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Corn Disease Update

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Corn Disease Update

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Goss’s Bacterial Wilt and Blight

Goss’s Bacterial Wilt and Leaf Blight, or more commonly referred to as Goss’s wilt, was commonly seen across the Corn Belt in the 2011 growing season. Goss’s wilt was prevalent in the 1970s and 1980s, but only developed sporadically from the late 1980s until 2006. In 2006, the disease reemerged in Western Nebraska, Northeastern Colorado, and Southeastern Wyoming. From here, the disease quickly progressed eastward and in 2008 it was first reported in Indiana (Ruhl et al., 2008). The disease has also been documented as far south as Texas, and as far north as North Dakota (Korus et al., 2011). In 2011 the disease was seen widespread by the UNL Plant and Pest Diagnostic Clinic as part of a regional survey funded by the NCRIPM program. Samples with Goss’s wilt were received from several states from throughout the Corn Belt, including WY, CO, NE, KS, SD, ND, MN, WI, and IN.

Symptoms

As the name implies, there are two phases to the disease. First, there is the wilt phase. This phase usually occurs in conjunction with early season wounding (e.g. sandblasting, hail, high winds, or heavy rainfall). The wilt phase is usually most severe when plants are hit in the early growth stages when nodes are stacked beneath the soil line V3-V5 (Suparyono and Pataky 1989). Stand reductions around V4 have been reported to be as high as 30% when the systemic wilt phase was severe. The wilt is caused by a buildup of bacteria in the vascular bundles, which causes the plant to be unable to transfer water, thus causing the plant to wilt and die. The wilt phase can also occur when plants are larger, but disease occurrence is usually not as severe (Suparyono and Pataky 1989).

The second and more common phase is a leaf blight. Goss’s wilt leaf blighting is also most commonly seen in association with the wounding events as previously described. Leaf blighting often is accompanied by water soaked lesions with discontinuous water soaked spots, often called freckles, along the lesion margin. The lesions run parallel to the veins, but are not confined between veins. The leaf blight phase was common during the 2011 growing season with 99% of Goss’s wilt samples received in the survey being leaf blight samples.

Management

There are four management techniques currently recommended.

- The first and best management technique is use of disease resistant hybrids.
- The second recommendation is to control alternative hosts (e.g. green foxtail, shattercane, sorghum, barnyard grass, and volunteer corn) (Schuster et al., 1975).
- The third recommendation is to use tillage to bury residue and reduce inoculum concentrations.
- The final recommendation is to rotate to a non-host crop like soybean or alfalfa. Our lab has also conducted efficacy trials using several products, but results have been inconsistent to this point. A summary of some of those results can be found in the article Effects of Crop Injury on Disease Development in the 2012 Crop Production Clinic Proceedings.

2011 Survey

During the 2011 survey, 506 samples were received with 359 samples testing positive for Goss’s wilt. Several states submitted samples that tested positive, as stated above. Most samples submitted came from areas where the disease had not been observed before. When samples were received, they were tested for Goss’s wilt using an ImmunoStrip Test kit sold by Agdia. A 1”x ½” segment of expanding lesion was cut from each sample and ground up to extract the pathogen. Usually after about 5 minutes a result would be expressed in the form of two pink lines for a positive sample, and one pink line for a negative sample. Samples that did not show good lesion development, but tested positive were checked for bacterial streaming as a precaution against false positives. The purpose of the survey was to help identify which cultural practices were affecting the development of Goss’s wilt across the Corn Belt, and an advanced statistical analysis will begin in the coming months. The results of which will help to prioritize which cultural practices have the biggest impact on disease development, and can thus be targeted for more effective management recommendations and future research.

Literature Cited


**Gray Leaf Spot**

Gray leaf spot was atypical during 2011 in Nebraska. In general, development of the disease was delayed in southern counties during the midseason when night temperatures remained warm and inhibited dew development. In these areas, disease developed more rapidly later during grain fill. In contrast, counties in the northern areas of the state experienced cooler night temperatures that hastened dew development and led to earlier and more severe gray leaf spot development.

Each year foliar fungicide trials are conducted on corn at the UNL South Central Agricultural Laboratory (SCAL) where gray leaf spot is the predominant foliar disease. Yield results were not yet available from these trials at press time for these proceedings. Trial results can be viewed at the Plant Disease Central website at [http://pdc.unl.edu/](http://pdc.unl.edu/) under “Management Trials.” In addition, a new publication summarizing results of foliar fungicide trials conducted across the north central states is available in hard copy or on the website.

**Seedling Diseases and Stalk/Crown Rot Diseases**

Stressful conditions for much of 2011 in parts of Nebraska created a high risk environment for the development of both seedling diseases and stalk rot diseases.

Excessive rain and flooded conditions early in the season led to nitrogen leaching and deficiencies in corn in many areas of the state and created a favorable environment for seedling disease. Although all commercial field corn seed is treated with one or more seed treatment fungicides to protect against seedling disease, during extended periods of wet and/or cool conditions seedling germination and growth can be inhibited and overcome by one or more common seedling pathogens. During the spring and early summer of 2011, Pythium root rot was the most common cause of seedling damping off and seed decay, with some additional Fusarium root rot.

However, some infected plants out grew the early season infections only to be overtaken by them late in the season. Many cases of stalk and crown rot diseases were reported late season in 2011. In addition to the common stalk and crown rot diseases that are typical for Nebraska, Pythium stalk rot was also a problem and likely due to latent infections that initially occurred early in the season. The fungus-like organism Pythium requires wet conditions for its swimming zoospores to locate roots and infect them. Pythium stalk rot may have a similar water-soaked appearance to that of bacterial stalk rot, but lacks the putrid odor that can accompany bacterial stalk rot. In some cases, the stalks infected by Pythium were also very wet inside, in contrast to the rotted stalk caused by other more common pathogens, such as Fusarium and Anthracnose.

Often the first indication of rotted stalks may be the rapid and premature desiccation of some plants in the field that appear to be senescing more rapidly. These plants often have stalks that are hollow and easily crushed by hand or bent using the “push or pinch” test. Stalk rots can occur at any point in the stalk from the crown at/below the soil line all the way to the tassel. Rotting that occurs at an upper node and kills only the upper plant parts is referred to as “top rot” and does not necessarily cause lodging of the whole plant. Premature desiccation of plants can also be caused by below-ground infections, such as crown and root rot diseases that were also common in 2011. Evidence of those infections can be seen by splitting stalks all the way through the root ball where discoloration and decay can be more evident. Crown and root infections can prematurely kill plants by shutting down water movement up the plant and lead to accelerated desiccation.

There is nothing to be done by the time these symptoms are observed during the season to stop stalk and crown rots. But, they can impact harvestability if plants lodge prior to harvest. Consider harvesting those fields that are heavily impacted by stalk rots early or first to avoid losses after lodging. The costs required to dry grain harvested early from a field with severe stalk rot may be less than that of the additional costs that will be required to harvest a field of downed corn.

There are several fungi and bacteria that are common in our production fields that can cause stalk rot diseases. Some of the most common in samples submitted to the UNL Plant & Pest Diagnostic Clinic in 2011 are listed below:

- **Pythium stalk rot** is a less common stalk rot disease that occurred in 2011 due in part because of the excessive rainfall. Infected plants may collapse and appear water-soaked inside, but lack the foul odor that accompanies bacterial stalk rot.
• **Anthracnose stalk rot** can also cause a leaf disease and is a common cause of top rots in corn. In more advanced stages the disease can cause the development of black lesions visible on the outside of the stalk.

• **Fusarium stalk rot** is especially common during damp conditions and may lead to white fungal growth visible at the nodes. Eventually, the disease may cause discoloration of the inside of stalks to pink or salmon.

• **Bacterial stalk rot** tends to occur mid-season. The most diagnostic feature of this disease is the very foul odor it causes. Plants that develop the disease late in the season are sturdy enough that they do not typically collapse like those infected earlier in the season.

**More Resources**

Additional information on these and other diseases can be found at the website Plant Disease Central at [http://pdc.unl.edu/](http://pdc.unl.edu/) or in the following UNL Extension publications:

- **Gray Leaf Spot of Corn**
  http://www.ianrpubs.unl.edu/sendIt/g1902.pdf

- **Goss’s Bacterial Wilt and Leaf Blight of Corn**
  http://www.ianrpubs.unl.edu/sendIt/g1675.pdf

- **Common Stalk Rot Diseases of Corn in Nebraska**
  http://www.ianrpubs.unl.edu/sendIt/ec1898.pdf

- **Rust Diseases of Corn in Nebraska**
  http://www.ianrpubs.unl.edu/sendIt/g1680.pdf