

Corn Disease Profile III

Ear Rot Diseases and Grain Molds

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1. *Aspergillus* Ear Rot



2. *Diplodia* Ear Rot



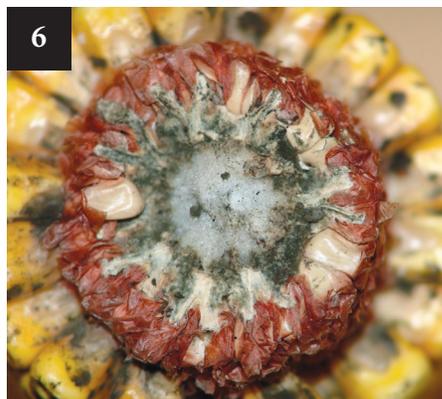
3. *Fusarium* Ear Rot



4. *Gibberella* Ear Rot



5. *Penicillium* Ear Rot



6. *Cladosporium* Ear Rot



7. Moldy Outdoor Storage Pile

Ear Rot Diseases and Grain Molds

Under certain conditions, corn ear rot and grain mold diseases are common and can lead to loss of grain quality. Moldy grain can be docked or rejected at the elevator. Additionally, some ear and grain pathogens may produce secondary metabolites called mycotoxins, which are toxic to animals and humans consuming the contaminated grain. Mycotoxin-contaminated grain can also be docked or rejected. Mycotoxin production may start in the field and continue after harvest, or it may start during storage if mold infection begins there. When grain storage is necessary, drying grain to less than 15 percent moisture for long-term storage or to no more than 18 percent for short-term storage will help reduce fungal growth.

Risk Factors and Stressful Conditions Favoring Ear Rot and Grain Mold Development

- Moisture stress
- Ear injury
- Extreme weather conditions
- Infected crop residue
- Growing continuous corn
- Susceptible hybrids
- Damaged grain
- High moisture storage conditions

Disease	Description
1. Aspergillus Ear Rot <i>Aspergillus flavus</i> , <i>A. parasiticus</i> , <i>Aspergillus</i> spp. *Management: C, R, N	Most common during years with high temperatures and drought conditions. Aspergillus spores tend to be yellow green to olive green (<i>Figure 1</i>) and infection is usually associated with the ear tips or other damaged areas such as those caused by insect feeding. These species, especially <i>A. flavus</i> , can produce the mycotoxin aflatoxin.
2. Diplodia Ear Rot <i>Diplodia maydis</i> (syn. <i>Stenocarpella maydis</i>) Management: C, R, N	Thick fungal mycelium evident of Diplodia ear rot most commonly develops at the base of the ear first (<i>Figure 2a</i>). Fungal reproductive structures (pycnidia) appear as small black dots on kernels (<i>Figure 2b</i>), cob, or husks. Advanced infections may overtake ears leading to development of lightweight mummy ears. The pathogen overwinters in infected crop residue and disease has been more common in minimum tillage and humid environments.
3. Fusarium Ear Rot <i>Fusarium verticillioides</i> , <i>F. proliferatum</i> , <i>F. subglutinans</i> Management: C, R, N	This disease is common when crop stress occurs around silking. Infection can occur anywhere on the ear and can be associated with injury, such as caused by hail (<i>Figure 3a</i>). It may appear as white to pink cottony fungal growth (<i>Figure 3b</i>). Infected kernels may have a “starburst” pattern. <i>Fusarium</i> species may produce mycotoxins, including fumonisin, vomitoxin (DON), and/or zearalenone.
4. Gibberella Ear Rot <i>Gibberella zeae</i> (sexual stage of <i>F. graminearum</i>) Management: C, R, N	Most common in cool, humid conditions, it is closely related to the pathogen causing Fusarium ear rot. Symptoms typically develop as reddish mycelium and discoloration on the tips of ears (<i>Figure 4</i>) and may be accompanied by small black fungal reproductive structures (perithecia). Mycotoxins may include vomitoxin (DON) and zearalenone.
5. Penicillium Ear Rot <i>Penicillium</i> spp. Management: C, N	Often called “blue eye,” Penicillium ear rot develops most often on damaged ears and grain. The fungus produces large amounts of dusty blue-green spores (<i>Figure 5</i>). <i>Penicillium</i> species also can produce several less common mycotoxins.
6. Other Grain Molds Cladosporium Rot, Nigrospora Ear or Cob Rot, Trichoderma Ear Rot Management: C, N	Appearance and discoloration may vary by disease (<i>Figure 6</i>). Some may be more common after damage and premature plant death, such as following early frost, and can continue to grow during storage. Outdoor storage piles are especially at risk for grain mold development (<i>Figure 7</i>).

Photo Credit: *Figures 5a* and *6* courtesy of Casey Schleicher and Amy Timmerman, respectively, University of Nebraska–Lincoln, and *Figure 7* courtesy of Larry Ziems.

*Management strategies which can be effective: **C** – cultural practices, such as the use of crop rotation, tillage, irrigation timing, or grain drying prior to storage may reduce disease; **R** – resistance: hybrids vary in their resistance/susceptibility and resistance to insects can reduce damage and disease severity ; **N** – management may not be necessary, practical, or possible.