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PURDUE EXTENSION

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DISEASES OF CORN

Aspergillus Ear Rot

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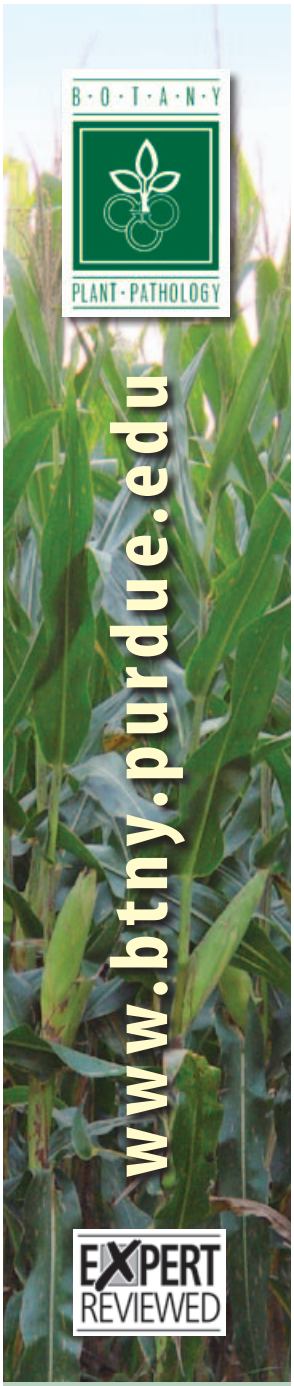

Photos by Burt Bluhm, University of Arkansas, and Charles Woloshuk

The fungus *Aspergillus flavus* causes Aspergillus ear rot, one of the most important diseases in corn. The fungus produces a mycotoxin — known as aflatoxin — inside the diseased corn kernels.

The presence of aflatoxin will affect grain quality and marketability, as well as livestock health if the grain is consumed. Aspergillus ear rot is commonly observed during hot, dry years on stressed plants (such as those exhibiting symptoms of nutrient deficiency or drought stress). Feeding damage from ear-invading insects also contributes to disease development and aflatoxin contamination.

Figure 1. Powdery olive-green fungal spores are characteristic of Aspergillus ear rot.

This bulletin describes:

1. How to identify the disease
2. Its danger to livestock
3. Mycotoxin testing
4. How to minimize losses and handle diseased grain after harvest
5. How to manage the disease

Scouting and Identifying the Disease

Scout for Aspergillus ear rot by inspecting at least 10 ears in several locations (minimum of 30 ears) in a field prior to harvesting.

Plants that grow in dry areas within a field (such as on hillsides, or light, sandy soils) will be the first to exhibit ear mold symptoms. These plants likely will be stunted with small ears.

After collecting the ears, peel back the husks and look for an olive-green mold on the ears (Figure 1). The fungal spores, which are the olive-green mold, will appear powdery and may disperse like dust when the husk is pulled back. Symptoms are mostly observed at the tip of the ear, but when the disease is severe the mold can be found all the way to the base.

Other fungi also infect ears and produce black or bluish spores, or pink or white molds on ears. However, the presence of an olive-green mold is diagnostic of Aspergillus ear rot (Figure 2).

Figure 2. Ears infected with Aspergillus flavus are often small and covered with powdery olive-green spores. Other fungal ear rots or molds may also be present on an ear.

Accurate mold identification is critical for making the right feeding and management decisions. Therefore, you should confirm any mold identification at a diagnostic laboratory, such as the Purdue Plant and Pest Diagnostic Laboratory (www.ppdl.purdue.edu or (765) 494-7071).

Danger to Livestock

Aflatoxin is a liver toxin and a potent carcinogen. Livestock that consume aflatoxin can experience a variety of health issues, including suppressed immune systems, reduced weight gain, cancer, and death.

Toxicity varies among animal species, and young animals are most sensitive to the toxin. Furthermore, when lactating animals consume contaminated grain, the aflatoxin is present in the animal's milk.

Table 1. U.S. FDA action levels for aflatoxin contaminated corn.

Action Level (parts per billion)	End Use of Grain
20 ppb	Animal feed and feed ingredients intended for dairy animals
20 ppb	Human consumption
100 ppb	Grain intended for breeding cattle, breeding swine, and mature poultry
200 ppb	Grain intended for finishing swine of 100 pounds or greater
300 ppb	Grain intended for finishing beef cattle

Source: FDA Regulatory Guidance for Toxins and Contaminants, www.ngfa.org/files/misc/Guidance_for_Toxins.pdf

The U.S. Food and Drug Administration (FDA) has set action levels on aflatoxin contamination (Table 1). The term "action level" refers to the specific level of aflatoxin for mandatory enforcement regarding the grain's end use. This means that aflatoxin levels in corn cannot exceed these levels.

Detecting Mycotoxins

An ultraviolet lamp, or black light, is often used as an initial screen to detect aflatoxin-contaminated grain. During this test, the grain is cracked to expose the germ and endosperm tissue to the light. If any of the kernels glow with a bright green-yellow fluorescence (BGYF) under the black light, the kernels are presumed to be infected by the fungus *Aspergillus flavus* and may contain aflatoxin (Figure 3).

This is strictly a presumptive test and does not confirm the presence of aflatoxin or other mycotoxins. A chemical test is necessary for the actual detection of aflatoxin.

Figure 3. Grain suspected to be infected by Aspergillus flavus is cracked and viewed under a black light. If the inner portion of the grain has a bright green or yellow fluorescence (bottom right) the sample may contain aflatoxin.

Mycotoxin Testing

Only a chemical analysis can verify the presence and amount of aflatoxin in infected grain. Your Purdue Extension county educator can help you with testing options. To find your educator, visit or call toll free:
www.extension.purdue.edu/counties.html
(888) EXT-INFO

There also are a variety of commercial laboratories and quick test kits for mycotoxin analysis. Romer Labs (www.romerlabs.com), Neogen (www.neogen.com), and Charm Sciences, Inc. (www.charmsciences.com), sell test strips for toxin analysis.

The Purdue Botany and Plant Pathology Web site, Mycotoxins: Biosecurity and Food Safety, maintains information about aflatoxin and other commercial laboratories:
www.btny.purdue.edu/NC1025

Two inspectors that analyze grain for aflatoxin in the central and north-central regions of Indiana are:
East Indiana Grain Inspection, Inc.
(765) 744-6425 • dwgross@comcast.net

Titus Grain Inspection, Inc.
(765) 463-3713 • titusgraininsp@aol.com

Minimizing Economic Losses

If areas within a field are known to have Aspergillus ear rot, those areas should be avoided (if possible) during harvest. Fields with extensive disease should be harvested as early as possible since the fungus will continue to grow and produce aflatoxin, even at moisture levels of 18 percent.

Late season rains will also contribute to increased aflatoxin contamination. Once harvested, the corn must be dried to below 15 percent moisture to prevent further fungal growth and mycotoxin production.

Grain storage information is available from Purdue's Post Harvest Grain Quality website, www.grainquality.org.

Managing the Disease

There are currently no commercial corn hybrids resistant to *Aspergillus flavus* infection. An important factor in preventing Aspergillus ear rot is to reduce stress on the corn plant. Hybrids that tolerate water stress and/or irrigation can reduce drought stress on the plant. Also, provide adequate nitrogen fertilizer and maintain appropriate fertility within a field.

Traited corn hybrids that reduce the impact of insect damage to the ear can also reduce conditions that favor disease development. A combination of preventative management tactics and good grain management at harvest can lessen the impact of Aspergillus ear rot on yield and grain quality.

Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Persons using such products assume responsibility for their use in accordance with current directions of the manufacturer.

Find Out More

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