10-24-2008

Corn Quality Issues in 2008 – Field Molds

Charles R. Hurburgh
Iowa State University, tatry@iastate.edu

Alison E. Robertson
Iowa State University, alisonr@iastate.edu

Roger W. Elmore
Iowa State University, relmore@iastate.edu

Corn Quality Issues in 2008 – Field Molds

Abstract
Fall weather has allowed late planted corn to mature, increasing grain yields expectations - the USDA October yield estimate is 172 bushels per acre in Iowa. Although high grain yields are expected, reports of quality issues are surfacing. The cool wet fall conditions also favor the development of fusarium fungi; the white or pink ear rots that are often found in ear corn stored too wet. Field moistures in the low 20s over a long period are favorable for these fungi, which in turn can produce several toxins harmful to people and livestock – vomitoxin, zearalenone, and fumonisin. Grain with field mold should be tested for mycotoxins before feeding.

Keywords
Agricultural and Biosystems Engineering, Agronomy, Plant Pathology

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering | Plant Pathology

search

Subscribe to Crop News

Archives

2015
2014
2013
2012
2011
2010
2009
2008

Previous Years

ISU Crop Resources

Extension Field Agronomists
Crop & Soils Info
Pesticide Applicator Training
Agronomy Extension
Entomology Extension
Plant Pathology Extension
Ag and Biosystems Engineering Extension
Agribusiness Education Program
Iowa Grain Quality Initiative
College of Agriculture and Life Sciences
ISU Extension

Integrated Crop Management NEWS

Print story
Email story
Add to Delicious
Atom Feed
Follow on Twitter

Corn Quality Issues in 2008 – Field Molds

By Charles Hurburgh, Department of Agricultural and Biosystems Engineering; Alison Robertson, Department of Plant Pathology; Roger Elmore, Department of Agronomy

Fall weather has allowed late planted corn to mature, increasing grain yields expectations - the USDA October yield estimate is 172 bushels per acre in Iowa. Although high grain yields are expected, reports of quality issues are surfacing.

The cool wet fall conditions also favor the development of fusarium fungi; the white or pink ear rots that are often found in ear corn stored too wet. Field moistures in the low 20s over a long period are favorable for these fungi, which in turn can produce several toxins harmful to people and livestock – vomitoxin, zearalenone, and fumonisin. Grain with field mold should be tested for mycotoxins before feeding.

Scouting and harvesting fields with disease problems
High moisture conditions favor growth of many ear and stalk rot fungi. Fields should be scouted as soon as possible to determine the extent of disease problems. To minimize losses due to ear rot and increased mycotoxin levels, it is recommended that producers harvest problem fields (greater than 10-15 percent incidence of ear rot) as soon as possible.

The longer the corn remains in the field, the greater the chance of toxin production. The toxins most likely to increase in the field at this time are those associated with fusarium ear rots - namely vomitoxin, zearalenone and fumonisin.

Additional Resources

The USDA – GIPSA – Grain Fungal Diseases & Mycotoxin Reference – Sept 2006 has additional information regarding Vomitoxin and Fumonisum; the FDA – Compliance Program Guidance Manual – 7371.003 – Dec 2005 contains the reference Guidance for Fumonisins in Animal Feeds .

Gibberella Ear Rot - a consistently important mycotoxigenic fungus in the northern corn belt, producing vomitoxin, zearalenone, and other toxins.

Diplodia Ear Rot - characterized by the appearance of raised black bumps on the moldy husk or kernels.

Diplodia ear rot is more prevalent this season than in previous years. Although mycotoxins are not usually associated with Diplodia ear rot, grain quality will decrease substantially if the corn is allowed to remain in the field, thus early harvest is also recommended in these fields.

Adjust harvest equipment to minimize damage to kernels since mold and mycotoxin levels tend to be at greater levels in damaged kernels. Dry (to less than 15 percent moisture) and cool (to less than 45 degrees F) grain as quickly as possible to reduce further mold growth and toxin production.

Elevator operators, especially in Eastern Iowa report cases of visible mold damage levels 5 percent and higher. In normal years, overall mold damage levels are generally less than 2 percent in freshly harvested corn. High damage levels in harvested grain create challenges for grain grading, particularly in the harvest rush. Damaged corn sharply reduces the future storage life of the grain.

Storage issues
Storage and harvest management will be particularly important. Field damaged grain, regardless of reason, should not be mixed with good grain. Producers should harvest around water holes, downed grain and immature areas. Do not mix damaged grain with good grain in storage. Regardless of condition, all grain should be aerated immediately to reduce temperature and equalize moisture.

Field damaged grain will not store beyond the winter months. Maintain 1 to 2 percentage points lower moisture than normal grain (for example, 13 percent corn instead of more typical 15 percent). Do not try to hold field damaged corn at higher moistures to avoid drying expense. If you suspect mycotoxin problems, check with crop insurance providers to see if adjustments may be needed, and how to represent the areas to be adjusted. Your veterinarian or the local USDA grain inspection service provider (see below) can assist with obtaining mycotoxin testing. Crop adjustments for quality problems, including mycotoxins, must be done on standing corn at or before harvest.

Accurate grading of field-damaged grain is always difficult in the rush of harvest. Expect end users, such as ethanol plants, to increase their level of grading because mold and weather damage reduce processing yields/byproduct quality.

An Official USDA grade is the standard against which buyer analysis should be compared. It is important that company graders be trained to match USDA graders. Alternatively, samples can be submitted to USDA grading agencies but this process is slower and more costly. In the event of a dispute, use an Official grader. The variety of damage types will be very challenging to evaluate. You can locate the official agency in your area from the USDA list of official inspection and/or weighing services.

Livestock Feed Issues

Livestock (swine, cattle, horses, poultry) are susceptible to certain mycotoxins. Therefore any grain that is fed to livestock should be tested for mycotoxins. Dairy producers should be particularly sensitive to mycotoxins. (See tables below.)

The wide variety of molds on these samples has created a range of mycotoxin possibilities – primarily vomitoxin, zearalenone and fumonisin. Prolonged cloudy, humid weather encourages production of the fusarium-based toxins.

Veterinarians can submit samples to the Iowa State Veterinary Diagnostic Lab. Alternatively, Official USDA grading agencies can do quick tests for these toxins. Toxins concentrate in the distillers grains three to four times the levels in the corn. Ethanol plants are doing quick screening tests on inbound grain, especially on low test weight corn (less than 50 lb/bu).

Please see ISU Extension publications *Aflatoxins in Corn - PM1800*, and *Corn Ear Rots, Storage Molds, Mycotoxins, and Animal Health - PM 1698*, for guidelines on sampling and sample handling. The black light test will not respond to fusarium.

Table 1: Guidelines for safe levels of fumonisins in animal feeds proposed by U.S. Food and Drug Administration (2001)

Corn and corn by-products intended for:	Recommended level of Total Fumonisins (FB_1+FB_2+FB_3) ppm (parts per million)	
	Corn Portion of diet	Total diet
Horses	5	1
Rabbits	5	1
Catfish	20	10
Swine	20	10
Ruminants	60	30
Mink	60	30
Poultry	100	50
Ruminant, mink and poultry breeding stock*	30	15
All others (includes dogs and cats)	10	5

*Includes lactating dairy cattle and hens laying eggs for human consumption

Table 2: Advisory levels for vomitoxin in animal feeds proposed by U.S. Food and Drug Administration (2001)

Grain and grain by-products intended for:	Vomitoxin level ppm (parts per million)	Not to exceed _% of ration
Ruminating beef and feedlot cattle older than 4 months	10	50
Chickens	10	50
Swine	5	20
All others	5	40

Alison Robertson is an assistant professor of plant pathology with research and extension responsibilities in field crop diseases. Charles Hurburgh is a professor of Agricultural and Biosystems. Roger Elmore is a professor of agronomy with research and extension responsibilities in corn production.