AGRONOMIC Spotlight

Aflatoxin Management in Corn

Aflatoxin is a naturally occurring toxic chemical that is produced by certain mold fungi in the *Aspergillus species*. Once a plant is infected by the fungi, the plant may produce chemicals to help defend itself against the fungus. These chemicals, or aflatoxin, can be poisonous to humans and livestock if ingested at high enough levels. Aflatoxin contamination levels can elevate by additional crop stress during the growing season. Every year aflatoxin is especially problematic for corn producers in southern regions due to crop stresses, warm temperatures and environmental conditions. The following includes information on aflatoxin development, management strategies and testing information.

Aflatoxin Development—Aflatoxin is a toxin produced due to the presence of the fungal disease, Aspergillus ear rot. This disease can be caused by several *Aspergillus species*, and appears as a gray-green powdery mold on the corn ear. The mold can grow on corn with moisture content as low as 15 percent and at temperatures up to 100 degrees F. Historically aflatoxin problems have been elevated in years with severe high-temperature stress, water deficiency and insect damage.

Figure 1. Pictured, Aspergillus ear and kernel rot. Aflatoxin is a by-product of Aspergillus fungus

Photo: Harry Duncan, North Carolina State Univ.

Infection can occur at silking through the silks, or later in the season through kernel wounds that are caused by hail or insects. Fungal spores can become air-borne and infect grain at harvest or during storage. In the Southern United States, earworms primarily cause damage to corn ears, allowing for aspergillus to further infect kernels. Fungal spores can over-winter on plant residues, making fields susceptible to the diseases year after year.

Aflatoxin Management—Aflatoxin thrives under severely stressed environmental conditions, therefore minimizing crop stress can help in reducing aflatoxin development. Caring for crops with the best management practices will promote crop health resulting in less aflatoxin growth.

Production Management Tips to Help Control Aflatoxin

- Timely planting. Planting corn late in the season may cause additional stress during the warmest months.
- Apply adequate fertilizer.
- Control insects and weeds.
- Plant hybrids suitable for the region.
- Plant at correct populations.
- Irrigate when needed

Harvest Tips to Help Control Aflatoxin

- Harvest fields with ear rot or insect damage as early as possible. Corn may need to be harvested prior to 15 percent moisture if drying facilities are available.
- Adjust combine to reduce kernel damage. Open sieves, reduce ground speed and increase fan speed to remove damaged, light kernels.
- Do not store grain in combines, truck boxes or non-aerated bins for more than 4 to 6 hours.
- Clean corn and debris from combines trucks, grain carts and augers daily and clean bins and handling equipment to prevent further contamination.
- Monitor storage bins for problems including crusting, hot spots or mold.

Sampling & Testing—Since aflatoxin does not occur uniformly in bulk corn, several samples should be taken in different areas of a load. Contact your grain testing laboratory for specific sampling instructions. Various chemical tests can be conducted to detect and quantify aflatoxin in a sample. A black light test can be used only to detect the presence of Aspergillus, not aflatoxin itself. **Since Aspergillus does not always indicate aflatoxin, do not accept the results of a black light test as grounds for rejection or docking of your corn.** A chemical test should be performed at a certified laboratory to determine if the grain is infected.

Trait Advancements—New developments in trait technology may assist producers in managing aflatoxin with advancements in Bt technology for insect protection in corn. The new *YieldGard VT Triple PRO™* hybrids will provide Roundup Ready® 2 trait technology as well as, two different above-ground proteins protecting against: European corn borer, corn earworm, and fall armyworm. Below-ground protection against corn rootworms and other secondary soil insects is also provided. Controlling insect damage to corn stalks and kernels may help reduce the plant's vulnerability to aflatoxin inducing diseases such as Aspergillus ear rot. As a result of recent United States Department of Agriculture approval, *YieldGard VT Triple PRO* is expected to be commercially available to U.S. farmers for planting in 2009.

Aflatoxin threshold levels (ppb)

Intended Use	Aflatoxin Level
Human food, feed for immature animals, dairy feed, or unknown destination.	20
Feed for breeding cattle, breeding swine, or mature poultry (eg. Laying hens).	100
Feed for finishing swine (over 100 lbs.)	200
Feeding for finishing beef cattle.	300

Table 1. FDA guidelines for the maximum levels of aflatoxin allowable for a range of corn end uses in parts per billion (ppb). *Table adapted from Wrather and Sweets, 2006.*

For more information please contact your local Monsanto representative

Sources: *J.Wrather and L. Sweets. March 2006. Aflatoxin in Corn. Missouri Ag Exp. Station. Delta Center. http://aes.missouri.edu/delta/croppest/aflacorn.stm*

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