What You Need to Know about Aflatoxin

Corn ear rots occur every year to some degree. While all ear rots may impact yield and grain quality, a few may produce toxins, referred to as mycotoxins, that can have an impact on the end use. Specifically, aflatoxin, which is a toxin produced by the fungus *Aspergillus flavus*, *fumonisins*, which are a family of toxins that are produced by *Fusarium verticillioides*, and deoxynivalenol (DON and vomitoxin) and zearalenone, which are produced by the fungus *Gibberella zeae*, are of greatest concern.

// What conditions lead to infection?

- ***Aspergillus flavus***
  - Occurs more commonly under drought, and under high temperature (>80° F) in combination with high relative humidity (>85%) during flowering and grain fill.
  - More of an issue in the Southeast and Texas and does not occur very frequently in the Corn Belt states.
  - Injury to the ear by weather (hail injury) and insects can increase the risk of the disease, particularly when the environmental conditions mentioned above occur.
- ***Gibberella zeae***
  - Occurs more commonly when cool and wet weather occurs within 21 days after silking.
  - Extended periods of wet weather in the fall, in particular before ear drop, will delay grain drydown.
  - Usually more severe in continuous corn production fields and when corn follows wheat that has been infected with Fusarium head blight, which is caused by *Gibberella zeae*.
- ***Fusarium verticillioides***
  - While the disease can cause infection under a wide range of weather conditions, it is usually more severe when the weather is warm and dry during flowering and grain fill.
  - As with Gibberella ear rot, the disease is more common in continuous corn production systems or when corn follows other grasses, such as wheat.
  - The point of entry is usually associated with injury to the ear, such as that caused by insects or hail; however, wind-blown spores can infect the ear via the silk channel. Insects, such as European corn borer, western bean cutworm, sap beetles, and corn earworm, that feed on kernels may also act as vectors for *Fusarium*.

What You Need to Know about Aflatoxin

// What management tactics can I use to prevent the occurrence of these diseases?

- Choose corn products with less susceptibility to the disease.
- Utilize corn products that contain trait packages that control ear-damaging insects, such as European corn borer, western bean cutworm, and corn earworm.
- Use tillage to bury and help degrade the inoculum.
- Crop rotation to a broadleaf crop, such as soybean.
- Management tactics to reduce stress, such as early planting, timely irrigation, and optimal plant population.

// If my corn crop does get infected, what tactic can I use to minimize the impact of the mycotoxin?

- ***Aspergillus flavus***
  - Harvest the crop as soon as possible, at 28 to 30% grain moisture, and handle the grain separately.
  - To reduce mycotoxins, which are often higher in fines and damaged kernels, adjust combine threshing settings to limit the amount of fines and damaged kernels in the grain hopper. Additionally, try to prevent damage to the seed coat by slowing header speed. Maintain cylinder and rotor speed and concave clearance to provide threshing, but limit seed coat cracking. Consider filler plates between cylinder bars to help reduce kernel cracking.
  - Move grain from grain carts or trucks as soon as possible and use fans in holding bins to cool the grain prior to drying.
  - Dry grain to 12% moisture as soon as possible to limit fungal growth. While in storage, maintain moisture at 12% and keep as cool as possible.
- ***Gibberella zeae*** **and** ***Fusarium verticillioides***
  - Harvest the crop as soon as possible and handle the grain separately.
  - To reduce mycotoxins, which are often higher in fines and damaged kernels, adjust combine threshing settings to limit the amount of fines and damaged kernels in the grain hopper.
  - Dry grain to 15% moisture as soon as possible to limit fungal growth.

// How can I be sure that my grain does not contain a mycotoxin?

If you believe the grain has been infected by a disease that could produce a mycotoxin, it would be wise to have the grain tested for the presence of mycotoxins. There are many laboratories that can conduct these tests; consult with your local extension office for more information.

Sources:
Woloshuk, C. and Wise, K. 2010. Gibberella ear rot. Purdue University Extension BP-77-W.
Woloshuk, C. and Wise, K. 2014. Fusarium ear rot. Purdue University Extension BP-86-W.
Sumner, P. and Lee, D. 2017. Reducing aflatoxin in corn during harvest and storage. Bulletin 1231. University of Georgia Extension.