



CORN DISEASE MANAGEMENT

Storing Mycotoxin-Affected Grain

The fungi that cause several corn ear rot diseases produce mycotoxins, chemical substances that can be dangerous to humans and livestock. If you have corn affected by ear rots, there are important management steps to take to limit your losses.

This publication outlines how to manage stored grain affected by mycotoxins.

Harvest Diseased Grain First

After corn reaches maturity, farmers often allow the crop to dry down in the field to save on drying costs. However, the presence of ear rot diseases should influence harvest timing. The fungi that cause ear rot diseases can continue to grow, spread, and produce mycotoxins even after corn reaches maturity.

The most common mycotoxins associated with ear rots are deoxynivalenol (associated with *Gibberella* ear rot), fumonisins (associated with *Fusarium* ear rot), and aflatoxin (associated with *Aspergillus* ear rot) (Figure 1). If you find *Aspergillus* ear rot, *Fusarium* ear rot, or *Gibberella* ear rot during pre-harvest scouting, harvest the affected fields first and immediately dry the grain to levels that stop the fungus from growing and producing mycotoxins.



Figure 1. Corn with *Aspergillus* ear rot.

More information about identifying ears rots in the field is available in *Corn Disease Management: Ear Rots* (CPN-2001), available from the Crop Protection Network, CropProtectionNetwork.org.

Dry Affected Grain Quickly

Drying corn (and other grains) helps prevent fungi from infecting or further degrading previously infected grain. Wet grain degrades quickly in a harvest truck or grain bin and mycotoxin levels can increase (Figure 2). This is especially true when temperatures are warm after harvest. However, if grain is stored at appropriately low moisture, evidence shows that mycotoxin levels will not increase.



Figure 2. Be sure to dry grain before storing or moving. When grain is wet, mycotoxins can continue to accumulate.

High-temperature drying stops mold growth and mycotoxin production. However, it will not reduce mycotoxins already present in the grain. Using high temperatures to quickly dry grain is preferable to using low heat to slowly dry grain. Be wary of using low-temperature, in-bin dryers for moldy corn, and be sure to meet proper ventilation requirements for storing dry corn.

A good post-harvest drying target for storing grain is 15 to 15.5 percent moisture. This moisture level is sufficient for short-term storage over the winter. Additionally, cooling the grain to below 55°F (13°C) will slow the growth of fungi and inhibit insect activity.

If you plan to store corn into the hottest months of summer, dry grain to less than 13 percent moisture. At this moisture level, mycotoxin-producing fungi are typically unable to grow.

Remove Damaged Grain

Damaged corn kernels can cause airflow problems during storage. There are a variety of factors that can damage the kernels.

Ear rot diseases often damage kernels, causing them to break and be lightweight at harvest. If the ear rot fungi in your corn are species that produce mycotoxins, the risk of mycotoxin contamination in your grain will be high (Figure 3). During the shelling process, machinery can damage healthy kernels. Additionally, impact forces can damage grain — such as when grain is dropped during postharvest handling through dryers, from elevator spouts, and so on (Figure 4).



Figure 3. These broken kernels are infected with *Aspergillus flavus*, the fungus that causes *Aspergillus* ear rot and produces aflatoxin.



Figure 4. Kernels can become damaged during transport.

Broken kernels and fine material (called “fines”) will accumulate in the center of the storage bin during filling unless the bin is equipped with a spreading device. This central core of fine material will hinder uniform air movement through the grain mass, which increases the risk that the grain will spoil. Withdraw grain from the bin after you fill it, or “core” the bin to remove most of the broken kernels and fine material that accumulate there.

If there are mycotoxins in the harvested grain, the majority of the mycotoxins can be detected in the broken kernels and fine material. Although costly, cleaning the grain before you store or sell it can greatly reduce the level of mycotoxin contamination. Cleaning usually involves passing the grain over a series of screens to remove broken kernels and fine material. Gravity separators can also remove the lightweight infected kernels. Although cleaning grain will reduce mycotoxin concentrations, the cleaned grain often still contains significant mycotoxin concentrations.

Manage Your Grain Bins

Before filling any grain bin, clean it by removing all grain from the floor and walls (Figure 5). Thorough cleaning will help remove any grain carryover from the previous crop, including grain that may be contaminated by mycotoxins.



Figure 5. Interior of a grain bin.

Regularly monitor storage bins. Check for leaks in the structure, and be on the lookout for condensation in the headspace. If condensed water drips on the grain surface, fungi may resume growing and this may lead to surface crusting. Inspect bins for sour, musty, earthy, or putrid odors. These odors indicate a fungal problem — most likely due to high grain moisture from improper drying, leaks, or insect activity.

If the grain gets wet, use a fan to increase airflow and reduce grain moisture — this can halt fungal growth. If mycotoxin-producing fungi begin to grow in high-moisture corn, the level of mycotoxins in your stored grain can increase. If you detect odors during warmer months, it is likely that fungus-feeding insects (foreign beetles and hairy fungus beetles) are in the grain. In such cases, you may need to treat the grain with insecticides.

Find Out More

The Crop Protection Network (CPN) is a multi-state and international collaboration of university and provincial extension specialists, and public and private professionals that provide unbiased, research-based information to farmers and agricultural personnel. Our goal is to communicate relevant information that will help in the identification and management of field crop diseases.

Find crop disease resources at CropProtectionNetwork.org.

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