PURDUE UNIVERSITY

PURDUE EXTENSION

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DISEASES OF CORN

Gibberella Ear Rot

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Gibberella ear rot, or Gib ear rot, is caused by the fungus, *Gibberella zeae (Fusarium graminearum).* This disease can occur throughout Indiana, but tends to be more prevalent in the northern half of the state.

The pathogen overwinters on corn and wheat debris. Spores produced on the debris lead to infection during silking. Gib ear rot is more prevalent when cool, wet weather occurs during the first 21 days after silking. Extended periods of rain in the fall, which delay dry down, increase the severity of the disease. Gib ear rot will be most severe in fields where corn follows corn, or corn follows wheat that was affected by Fusarium head blight (scab), which is caused by the same pathogen.

This bulletin describes:

1. How to identify the disease
2. The danger to livestock
3. How to minimize losses and handle diseased grain after harvest
4. How to manage the disease

Scouting and Identifying the Disease

Gib ear rot can be readily identified in the field on intact ears, but it is much more difficult to identify after the grain has been shelled. The easiest and most accurate visual detection of Gib infection can be made just before harvest.

To scout for the disease, inspect at least 10 ears in several locations in a field prior to harvesting by peeling back the husks and observing the ears. Look for a pink to reddish mold that begins at the tip of the ear and develops toward the base (Figures 1 and 2).

Figure 1. Pinkish mold at ear tips is characteristic of Gibberella ear rot.

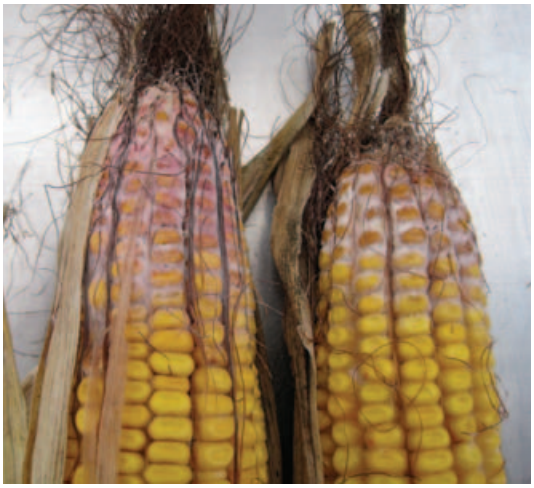

Figure 2. Gibberella ear rot typically affects only part of the ear.

The pinkish mold is typically diagnostic of Gib ear rot. Severely affected ears may be largely rotted with husks and silks adhering tightly to the ear. A pink to reddish mold also may be growing between the husks and ear. Except in highly susceptible hybrids, the disease usually affects only part of the ears.

Mycotoxin Testing

Only a chemical analysis can verify the presence and amount of deoxynivalenol (DON) in infected grain. Your Purdue Extension county educator can help you with testing options.
To find your educator, visit or call toll free:
www.extension.purdue.edu/counties.html
(888) EXT-INFO

There also are a variety of commercial laboratories and quick test kits for mycotoxin analysis.
Romer Labs (www.romerlabs.com) and
Neogen (www.neogen.com) sell test strips for toxin analysis.

The Purdue Botany and Plant Pathology Web site, Mycotoxins: Biosecurity and Food Safety, maintains information about DON and other commercial laboratories:
www.btny.purdue.edu/NC1025

The Indiana Animal Disease Diagnostic Laboratory (ADDL), and Indiana Crop Improvement Association (ICIA) perform toxicology services (including DON analysis) on grain samples.

ADDL (West Lafayette, Ind.) • (765) 494-7440
www.addl.purdue.edu/Users/TOX/Tests.asp

ADDL (Dubois, Ind.) • (812) 678-3401

ICIA (Lafayette, Ind.) • (866) 899-2518
www.indianacrop.org

Two inspectors that analyze grain for DON in the central and north-central regions of Indiana are:

East Indiana Grain Inspection, Inc.
(765) 896-8164 • dwgross@comcast.net

Titus Grain Inspection, Inc.
(765) 463-3713 • titusgraininsp@aol.com

Danger to Livestock

The pathogen that causes Gib ear rot can produce two mycotoxins in the infected kernels: deoxynivalenol and zearalenone. These mycotoxins can affect the health of many monogastric animals, but swine are especially sensitive. If Gib ear rot is present, assume that the mycotoxins are also present. A test is needed to determine the level of contamination. For testing options, contact the Purdue Extension office in your county.

Deoxynivalenol

Deoxynivalenol, also known as DON and vomitoxin, causes swine and other animals to refuse infected grain and regurgitate feed.

Zearalenone

Zearalenone has estrogenic properties, which means it can cause infertility, abortion, or other breeding problems. As little as 1 to 5 ppm zearalenone in a feed ration may produce an estrogenic effect in swine.

More information about the effects of zearalenone on swine is available in Purdue Extension publication AS-598-W, *Zearalenone Concerns in Reproducing Livestock*, available from the Education Store, www.extension.purdue.edu/store.

Deoxynivalenol (DON) Advisory Levels for Animals*

Animal	Maximum DON Level Allowed
Swine	**5 ppm** Not to exceed 20 percent of ration with finished feed = 1 ppm
Ruminating beef and feedlot cattle (more than 4 months old)	**10 ppm** Not to exceed 50 percent of diet with finished feed = 5 ppm
Poultry	**10 ppm** Not to exceed 50 percent of diet with finished feed = 5 ppm
All other animals	**5 ppm** Not to exceed 40 percent of diet

*These levels have been established by the U.S. Food and Drug Administration.

Specific Effects of Mycotoxins on Swine

Deoxynivalenol (vomitoxin, DON)			
Swine	**Concentration**	**Duration**	**Effect**
Feeder pigs	5-10 ppm	1-5 days	50% reduction in feed intake, vomiting
Feeder pigs	10-40 ppm	1-5 days	Complete feed refusal, vomiting
Sows	3-5 ppm	Gestation, lactation	Lower fetal weights, or no effect
Zearalenone			
Swine	**Concentration**	**Duration**	**Effect**
Prepubertal gilts	1-5 ppm	3-7 days	Hyperestrogenism, prolapse
Sexually mature open gilts	3-10 ppm	Mid-cycle (day 11-14)	Anestrus, pseudopregnancy
Bred sows	15-30 ppm	First trimester	Early embryonic death, small litters
Juvenile boars	10-50 ppm	Indefinite	Reduced libido, small testicles
Mature boars	200 ppm	Indefinite	No effect

Source: Nolan Hartwig , Gary Munkvold , Gary Osweiler. *Corn Ear Rots, Storage Molds, Mycotoxins, and Animal Health*. 1997 Iowa State University Extension publication PM-1698.

Minimizing Economic Losses

Producers with Gib ear rot in their fields often ask when they should harvest. We base our advice on the fact that grain moisture and temperature influence fungal growth. When grain moisture is more than 22 percent and the temperature is near 80°F, fungal growth and mycotoxin production will continue in the ear. Cooler temperatures will slow growth; however, periods of cold weather (below 50°F) can increase production of the mycotoxin zearalenone, especially if the temperature turns warm again. Disease spread and mycotoxin development should cease when grain moisture content falls below 18 percent.

Thus, fields with significant amounts of Gib ear rot should be harvested as early as possible and handled separately. Mycotoxin concentrations are almost always higher in fines and screenings, and combines should be adjusted to reduce the amount of fines and small, shriveled, or broken kernels. Immediately after harvest grain should be dried to 15 percent moisture. Properly storing grain at or below 15 percent moisture will prevent further fungal growth and mycotoxin production.

More information about grain storage can be found at Purdue Extension's Post Harvest Grain Quality Web site at www.grainquality.org.

Managing the Disease

To prevent future Gib ear rot outbreaks, tillage following a corn rotation is encouraged. Rotation out of corn (or wheat) will allow infected residue to degrade, reducing the presence of the fungus that causes the disease.

Corn hybrids vary in their resistance to Gib ear rot. Check with your local seed dealer to find out more about resistant varieties.

Find Out More

Find more publications in the *Diseases of Corn* series by visiting the Purdue Extension Education Store
www.extension.purdue.edu/store