



# Agronomic Spotlight

## Managing Diplodia Stalk and Ear Rots

- Diplodia stalk and ear rots are caused by the fungus *Stenocarpella maydis* and commonly occur around mid to late ear fill.
- Stalk and ear rots can reduce the quality of the grain and compromise stalk integrity, leading to lodging, premature plant death, and potential yield losses.
- In-season management options are limited but proactive management strategies, such as product selection, reducing inoculum in the field for the following crop, and minimizing stress, can reduce the disease incidence next season.

### Causal Agent and Favorable Conditions

Diplodia stalk and ear rots are caused by the fungus *Stenocarpella maydis*. The fungus overwinters in corn debris; therefore, corn-on-corn fields managed with reduced tillage have an increased potential for Diplodia stalk and ear rots. In general, stalk rot development is favored by late-season stresses such as an excess or lack of moisture, a nutrient deficiency or imbalance, excessively cloudy weather, and invasive injury to the leaves, stalks, or roots by insect feeding, foliar diseases, wind, or hail. Dry conditions during early vegetative growth stages followed by warm, wet weather within the first 21 days after silking favors the development of Diplodia ear rot. Greatest losses may occur when rainfall is above average from silking to harvest, or when insects or birds damage the ear during development. Corn products vary in their level of susceptibility to Diplodia; however, any product can be infected under favorable conditions.

### Symptoms and Scouting

Diplodia stalk rot commonly occurs around mid to late ear fill. Diplodia stalk rot causes a straw-brown discoloration of the lower nodes and internal disintegration of the pith, leaving only vascular tissues intact. Stalks will feel squishy and break easily. Small black dots, called pycnidia (fungal spore producing structures), appear embedded around the lower nodes of infected stalks (Figure 1).



Figure 1. Pycnidia (fungal spore producing structures) embedded around the lower nodes of a corn stalk.

Infected ears will have a tan or bleached appearance on the base of the husk (Figure 2). Inside the husk, a white to gray mold grows between the kernels beginning at the base of the ear and progressing toward the tip (Figure 3). Diplodia continues to develop on infected ears until corn is harvested and dried. If left in the field, particularly when weather is rainy and humid, ears with light infections may progress into ears that are completely mummified by the fungus. Pycnidia, similar to those seen with the stalk rot, can also be found on the husks, cobs, and kernels.



Figure 2. Bleached husks from Diplodia ear rot.

Scouting for stalk rots is recommended as corn reaches the dough through dent stage. Evaluation of stalk quality helps to identify where stalk rots are occurring in your fields and can assist in making decisions on which fields to harvest first and where to employ proactive management practices for the following season. Fields with heavy infestations of leaf diseases should be watched closely for stalk rots as this may lead to cannibalization of the stalk in order to supply carbohydrates to the developing kernels.



Figure 3. Progression of Diplodia ear rot.

Two methods used to evaluate stalk quality are the pinch and push tests. Conduct either test on 10 plants in a row at several locations throughout the field. The pinch test is conducted by pinching the lower internodes between your thumb and finger to see if the stalk collapses.

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The push test is conducted by pushing each stalk to approximately a 45 degree angle to see if it breaks. If stalk quality has been compromised in more than 10% of stalks, then the field should be slated for early harvest.<sup>1</sup>

## Impact on Yield

Stalk and ear rots can reduce the quality of the grain and compromise stalk integrity, leading to lodging, premature plant death, and potential yield losses. As plants die from infection, the normal grain filling process stops. This can result in a reduction in kernel size and grain weight. Grain quality can also be affected by ear rots after the ears on lodged plants come into contact with the soil and crop residue. Ears infected with Diplodia are lightweight and subject to breakage and losses during harvest. Infected kernels will be lightweight and have reduced nutritional value. Unlike some ear rots, Diplodia does not produce a mycotoxin harmful to livestock, but will result in lower quality feed.

## Management Options

In-season options for managing Diplodia are limited and fungicides are not effective at controlling the disease, but proactive practices can help manage both Diplodia stalk rot and ear rot in future crops.

### Product Selection.

- Corn products differ in their level of resistance to Diplodia stalk and ear rots. Products with good standability ratings may have fewer lodging issues in infected fields.

### Reduce Inoculum.

- Corn is the only host for the fungus that causes Diplodia ear and stalk rots; therefore, rotating to crops other than corn for 1-2 years is very effective at reducing the inoculum in the field.
- Burying infected corn residue with tillage speeds decomposition and reduces the amount of inoculum for the following crop.

**Minimize Stress.** Minimizing stress during the growing season can help maintain stalk health and minimize stalk rots.

- Plant products with insect protection traits to minimize damage from stalk boring insects and to protect ears from ear feeding insects that may compromise husk coverage.
- Control foliar diseases to help maintain healthy photosynthetic leaf area and minimize stalk cannibalization during grain fill.
- Plant products with different relative maturities and/or different GDU requirements to flowering so that the entire crop does not flower during peak environmental conditions for Diplodia ear rot infection.
- Lower planting populations to help decrease plant stress.
- Minimize nutrient and moisture stress when possible.

## Grain Drying and Harvest Considerations



Figure 4. Diplodia grows around the kernels and infects the pith, resulting in reduced grain quality and compromises stalk integrity.

Proper drying and storage of grain are important when Diplodia ear rot is present. Consider the following management practices for harvesting and storing grain from fields with established ear rot:

- Schedule affected fields for early harvest to prevent further spread of ear rot if weather conditions have been favorable or if stalk lodging is a concern.
- Allow corn to dry in the field to 23 to 25% moisture and dry grain to 13 to 14% moisture prior to storage.<sup>2</sup>
- Store grain at cool temperatures between 36 and 44 °F after drying.
- Limit storage to cold weather and do not store through the next summer.
- Store diseased grain separate from healthy grain.
- Check grain periodically for temperature, wet spots, and insects.
- Clean bins thoroughly before storing.

### Sources

<sup>1</sup> Bissonnette, S. 2000. Diplodia ear and stalk rot. The Bulletin. University of Illinois. <http://bulletin.ipm.illinois.edu/>. <sup>2</sup> Lipps, P., Dorrance, A., and Mills, D. 2004. Corn disease management in Ohio. The Ohio State University Extension. Bulletin 802. <http://ohioline.osu.edu/>. Other sources: Diplodia stalk rot. Field crop diseases. University of Illinois. <http://cropdisease.cropsci.illinois.edu/corn/Diplodiastalkrot.html>. Grabow, B. Diplodia stalk and ear rot. Kansas State University Department of Plant Pathology. <http://www.plantpath.k-state.edu/>. Web sources verified 8/1/16. 130816014103

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For additional agronomic information, please contact your local seed representative. **Individual results may vary**, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** ©2016 Monsanto Company. 130816014103 080816CAM