



HOT AND DRY SUMMER CONDITIONS IN MINNESOTA ARE FAVORABLE FOR CORN EAR ROTS AND MYCOTOXIN PRODUCTION

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Not only have the hot and dry conditions and hail affected corn yields in Minnesota this year, these conditions have also favored development of ear rots. Reports of ear rots have been coming in from several different areas, and the quality of grain that comes off these affected fields may be reduced. Several different types of ear rots occur in Minnesota, and all are not equally important. *Aspergillus* ear rot and *Fusarium* ear rot may be of particular importance this year due to the hot and dry conditions in much of Minnesota.

Aspergillus ear rot, caused by the fungus *Aspergillus flavis*, could be an important problem in some areas this year. This disease is typically uncommon in Minnesota in years of more normal temperatures and moisture, but can become common under high temperatures and low soil moisture. Patches of green to yellow spores form on or between kernels. The fungus can become dark green to brown as it ages. It is most common at tips of ears and often only affects a few kernels or small areas of the ear. *Aspergillus* species can also cause storage rot. This fungus can invade kernels with moisture levels as low as 15%, especially if kernels have been damaged or have come from rotted ears.

Aspergillus can produce aflatoxin, a mycotoxin that toxic to animals and humans. The presence of the ear rot does not mean the corn definitely has high levels of aflatoxin. The grain must be tested to determine how much aflatoxin is present. Two types of screening tests are available for aflatoxin, a black light test and several commercial test kits. Grain samples can be sent for analysis of aflatoxin, fumonisin and other mycotoxins to the University of Minnesota Veterinary Diagnostic Laboratory (www.vdl.umn.edu/vdl/ourservices/guidelinefiles/toxicology/home.html) or the NDSU Veterinary Diagnostic Laboratory (www.vdl.ndsu.edu/inform/toxic/toxserv.htm#lox2).

Fusarium ear rot, caused by the fungi *Fusarium verticillioides* and *F. proliferatum*, may typically be a more common ear rot of corn. This disease is most common when the weather is hot and dry at flowering. Infected kernels have whitish-pink to salmon-colored fungal growth that is often seen at the ear tip, but infected groups of kernels or



Figure 1. *Aspergillus* ear rot, caused by the fungus *Aspergillus flavis*. Photo: Dean Malvick



Figure 2. *Fusarium* ear rot, caused by the fungi *Fusarium verticillioides* and *F. proliferatum*, may typically be a more common ear rot of corn. Photo: Dean Malvick

individual kernels may be scattered on the ear. Infected kernels can have a “starburst” symptom, which appears as white lines radiating out from a point on the kernel without the clear presence of fungal growth. Kernels can also be infected at the embryo end and symptoms may not be visible. Symptoms may vary according to the genotype of the corn hybrid, environment, or disease severity. Infection is

Species	Commodity	Action Level
Humans	Milk	0.5 ppb (M ₁)
Humans	Any food except milk	20 ppb
Immature animals (including poultry), dairy animals, or when end use is not known.	Corn and other grains	20 ppb
All species	Animal feed other than corn or cotton seed meal	20 ppb
Breeding beef cattle, breeding swine, or mature poultry	Corn and other grains	100 ppb
Finishing swine of 100 lbs. or greater	Corn and other grains	200 ppb
Finishing beef cattle	Corn and other grains	300 ppb
Beef cattle, swine, poultry	Cottonseed meal	300 ppb

Source of Table: archive.gipsa.usda.gov/pubs/mycobook.pdf

avored by damage to the ears.

Fusarium ear rot can produce a mycotoxin called fumonisin, which can be harmful to animals and humans. Fumonisin production is reported to be favored by drought conditions. The FDA has recommended different maximum levels for total fumonisins for animal and human consumption ranging from 2 ppm for degermed dry milled corn products to 60 ppm for ruminants (www.ngfa.org/toxinsPDF-1.pdf). Grain must be tested to determine the levels of fumonisin that may be present.

To assist with diagnosis of ear rots as well as other corn diseases, a useful book 'Field Guide to Corn Diseases' with multiple color photos of many diseases is available through the University of Minnesota Extension (shop.extension.umn.edu/PublicationDetail.aspx?ID=1775).

The following sources of information provide much more information on corn ear molds and mycotoxins:

- www.extension.umn.edu/dairy/dairystar/10-28-06-Murphy.htm
- archive.gipsa.usda.gov/pubs/mycobook.pdf (a good, comprehensive reference)
- www.geaps.com/proceedings/2004/Hawk.cfm
- agbiopubs.sdstate.edu/articles/FS907.pdf
- www.extension.iastate.edu/Publications/PM1800.pdf
- www.ngfa.org/toxinsPDF-1.pdf
- www.oardc.ohio-state.edu/ohiofieldcropdisease/Mycotoxins/mycopagedefault.htm