15	-0.25	-0.15	-0.15
8-8.9	-0.30		-0.20	-0.35	-0.22	-0.20
9-9.9	-0.35		-0.25	may reject	-0.30	-0.25
10-10.9	-0.75		-0.30		-.40 max	-0.30
11-11.9			-0.35			-0.35
12-12.9			-0.40			-0.40
13-13.9			-0.45			-0.45
14-14.9			-0.50			-0.50
15+			-0.55			reject

**Keeping Grain in Condition as Outside Temperatures Warm** Grain with mold concerns should be dried one half to one percentage point below the normal safe storage moisture, according to Richard Stroshine, Purdue Agricultural Engineer. This will provide added protection against mold growth during storage. In addition, the corn should be inspected at least every two weeks during the winter and inspected weekly after outside temperatures begin to rise in late winter and spring. Aeration fans can be turned on and the exhaust air can be checked for foul odors or an increase in temperature. Both of these symptoms indicate that fungi may be growing in the bin.

It is also recommended that corn be removed from the center of the bin by “coring.” This involves opening the center well of the unloading auger and removing at least one or two loads of grain from the bin. The fine material usually concentrates in the center of the bin and removal of this corn helps remove that fine material. It also allows air to move through the grain mass more easily. In addition, the top surface of the grain in the bin should be leveled. Air finds the path of least resistance and all of the grain in the bin should be at approximately the same depth to ensure there is even airflow throughout the grain mass.



**What About Next Year?** Fields that had ear mold problems in 2009 are at higher risk of having ear mold if planted back to corn in 2010. If possible, rotate corn fields with another crop, such as soybeans. Choose a corn hybrid that is less susceptible to ear rots. Tillage can also help break up the disease inoculum present in crop residue, although it will not eliminate it.

#### **For More Information**

Crop Maturity, Disease & Harvest Issues (links to Purdue Agronomy Chat 'n Chew Café):

<http://www.agry.purdue.edu/ext/corn/cafe/harvest/>

Grain Drying, Conditioning, and Aeration (links to Purdue Post Harvest Grain Quality & Post Harvest Protection Program) <http://extension.entm.purdue.edu/grainlab/index.php?page=news/home.php>

Managing Moldy Corn (links to new site developed by Purdue Extension)

<http://www.ag.purdue.edu/extension/cornmold/Pages/default.aspx>

