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Handling Flooded and Down Corn at Silage and Grain Harvest

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Rain events during August produced localized flooding affecting numerous corn fields. Recent high winds combined with saturated soils have resulted in lodged corn. All this is occurring at the dent growth stage (R5) as we head into corn silage harvest season. Heavy silage harvest equipment can further damage soils by causing compaction which could influence next year's crop.

Flooded corn

Flood water from streams and silt can be a source of pathogens. Flooded corn grain is "adulterated" grain. Farmers are strongly encouraged to work closely with their veterinarian and animal nutritionist when determining which vaccination and feeding protocol to use to further protect the herd from possible health issues associated with feeding flooded crop material. Flooded crops should be stored separately from the rest of your feed. In cases of production problems, this allows for feeding or disposal options without affecting your good feed.

Lodged corn

Fields that have lodged at denting (R5) might "goose-neck" back upright if they are still green. However, high yielding heavy ears may prevent the stalks from straightening at all. Fields should respond to any straightening within 7-10 days

Silage harvest

Some things to consider as we head into corn silage harvest season:

1. Safety first.
2. Water saturated soils will slow down plant dry-down rate, especially with cooler temperatures. Allowing a little more time for the field to dry out will help alleviate potential soil compaction.
3. Regardless of lodging, **the key management driver is plant moisture**.Yield is no longer a concern. Target fields at the ideal moisture content of the storage structure. Bag silos have the greatest moisture range (60 to 70%) and may be best option when the field is variable.
4. Good fermentation will help with preservation. Consider a silage inoculant, however, balance the cost of the product with the loss expected in in the field. Don't throw good money after bad.
5. Use a Kemper head and go against the direction in which it leans.
6. Reach down low. Run the head as close to the ground as possible. Be wary of rocks and uneven terrain.

7. Make sure the kernel processor is adjusted correctly. Kernel processing allows for grain that might be more mature extending the harvest window and allowing the soil to dry more avoiding compaction.

Grain harvest

Identify fields that are at greatest risk and harvest these fields first. Fields which experienced late season stress or disease would be prime candidates for early harvest.

8. Safety first
9. Reduce ground speed. Slow down and adjust gathering chain and snapping roll speed to match combine speed
10. Go against the grain. Combine corn the opposite direction from which it leans.
11. Catch the corn. Adjust gathering chains and snapping plate as close as possible to the stalks.
12. Reach down low. Run the head as close to the ground as possible. Be wary of rocks and uneven terrain.
13. Be ready. Scout fields to anticipate harvest problems.

Further Reading

Flooding Effects on Corn

Lodging in Corn

Lauer, J. 2016. Wet Fall Weather, Flooding, Kernel Sprouting and Molds. Agronomy Advice, Field Crops 28.49-127.

Lauer, J. 2008. Flooding Impacts on Corn Growth and Yield. Agronomy Advice. June 2008 Field Crops 28.49-56.

Two New Videos Posted on Corn Diseases In Wisconsin

Damon L. Smith, Extension Field Crops Pathologist, University of Wisconsin-Madison

Gibberella ear rot on corn>>>

The 2018 corn growing season has been met with numerous disease challenges this season. From typical foliar disease issues like gray leaf spot and northern corn leaf blight, to new diseases like tar spot and bacterial leaf streak, the season has not been easy. As we have started to chop silage, ear rot and mycotoxin issues are also readily apparent.

In an effort to address the new disease, tar spot, we have put together a new video on what we know and don't know. You can view that new video on YouTube, by CLICKING HERE. We have also assembled a second video on ear rots and mycotoxin issues in silage corn. That video can be found on YouTube by CLICKING HERE.

We hope you find these videos informative and help you gain ideas to manage these issues in your operation.

What to Expect from Stalk Rot and Mycotoxins in Severely Diseased and Damaged Corn

Damon L. Smith, Extension Field Crops Pathologist, University of Wisconsin-Madison

To view this blog post from its original website, click here.

Corn is looking pretty rugged in many areas of the Wisconsin corn belt. Areas in southern, southwestern, and south-central Wisconsin have experienced major foliar disease epidemics including the new disease, tar spot. Areas in eastern, east-central, and south-central Wisconsin have also seen heavy flooding and storm damage in corn fields. We have seen fields severely diseased, experiencing stalk rot, lodged, flooded – you name it, it has been a challenging finish to a season that had much promise.

How is tar spot affecting stalk integrity?

Figure 1. Stalks lodged due to reduced stalk integrity.

For corn foliar diseases such as northern corn leaf blight (NCLB) and gray leaf spot (GLS), it is well known that high severity can lead to stalk integrity issues. As foliage is damaged, less photosynthetic capacity is available from the leaves to produce carbohydrates for the plant. To fill an ear of corn, carbohydrates are needed from somewhere. In corn where the foliage is significantly damaged, the stalks become a considerable source to fill out the ear (a sink for nutrients). This leaves the stalk tissues devoid of carbohydrates leading to cell death and subsequent colonization of the stalk by fungal pathogens who are taking the opportunity to feed on a weak stalks. Thus, it isn't uncommon to see stalk rots like Gibberella stalk rot, Fusarium stalk rot or Anthracnose stalk rot at higher incidence where high foliar disease pressure was observed (Fig.1). Where you find stalk rots, you often find root rots caused by the same pathogens. Root rot and stalk rot often go hand-in-hand.

Other causes for loss in stalk integrity can include large ears (nutrient sinks) that the plant can't fill out, without using some of the stalk resources. In 2018 we saw many fields where the crop was moving through growth stages quickly and setting what appeared to be good yields. However, weather conditions changed midseason, with wet weather and more cloud cover, combined with nitrogen issues in some fields. This led to large ears that needed to be filled out, with again, limited photosynthetic capacity. The stalks were scavenged for carbohydrate, leaving them, again, with limited integrity.

Figure 2. An entire field lodged due to significant stalk rot

Now throw in some tar spot. Yet, another foliar disease that can limit photosynthetic capacity of the corn plant. We have observed many fields with significant stalk integrity issues. Whether just tar spot, or tar spot combined with GLS, NLCB, and/or stalk scavenging just for carbohydrates – stalks are in bad shape in many areas of Wisconsin. This is resulting in significant lodging issues in many fields, especially those hit with bad storms over the last several weeks (Fig. 2). Harvesting fields with low stalk integrity early will be key to protect yield potential. Conduct a "pinch" test or "push" test to determine which field have lower stalk integrity. Simply pinch stalks or push stalks to a 30 degree angle. Those plant that are soft and easily pinch or don't pop back up after pushing, have stalk integrity issues. If 30-50% or more of these plants are identified with stalk integrity problems, they should be harvested first, to prevent yield losses from lodging.

What about tar spot, lodged corn, and mycotoxins?

Mycotoxins have not been implicated in the organisms reported to cause tar spot in Latin America. However, that doesn't mean that other organisms that cause mycotoxins might not be present on harvested grain or silage. As plants dry down they can no longer actively fight fungal infection. We have looked at many brown and drying leaf samples from corn plants with tar spot. We do find many other fungal organisms, including Fusarium-organisms, which can produce mycotoxins. So while tar spot itself may not lead to mycotoxins, opportunistic fungi that colonize secondarily may result in elevated mycotoxin levels.

In addition, corn that has lodged and is in contact with the wet and saturated ground is at risk of being colonized by organisms that produce mycotoxins. Many of the known mycotoxin-producing fungi are found in the soil and on residue on the surface of the soil. If lodged corn is in contact with the ground and there is good moisture, it is possible that the ear and plant are being colonized and mycotoxins are being produced. So while your combine might be able to pick a plant up and harvest the ear, beware that it might be heavily colonized with organisms that produce mycotoxins. If taking corn for silage, lodged plants run the risk of significant hygiene issues in the bunker, including mycotoxins issues.

Where else can mycotoxins come from?

Figure 3. Diplodia ear rot on an ear of corn>>>>>

Corn ears don't have to touch the ground to be infected with ear-rot

fungi, they can also be colonized by ear-rot fungi through the silks. Given the kind of crazy year we have had, ear rot might be a significant concern in fields that saw erratic weather this season. Ear rots caused by fungi in the groups Diplodia (Fig. 3), Fusarium, and Gibberella will be the most likely candidates to watch for as you begin harvest. Fusarium and Giberrella are typically the most common fungi on corn ears in Wisconsin. This group of fungi not only damage kernels on ears, but can also produce mycotoxins. The toxins of main concern produced by these organisms are fumonisins and vomitoxin and can threaten livestock that are fed contaminated grain. Thus grain buyers actively test for mycotoxins in corn grain, and feed managers monitor silage for mycotoxin levels to be sure they are not above certain action levels established by the U.S. Food and Drug Administration (FDA).

The FDA has established maximum allowable levels of fumonisins in corn and corn products for human consumption ranging from 2-4 parts per million (ppm). For animal feed, maximum allowable fumonisin levels range from 5 ppm for horses to 100 ppm for poultry. Vomitoxin limits are 5 ppm for cattle and chickens and 1 ppm for human consumption.

For more information about ear rots and to download a helpful fact sheet produced by a consortium of U.S. corn pathologists, CLICK HERE.

How do I reduce mycotoxin risks at harvest?

Before harvest, farmers should check their fields to see if moldy corn is present. Sample at least 10-20 ears in five locations of your field. Pull the husks back on those ears and observe how much visible mold is present. If 30% or more of the ears show signs of Gibberella or Fusarium ear rot then testing of harvested grain is definitely advised. If several ears show 50-100% coverage of mold testing should also be done. Observe grain during harvest and occasionally inspect ears as you go. This will also help you determine if mycotoxin testing is needed.

If substantial portions of fields appear to be contaminated with mold, it does not mean that mycotoxins are present and vice versa. For example, Diplodia ear rot does not produce mycotoxins. However, if you are unsure, then appropriate grain samples should be collected and tested by a reputable lab. Work with your corn agronomist or local UW Extension agent to ensure proper samples are collected and to identify a reputable lab.

For more information on mycotoxins and to download a fact sheet, CLICK HERE.

Helpful information on grain sampling and testing for mycotoxins can be found by CLICKING HERE.

For a list of laboratories that can test corn grain for mycotoxins, consult Table 2-16 in UW Extension publication A3646 – Pest Management in Wisconsin Field Crops.

How should I store corn from fields with ear rots and mold?

If you observe mold in certain areas of the field during harvest, consider harvesting and storing that corn separately, as it can contaminate loads; the fungi causing the moldy appearance can grow on good corn during storage. Harvest corn in a timely manner, as letting corn stand late into fall promotes Fusarium and Gibberella ear rots. Avoid kernel damage during harvest, as cracks in kernels can promote fungal growth. Also, dry corn properly as grain moisture plays a large roll in whether corn ear rot fungi continue to grow and produce mycotoxins. For short term storage over the winter, drying grain to 15% moisture and keeping grain cool (less than 55F) will slow fungal growth. For longer term storage and storage in warmer months, grain should be dried to 13% moisture or less. Fast, high-heat drying is preferred over low-heat drying. Some fungi can continue to grow during slow, low-heat drying. Also, keep storage facilities clean. Finally, mycotoxins are extremely stable compounds: freezing, drying, heating, etc. do not degrade mycotoxins that have already accumulated in grain. While drying helps to stop fungal growth, any mycotoxins that have already accumulated prior to drying will remain in that grain. The addition of acids and reducing pH can reduce fungal growth but will not affect mycotoxins that have already accumulated in harvested grain.

For more information on properly storing grain and to download a fact sheet on the subject, CLICK HERE.

References

Munkvold, G.P. and White, D.G. Compendium of Corn Diseases, 4th Edition. APS Press.

In addition, This article is a compilation of the following previously written resources:

Smith, D.L. 2016. Wisconsin Late-Season Corn Disease Update. http://fyi.uwex.edu/fieldcroppathology/2016/09/07/wisconsin-late-season-corn-disease-update/.

Smith, D.L. and Mitchell, P. D. 2016. Wet Wisconsin: Moldy Corn and Crop Insurance. http://ipcm.wisc.edu/blog/2016/09/wet-wisconsin-moldy-corn-and-crop-insurance/.

Bacterial Leaf Streak of Corn Confirmed for the First Time in Wisconsin

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To view this post from its original website, click here.

Figure 1. Symptoms of bacterial leaf streak on corn.

The 2018 corn production season in Wisconsin has been challenging to say the least. We had what looked to be some of the best corn production we ever had, and then the diseases started to move in. We have observed numerous foliar disease issues and have spent a lot of time trying to understand the tar spot epidemic in Wisconsin and surrounding states.

To add insult to injury, we have now confirmed bacterial leaf streak (BLS) of corn. You may remember that we have been on the lookout for this disease over the past several seasons, but have not confirmed it officially in the state until now. A corn sample was received in our Plant Disease Diagnostic Clinic this season from Pierce County with symptoms consistent with those for BLS (Fig. 1). The sample was confirmed positive in our clinic through multiple tests, including bacterial streaming and PCR. Subsequently, the sample has been confirmed positive by multiple laboratories, including the CPHST-Beltsville Laboratory.

Bacterial leaf streak (BLS) of corn was reported for the first time on corn in the U.S. in 2016, but was likely present in Nebraska since 2014. The first report was in Nebraska with subsequent reports coming in from other states in the U.S. corn belt. Other states where the disease has been confirmed include Iowa, Illinois, Colorado, Kansas, Minnesota, Oklahoma, South Dakota, Texas, and now Wisconsin.

What causes bacterial leaf streak and what are the symptoms?

Bacterial leaf streak is caused by a bacterium named Xanthomonas vasicola pv. vasculorum. It causes wavy narrow leaf lesions with wavy edges that are often brown in color. Lesions can appear translucent and have halos when backlit. Symptoms on corn have been observed as early as V7, starting in the lower canopy and moving up the canopy if weather conditions are favorable (wet weather, with hot temperatures). Little is known about the disease cycle, but researcher believe it can overwinter on corn residue. The bacterium is presumed to be spread by irrigation, splashing rain, or wind-driven rain. No injury is needed for the bacterium to enter the plant. It is unknown if the bacterium can be spread on, or in, seed and if there are alternative weed hosts.

Does bacterial leaf streak cause yield loss?

Little is actually known about the disease on corn in the U.S. Most researchers believe that yield loss is minimal if the disease moves in late in the season. If the disease moves in earlier and causes extensive leaf blighting during grain fill, then yield losses could be more substantial. Little is known about the effect of BLS on grain quality.

How do I manage bacterial leaf streak of corn?

Some corn hybrids appear to have better resistance to BLS than others. Work with your seed dealer to find a hybrid that is rated as resistant and fits your environment. Hybrid resistance will be key to manage this disease. BLS is caused by a bacterium, thus, fungicides are not effective in controlling this disease. Withholding irrigation has also been shown to not be effective as the disease can occur in drylands and irrigated fields. Managing corn residue through rotation may be helpful. Tillage and burying residue might also be an option, but managing soil erosion should be placed as a higher priority.

Other Resources about bacterial leaf streak

- You can click here to read the USDA APHIS Statement on Xanthomonas vasicola pv. vasculorum.
- To learn more about the disease and to watch a video by Dr. Tamra Jackson-Ziems at the University of Nebraska CLICK HERE.
- To learn how BLS is diagnosed in the lab, CLICK HERE to watch a video from Iowa State University.
- CLICK HERE to download a fact sheet on BLS of corn, by a team of U.S. plant pathologists.

How do I get a diagnosis if I suspect bacterial leaf streak?

If you suspect that you have BLS in your corn crop in Wisconsin, leaf samples of corn plants can be sent in a sealed plastic bag with NO added moisture to the University of Wisconsin Plant Disease Diagnostic Clinic (PDDC). Informa-

tion about the clinic and how to send samples can be found by CLICKING HERE.

2018 Wisconsin Soybean Yield Contest

Shawn Conley, State Soybean and Small Grains Specialist

The Wisconsin Soybean Association (WSA) Soybean Yield Contest is organized to encourage the development of new and innovative management practices that highlight the importance of using sounds cultural practices in Wisconsin soybean production systems. Any soybean production system can enter in the contest. Two winners will be selected from each of four geographical divisions in the state. Divisions are based on long-term county soybean yield averages. WSA is not responsible for incorrect or missing entries. All rules set forth herein apply to all entries.

For contest details, click here.