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Abstract
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This article will briefly summarize the biology of Aspergillus ear rot, aflatoxin production and management recommendations for the next few weeks of this growing season.

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Aspergillus Ear Rot and Aflatoxin Production

By Alison Robertson, Department of Plant Pathology and Microbiology

Not surprisingly, the hot dry conditions we have been experiencing across the Corn Belt have many farmers and the grain industry concerned about aflatoxin, a potent mycotoxin that is produced by the fungal pathogen, Aspergillus flavus, which causes Aspergillus ear rot.

This article will briefly summarize the biology of Aspergillus ear rot, aflatoxin production and management recommendations for the next few weeks of this growing season.

How do I recognize Aspergillus ear rot?

Aspergillus ear rot is an olive-green powdery mold (Figure 1), not to be confused with Penecillium ear rot, a powdery denim-blue mold. Higher aflatoxin levels are associated with discolored, shriveled kernels that are often found near the tip of the ear.

Figure 1. Characteristic signs of Aspergillus ear rot

What conditions favor infection of corn by A. flavus?

Infection of corn by A. flavus and consequent disease development is favored by hot (>86F) dry conditions at pollination and during grain fill. Yellow brown silks are most susceptible to infection. Spores landing on the silks germinate, rapidly grow down the silk and colonize the surface of the developing kernels. Around physiological maturity, when moisture content (MC) drops to around 32 percent, the fungus starts to colonize the internal tissues of the kernels, and it continues to grow until MC is around 15 percent.

What conditions favor aflatoxin production?

Aflatoxin is a secondary metabolite that is produced by A. flavus under certain conditions. Drought and high temperatures (80 to 105F) during grain fill are the most common factors associated with pre-harvest aflatoxin production. Warm nights (>70F) may can also increase risk of aflatoxin contamination.

Toxin production depends on kernel moisture and temperature. As kernel moisture decreases, aflatoxin production increases. Toxin production is highest at 20 to 18 percent kernel moisture and stops at around 15 percent moisture. Aflatoxin production occurs between 52 and 104F with the optimum temperature range being 77 to 95F.

Can I determine if my corn is at risk for aflatoxin?

Because aflatoxins are associated with Aspergillus ear rot, farmers can scout for the ear rot. From dent through to harvest, several (five to 10) locations in a field should be assessed. Target areas of the field with plants that appear most stressed. At each location, peel back the husks of 10 ears and inspect them for olive-green powdery mold (Figure 1) that is characteristic of the ear rot. If greater than 10 percent of the ears show signs of Aspergillus ear rot, schedule the field for an early harvest.

Harvesting fields with Aspergillus ear rot

Notify your insurance adjuster immediately if you have fields with Aspergillus ear rot. Infested fields need to be inspected before harvest or strips left in the field for a claim to be made.

Harvest grain at approximately 20 to 25 percent moisture. Adjust combine settings to ensure minimal damage to the grain. Damaged grain is at risk to infection by A. flavus in storage.

Cool and dry grain to 16 percent moisture or less immediately. One study showed that if corn grain at 21 percent MC was put in bin at 86F and cooled with air immediately, little fungal growth was detected and no aflatoxin was produced. If cooling was delayed 20 to 40 h, the fungus grew and aflatoxin was detected.

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