

SW Iowa Crop Update: July 21, 2009

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I'll be perfectly honest, I'm concerned at the amount of Gray Leaf Spot (GLS) that is present in some of the corn fields in SW Iowa. Not every field has GLS that is at concerning levels but some fields do. I will outline the important information to make the most informed decision.

Gray Leaf Spot

GLS is considered the most yield limiting disease for Corn, it is caused by the fungus *Cercospora zeae-maydis*. GLS was first recorded in the US in 1924 in Illinois. Many may remember or have encountered GLS in the 1990's. Increased acres of reduced tillage and the increase of continuous corn production may further increase GLS.

How does it Impact Yield

Weather and hybrid susceptibility will have the greatest influence on how GLS affects corn's yield potential. GLS reduces yield by taking away the photosynthetic area of each leaf. Corn grain fill is primarily driven by the leaves in the top of the plant (ear leaf and above). Depending on which paper you read, 70-75% of the carbohydrates that make their way into the ear are produced by the ear leaf and above leaves. GLS can have negative effects on yield by reducing, kernel number and weight. Many Midwest Universities have studied stalk quality, foliar disease, and fungicide use. One thing that is very consistent, when a corn plant experiences reduced photosynthetic area, the plant may "rob" or "canabalize" the stalk for carbohydrates leading to stalk rot and other pathogens that may lodge the plant. Below is a table that estimates yield loss (taken from UNL G 1902). One thing to remember, people commonly over estimates the area that a disease covers or an insect eats.

Table I. Predicted yield loss due to Gray Leaf Spot.
(Source: Pat Lipps, The Ohio State University)

<i>Percentage ear leaf area affected by early dent stage</i>	<i>Approximate yield loss expected</i>
5% or less	0-2% loss
6%-25 %	2-10% loss
25%-75%	5-20% loss
75%-dead leaf	15-50% loss

Gray Leaf Spot Identification

GLS may look somewhat different early after infection. The lesions may appear to be more of a spot than a long lesion. The lesions are tan to brown with yellow margins, the lesions are usually confined by leaf veins which run parallel with the midrib. I have confused early GLS with common rust pustules but in time the GLS lesions are easily distinguished. Single lesions are about 1/8" wide and are restricted by the leaf vein. The lesion may be a few veins wide. Lesions have been documented at almost 3" long but more often they are 3/8 to 1" in length right now. Multiple lesions may form next to each other look more like a 1/4" wide spot. Lesions have squared off ends and this gives them a rectangle looking

shape. I know a picture is worth a thousand words, below is a few pictures I took from leaves I collected yesterday.







Infection

I will try to keep this as simple and short as possible. Infection cycle may be different for different hybrids. The cycle may take 14-21 days on a susceptible hybrid while a more tolerant hybrid may slow the infection cycle some and be more in the 21-28 day range. The slower the infection cycle the greater the chance that GLS doesn't reach an economical threshold of damage. Under perfect growing conditions for GLS, the infection cycle has been documented as low as 7 days. Inoculum (spores) come from two sources: from previous crop's residue that is infected with GLS, or blown in from other infected fields in the area. GLS infection is favored by warm, humid conditions and frequent rainfall (that weather pattern should sound familiar, doesn't it)? Infection requires the leaf surface to be wet for 10-13 hours and high relative humidity in the canopy. Under these conditions the fungus can produce more spores that can be blown around the canopy and may infect the upper leaves.

Fungicides

There are several fungicides that are labeled for use on corn in Iowa. Careful and timely application of a fungicide will effectively control GLS. We know that fungicides will control some fungus, the real question is finding out if applying a fungicide will **return economically**. There have been years of work dedicated to determining economic thresholds but this work was done in the 90's with different hybrids and different fungicide chemistry. One threshold from the 90's is, look for lesions on the ear leaf and a leaf above and below, if they add up to a size of a quarter at tassel, then spray. The other threshold was, 50% of plants having 3/8" long lesions on the third leaf below the ear at tassel, then spray.

We do not currently have sound economic thresholds today for post tassel disease severity. One major reason for this is the lack relationship between yield reduction and disease severity. This is further complicated by different calendar date, crop growth stage, weather, and other stresses the crop may encounter between application and harvest.

Of the fungicides that are available, some are strobilurins, triazoles, or a tank mix of both. These fungicides also have been classified as “preventative” and others “curative”. Which of these fungicides should you use? I personally would not put too much emphasis on the different classes of fungicides. For more information on the differences between curative and preventative fungicides, visit this web page.

<http://www.extension.iastate.edu/CropNews/2008/Preventative+or+curative+fungicides.htm>

So Now What

There are a few things to consider at this time. It all starts with scouting each and every field. Knowing if GLS is present, and at what severity is crucial. University of Kentucky Extension has a listed eight high risk factors for GLS.

1. Susceptible hybrid
2. Continuous corn
3. Late planting date
4. Minimum tillage
5. Field history of sever disease
6. Early disease activity (before tasseling)
7. Irrigation (probably not the norm here)
8. Favorable weather forecast for disease spread

I have been talking with our ISU Extension plant pathologists the past few weeks about GLS. This is what has been defined on what we know and how to proceed in GLS and other foliar disease management.

1- For the past few years, fungicides have resulted in yield increases in some fields over the past few years. However, this has been inconsistent.

2- To increase the chances of getting a positive yield response is to apply fungicides to fields with foliar disease pressure.

3- This year we are seeing GLS (and eyespot) in several fields that are at or exceeding thresholds (granted the thresholds that we are using are 20 years old)
Research is ongoing to update these thresholds.

4- Environment is critical for further disease development. If the weather dries up, foliar disease progress will slow or stop, which would minimize the effect of disease.

5- Fungicide application timing could be critical, but this is really a field-to-field situation. Scouting your field and assessing the amount of GLS and knowing the resistance level of the hybrid will help determine when you should spray.

I'll repeat it once more. Scouting is the first and most important step at this time of the growing season. Rate each field, and any hybrids within that field having foliar diseases. Record the severity of the disease, and how far up in the canopy is the disease.

Alison Roberston, ISU Extension Plant Pathologist has recently written an article on the ICM newsletter regarding foliar diseases.

<http://www.extension.iastate.edu/CropNews/2009/0721Robertson.htm>

Remember don't just look for GLS in the corn, they may be other diseases and issues in the fields. While scouting the last week, I've begun to find some corn leaf aphids. The aphids are at very low levels, about 20 per plant, less than 1% of plants infected.

Don't forget about your soybeans, soybean aphids are in the area in very low numbers.

Special thanks to Daren Mueller and Alison Robertson (ISU Extension Plant Pathologists)

If you have any questions, feel free to call or email. I will try to help as much as I can or pass your questions on to our experts. Thank you.