

Dealing With Ear Rots in Drought Damaged Corn

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Damage from Fungal Infections and Ear Rot

Drought can significantly impact corn production in several ways. Early-season drought can cause stunting, poor nodal root systems, reduced ear size potential, and overall, more susceptible corn plants. When a rain does occur, ear rot fungi can grow on stressed corn, leading to ear rot and kernel damage. This damage can cause substantial yield loss and the production of mycotoxins, making the grain unusable for feed or food.

What Makes Corn More Susceptible to Infection During a Drought?

Fungal infections of the ear often occur during pollination. Drought stress disrupts the synchronization between pollen shed by the tassel and the emergence of silks from the ear, increasing the likelihood that pollen will not be viable when it reaches the silk tube. As a result, the silk tubes often become longer and more susceptible to the fungal spores. Additionally, kernel sites where pollination failed create ideal conditions for harboring and incubating fungal pathogens.

Why are Ear Rots Worse in Some Seasons?

Although infections begin during pollination, the severity of ear rot damage depends on favorable conditions for fungal growth from corn pollination to physiological maturity. Frequent rainfall creates the high humidity and moisture levels needed for fungal growth and reproduction. Drought damage can result in poor shuck coverage, allowing water to penetrate the shuck and remain trapped next to developing kernels. Once the corn reaches physiological maturity and the black layer forms, fungi will continue to grow and produce mycotoxins within infected kernels.

Common Ear Diseases in North Carolina

1. Common smut, caused by fungus *Ustilago maydis*, is frequently found in North Carolina. The fungus tends to favor sites on the ear where pollination has failed, resulting in the formation of unsightly black or blue-black galls. Ungalled kernels from smutted may contain higher levels of mycotoxins (i. e. fumonisins).
2. The most common ear rot fungi are *Aspergillus flavus* and *Fusarium spp.* In addition to severely affecting kernel growth and weight, these fungi produce several mycotoxins that are harmful to livestock and humans. By law, corn with high levels of aflatoxins and fumonisin cannot be sold and should not be harvested.
3. Other fungi such as *Diplodia (Stenocarpella maydis)*, *Penicillium*, and *Trichoderma* ear rot are not as common in North Carolina, but can occur in years with severe drought. *Diplodia* and *Trichoderma* can result in severe reductions in kernel weight and sprouted kernels, but these fungi are not associated with mycotoxins. *Penicillium spp.* can produce PR Toxin and Ochratoxin A, which are not regulated by law.

What Should I Do to Reduce Damage Caused By Ear Rot?

Prevention is the most effective method for reducing ear rot. Although different hybrids exhibit varying levels of resistance, there is limited independent information available to guide hybrid seed selection. In seasons with extreme conditions, avoiding drought stress can be challenging. Therefore, growers should focus on minimizing damage. Regular scouting for visible signs of damage and mycotoxins is essential. White, gray, or green mold or white and pink streaking in the kernels at the tip or base of

the ear are indications of an ear rot fungus, but not necessarily mycotoxins.

How Do I Determine If I Have a Problem?

Growers should hand-harvest 100 ears of corn from a representative area of the field, preferably from consecutive plants in a row or samples of 10 or more consecutive plants. After removing the shuck, select the 10 ears showing the worst ear rot damage. Place these ears side-by-side to assess the average amount of kernel damage (Figure 1). If more than 25% of the kernels on these 10 ears are damaged, there is a severe problem. To determine the extent of the problem, combine these 100 ears and shell enough to produce a 5-pound sample. This sample should be sent to the NCDA marketing lab to test for mycotoxin levels. If aflatoxin levels are above 20 ppb or fumonisin levels above 50 ppm, the grain cannot be marketed for food or feed, and the grower should avoid harvesting or mixing this grain. If levels are below these thresholds, the grower should harvest the grain as soon as possible. It is illegal to blend corn with aflatoxin concentrations greater than 20 ppb. If aflatoxin concentrations exceed 20 ppb, the only option is to dispose of the grain as a toxic substance, typically spreading it back on the field and incorporating it into the soil as fertilizer. Because it is more cost-effective to avoid harvesting aflatoxin-contaminated corn, implementing a good scouting program is important. If 10% to 25% of the kernels on the 10 worst ears are damaged, the field should be re-examined after any additional rainfall and scheduled for early harvest. Harvesting at more than 25% moisture and drying to 15.5% moisture will significantly reduce harvest losses when compared to waiting for the corn to dry naturally to 15.5%.

Avoid feeding moldy kernels, especially those that are pink and green, to personal livestock. To store affected kernel, dry corn to 13% or less to

prevent fungi from growing and producing mycotoxins. If ear rot is severe, store kernels in a cool area (below 15°F), and do not store infected corn longer than a year. Sanitizing and rinsing equipment to remove soil and spores after use is good practice for managing most diseases. Ensure that runoff water does not flow into 'clean' fields.

The Bottom Line:

SCOUT the fields for mold and, if present, have a sample analyzed for mycotoxins. If moderate to severe amounts of mold are present, plan to **HARVEST EARLY** to prevent further infection. Contact your crop insurance agent about assessing your loss. **Take advantage of all the disaster relief available by documenting loss and obtaining independent assessments of yield potential.**

TESTING LABS

The North Carolina Department of Agriculture will test feed or grain samples free for aflatoxins and \$75 for fumonisins.

There is a digital, fillable form at: <https://apps.ncagr.gov/AgRSysPortalV2/forageanalysisreport>

AFLATOXIN TEST KITS

Neogen Corp.
620 Leshar Place
Lansing, Michigan 48912
Phone: 800-234-5333

There are two kinds of kits. The simple kit identifies the presence of aflatoxin. The advanced kit identifies the presence of aflatoxin and level of infection.



Figure 1. Top ten ears show little or no ear rot damage. On-average the bottom ears show 5-7% kernel damage.