Wisconsin Crop Manager

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# Stalk Borers

Bryan Jensen
UW Extension and IPM Program

Stalk borers are starting to move to corn in the southern part of the state and likely hop vine borers are doing the same. Both insects overwinter as eggs and initially feed on perennial grasses before migrating to corn. As a result, it is not always a well-timed migration. Look for feeding damage in all parts of the state over the next few weeks to be sure.

Early symptoms of stalk borer damage

Stalk borer larvae

Field areas damaged from both insects are strongly correlation to the presence of perennial grasses. Usually this is along field edges such as ditches, waterways and field borders and feeding is confined to the first few (2-6?) rows of corn. However, damage can be found wherever these grasses were located last summer/fall during the egg laying period.

Preventing damage from stalk borer is arguably easier than hop vine borer. Stalk borers are susceptible during the migration to corn and while feeding in the whorl and/or when moving from plant to plant. However, once they tunnel into the stalk they are no longer susceptible. Economic thresholds have been developed

Hop vine borer damage

by Iowa State University and are based on crop stage, expected yield and commodity prices. This table can be found on p. 67 of A3646, Pest Management in WI Field Crops. For $4.00 corn that threshold is roughly 4-5% damaged plants.

Timing of hop vine borer treatment is critical as their susceptibility to insecticide treatments is only during the initial migration to corn. They immediately tunnel into corn plants below ground and there is little plant to plant movement. Insecticide applications are suggested at first signs of damage if there was significant feeding in that same field the previous year.

Damage symptoms from stalk borer is small feeding scars on the newly emerging leaves and eventually holes in the leaves when larvae mature. Eventually you will find wilted whorl leaves if tunneling reaches the growing point on small corn plants. Symptoms from hop vine bore are often described as wilted whorls or dead-heart. You should also be able to find the entry point below ground. Because both species do not pupate until mid to late-July you can frequently find larvae in most, but not all, damaged plants.

Hop vine borer larvae

## European Corn Borer

Bryan Jensen
UW Extension and IPM Program

In most of Wisconsin we are close to peak European corn borer (ECB) moth flight, however, the best treatment period is a week or two away. DATCP's Pest Survey data indicates 2015 had the lowest amount of field damage in the history of their 74-year survey. Nonetheless, I would not be surprised to hear of a few conventional corn fields with damage. Based on DATCP's results, I am not expecting any widespread damage but there are more acres of conventional corn grown this year. A little spot-checking might be worthwhile over the next few weeks. I would concentrate my efforts on the tallest (> 18 in. extended leaf height) conventional corn in your area. These fields are most attractive and offer the greatest chance of survival. After egg hatch, larvae will migrate to the whorl and feed for a period of time before tunneling into the stalk. Initial feeding symptoms will be small, random holes in the emerging leaves. Pull the whorl leaves from a damaged plant and count the number of larvae/whorl. Treatment decisions will be based on a field average of infested plants and number of larvae/plant. You may calculate a threshold for first generation ECB by using the worksheet found on p. 65 of A3646, Pest Management in WI Field Crops. It is always a little dangerous to suggest treatment levels for ECB because they vary by price, yield and applications costs. However, to give you a ballpark estimate, a field with 60% of the plants infested and an average of 1.2 larvae/plant that yields 150 bu/a and a selling price of $3.80/bu will likely give a $27 loss/acre if your insecticide is 80% effective.

## Northern Corn Leaf Blight Positively Identified in Wisconsin in 2016

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

I was hoping that I would write this article later in the year. But it has happened relatively early for us. We have positively confirmed northern corn leaf blight (NCLB) on field corn at about the V7-V8 growth stage near Janesville, WI this week. This is a bit early for us, however, not entirely surprising given the levels of residual inoculum from the fungus that causes NCLB left from 2015 in many fields and the cool wet conditions we have had this spring. The situation has been similar to that in Iowa. Dr. Alison Robertson also reported the first find of NCLB in southeast Iowa this week. While this find is relatively early for Wisconsin, I don't think the world is going to come to an end. Patience will be key over the next couple of weeks. I'll explain why folks should be cautious in making management decisions below.

**What is the Organism that Causes Northern Corn Leaf Blight (NCLB)?**

A fungus called *Setosphaeria turcica* (synonym: *Exserohilum turcicum*) causes NCLB (Fig. 1). The fungus loves it wet and cool. The fungus is most active when wet weather coincides with temperatures between 65 F and 80 F. During these conditions, the fungus will readily make microscopic spores (called conidia) inside the symptomatic areas of leaves and those spores (Fig. 2) will get splashed onto more leaves. Therefore, the disease typically moves form the lower canopy, up the corn plant as the season progresses. When temperatures get above 80 F and it is dry, growth and spread of the fungus slows dramatically. Remember the disease triangle? It takes

**Figure 1**. Northern Corn Leaf Blight symptoms on a corn leaf.

three things for a plant disease to occur – susceptible plants, fungal inoculum present near those susceptible plants, and favorable weather. Early this season, all three legs of the triangle were present. We have lots of residual inoculum left from 2015, we have lots of corn planted again in many fields that had corn last year, and we had cool rainy conditions early on this season. However, as we think about the disease triangle moving forward, and look at forecasts over the next 7-10 days, weather is not going to be conducive for the NCLB fungus. Temperatures are forecasts to be above 80 F and there isn't much rain in site. Without the weather component of the triangle, fungal growth, spread, and subsequent disease development will be halted.

**What should I do About Managing NCLB in 2016?**

Farmers and consultants should start actively scouting corn fields in Wisconsin and keep track of disease and disease development. Remember, that while the disease is manifesting early, it is currently affecting leaves that will be in the lower canopy of the plant and are not responsible for a large portion of grain yield. While I hate talking about threshold levels for managing disease, it can be helpful in your decision making process to know what might be severe disease. While scouting look in the lower portion of the canopy. If some symptoms

**Figure 2**. A photo-micrograph of spores produced by the NCLB fungus.

**Figure 3:** A computer simulation of 5% NCLB severity on a corn leaf.

are present in the lower canopy, make a visual estimation of how frequent (percentage of plants with lesions) NCLB is in a particular area and how severe (how much leaf area is covered by NCLB lesions. The lower leaves aren't responsible for much yield accumulation in corn, but spores produced in NCLB lesions on these leaves can be splashed up to the ear leaves where disease can be very impactful. So by scouting the lower canopy and getting an idea of how much disease is present, you can "predict" whatmight happen later on the ear leaves to make an informed spray decision. The other consideration you should make while scouting is the resistance rating that the hybrid has for NCLB. If it is rated as resistant, then NCLB severity might not be predicted to get very severe, while in a susceptible hybrid, NCLB might be present on 50% or more of plants at high severity levels. Note however, that even if a hybrid is rated as resistant, it can still get some disease. Resistance isn't immunity! If NCLB is present on on at least half the plants and severity is at least 5-10% and weather is forecast to be rainy and cool, a fungicide application will likely be needed to manage the disease. So what does 5% leaf severity look like? Figure 3 is a computer generated image that shows 5% of the corn leaf area with NCLB lesions. You can use this image to train your brain to visually estimate how severe the disease might be on a particular leaf. As for fungicide choice and timing, I consider that further below.

**When Should I Spray and What Should I Spray?**

While it might seem tempting to spray fungicide now (between the V6-V8 growth Stages) because of NCLB, remember that the disease will likely slow due to the hot dry weather pattern we are about to encounter. I would encourage you to be patient and save your fungicide spray until as close to tassel (VT growth Stage) as you can. Over the last several years corn pathologists in the U.S. corn belt have conducted fungicide application timing trials on corn for grain. Programs included various products, but applications focused on an early (V5-V8) timing, a VT-R2 timing, or a combination of V5-V8 plus a VT-R2 application (two fungicide applications). Over a 6 year period and well over 1,500 observations, the

Figure 4. 2016 Break-even table for corn fungicide application (Click here to enlarge)

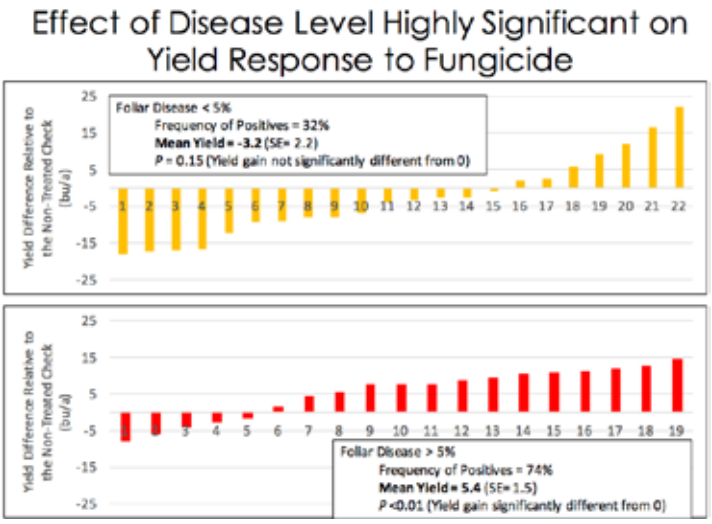
## Break-even scenarios for corn

(bushels needed to cover cost)

| Corn Price ($/bu) | Cost Per Fungicide Application ($/A) | | | | | | |
|---|---|---|---|---|---|---|---|
| | $10.00 | $12.00 | $14.00 | $16.00 | $18.00 | $22.00 | $24.00 |
| $2.00 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 11.0 | 12.0 |
| $3.00 | 3.3 | 4.0 | 4.7 | 5.3 | 6.0 | 7.3 | 8.0 |
| $4.00 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.5 | 6.0 |
| $5.00 | 2.0 | | 2.8 | 3.2 | 3.6 | | 4.8 |
| $6.00 | | Generic Formulations | | 2.7 | | Original Formulations | |
| $7.00 | 1.4 | 1.7 | 2.0 | 2.3 | 2.6 | 3.1 | 3.4 |
| $8.00 | 1.3 | 1.5 | 1.8 | 2.0 | 2.3 | 2.8 | 3.0 |

average yield gain when using fungicide at V5-V8 alone was 1.9 bu/acre, while that at the VT-R2 timing was 4.7 bu/acre, and 5.6 bu/acre for the two-pass program. Now consider the price of corn and the fungicide cost. Figure 4 is a breakeven table for fungicide cost compared to corn price. You will see that I have called out a couple of possibilities depending on the price of your fungicide. If we consider the price of corn grain to be somewhere between $3 and $4 and the cost of a fungicide to be in the $10 to $14 range, you can see from the table that you would need 2.5 to 4.7 bu/acre of additional corn grain in the treated fields, over not treating, to cover the cost of fungicide. Considering these numbers, and the nationwide average bushel return when using fungicide at various corn growth stages, you can see that the VT application timing for fungicide seems to make the most sense.

Figure 5. Yield Gain in field corn where there was little disease activity or high disease activity in Wisconsin. (Click here to englarge)



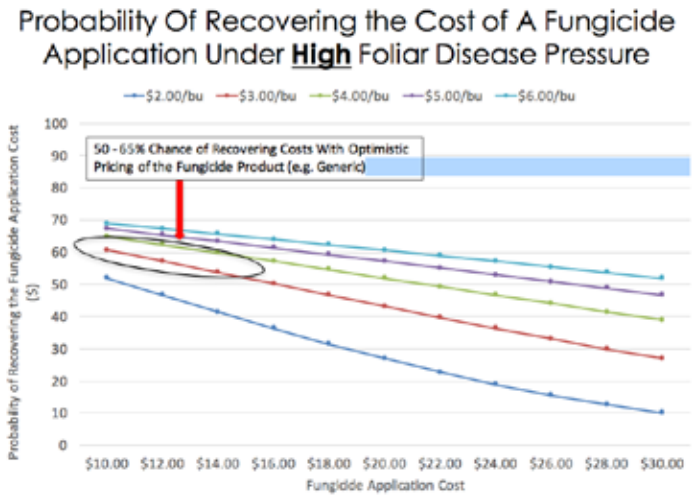

So what about fungicide application on corn in Wisconsin? We have compiled a 3-year dataset where we have looked at return on investment when using fungicide in fields where little disease was active (< 5% NCLB ear-leaf severity) or where diseases active (>5% NCLB ear-leaf severity). When NCLB was active, we found that there was a positive yield response when using fungicide about 74% of the time with an average yield gain of 5.4 bushels per acre (Figure 5). When disease activity was low, that positive yield response dropped to just 32% with little gain over zero bushels (Figure 5).

How about the return on investment in the current corn market? If we consider the current corn pricing and a fungicide cost of $10 to $14, Figure 6 shows that in Wisconsin a positive return on investment (ROI) occurs about 50-65% of the time when disease is active on ear-leaves (Figure 6). When disease is not active, the odds of positive ROI drop to just 12% – 20%. For a full discussion and explanation, I would encourage you to watch this video about corn disease and fungicide applications in Wisconsin.

Also be aware that in some cases, application of fungicide in combination with nonionic surfactant (NIS) at growth stages between V8 and VT in hybrid field corn can result in a phenomenon known as arrested ear development. The damage is thought to be caused by the combination of NIS and fungicide and not by the fungicide alone. To learn more about this issue, you can CLICK HERE and download a fact sheet from Purdue Extension that covers the topic nicely.

For information on fungicide efficacy for NCLB you can consult fungicide efficacy trial data in Wisconsin BY CLICKING HERE. You can also consult the National Corn

Figure 6. Return on Investment calculations for fungicide application on field corn in Wisconsin when disease activity is high. (Click here to enlarge)



Disease Working Group fungicide efficacy table that was recently updated. The fungicide efficacy table can be found BY CLICKING HERE.

**Summary**

While it is earlier than normal to see NCLB in Wisconsin, I would encourage people to be patient in managing this disease with fungicide. Remember that conditions are going to be hot and dry over the next 1 – 2 weeks, which will dramatically slow the progress of NCLB. Also, considering that the best response out of a fungicide application seems to be between VT-R2, and the issues with fungicide plus NIS application between V8 and VT, I would suggest holding off for any fungicide applications until closer to VT. With the price of corn grain comparatively lower than in years past, one application of fungicide is about all that Wisconsin farmers can afford, therefore I would maximize that application and apply it as close to the VT growth stage as you can. As you approach that growth stage, continue scouting and consider if the disease is active. If it isn't active and the weather pattern continues to be hot and dry, a fungicide application may not be needed at all.

# Wisconsin Winter Wheat Disease Update – June 16

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

Brian D. Mueller, Graduate Research Assistant, University of Wisconsin-Madison

The University of Wisconsin Field Crops Pathology team has completed leaf disease ratings at all Wisconsin winter wheat variety trials this week. We will begin rating for Fusarium head blight (FHB) damage in these same trials next week. We have also scouted wheat in production fields in various areas. Most wheat has completed anthesis and is filling grain. No FHB has been observed up to this point. However, stripe rust is pretty serious in most locations we have been (Figure 1). On susceptible varieties that haven't been sprayed with a fungicide, we have observed 100% incidence with average severity on flag leaves ranging between 30 and 90%! We even have our token "Yellow Jeans" picture to demonstrate how severe stripe rust is in some fields (Figure 2). While there are many cases of severe stripe rust, we have observed some varieties to be very resistant. Little or no rust observed (Figure 3). I think there will be a wide range in yields of winter wheat this year in Wisconsin, based on stripe rust severity. Those who did not spray fungicide and have susceptibility will see significant yield losses and reduced test weight.

**Figure 1.** Stripe rust spores on a wheat leaf, being collected for research.

**Figure 2**. Stripe rust spore on denim jeans

We have seen very few other foliar diseases on wheat during our travels. Leaf blotch diseases are present in some fields in the lower canopy, but in many cases, stripe rust is out-competing those diseases. We found powdery mildew in one isolated location in one field we have

**Figure 3.** A stripe rust susceptible winter wheat variety on the left and a resistant winter wheat variety on the right. Note the yellow leaves on the variety on the left.

been in. We suspect that we will find some FHB over the next several weeks as portions of the state had favorable weather for the FHB fungus during anthesis. We will continue to monitor this situation and alert you to what we find.

Finally, I want to note that fungicide applications should not be made after the anthesis period. Most fungicide will no longer be effective on these diseases once established. Also, the pre-harvest intervals on these products will not allow application after the anthesis period.

## Using High-Input Systems for Soybean Management Increases Yield but Not Profitability

Shawn P. Conley
Soybean and Wheat Extension Specialist

As fields begin to dry out and growers look to get across their fields to apply inputs here are a few points to ponder for Midwestern farmers based on our USB funded High Yield Project.

1. V4 applications of nitrogen to soybean provided a +3.9% relative yield change, but a 0 to 27% chance of ROI based on yield levels from 45-75 bu per acre and $12 beans….. i.e. additional nitrogen to soybean does not pay!
2. Lactofen has efficacy on many broadleaf weeds and on white mold….it is not a yield enhancer for Midwestern farmers. We measured a 0% probability of ROI when lactofen was intentionally used to defoliate soybeans and promote branching in Northern and Midwestern soybean fields.

For additional information please review: Using High-Input Systems for Soybean Management Increases Yield but Not Profitability

## UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from June 4, 2016 through June 10, 2016.

**Plant/Sample Type, Disease/Disorder, Pathogen, County**

**Field Crops**

Oats, Phyllosticta Leaf Spot, *Phyllosticta sp.*, Sauk

Oats, Red Leaf (Suspected), *Barley yellow dwarf virus*, Sauk

**Forage Crops**

Alfalfa, Aphanomyces Root Rot, *Aphanomyces euteiches,* Walworth

Pythium Root Rot, *Pythium sp.*, Walworth

**Fruit Crops**

Cherry, Bacterial Canker, *Pseudomonas syringae,* Dane

Cherry, Brown Rot, *Monilinia sp.*, Dane

Grape, Antracnose, *Sphaceloma ampelinum,* Dane

Raspberry, Unidentified Viral Disease, Unidentified virus, Monroe

**Vegetable Crops**

Tomato, Herbicide Damage, None, Dane

**Specialty Crops**

Hop, Downy Mildew, *Pseudoperonospora humuli,* Fond du Lac

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

## Vegetable Crop Update June 10, 2016

Amanda J. Gevens, Associate Professor & Extension Vegetable Plant Pathologist

The 12th issue of the Vegetable Crop Update is now available.

In this issue :

- Late blight and cucurbit downy mildew updates from the U.S
- WI disease forecasting information for late blight and early blight diseases of potato
- Update on Orondis fungicide (Syngenta)

Click here to view this update.

# Vegetable Crop Update June 15, 2016

Amanda J. Gevens, Associate Professor & Extension Vegetable Plant Pathologist

The 13th issue of the Vegetable Crop Update is now available.

In this issue :

- Early prevention of late blight
- Considerations for kicking-off your preventive fungicide program

Click here to view this update.

# Wisconsin Fruit News: Volume 1 Issue 5– June 10, 2016

Janet van Zoeren, Christelle Guédot, and Amaya Atucha, University of Wisconsin – Madison, Departments of Entomology and Horticulture

The 5th issue of Wisconsin Fruit News is now available. Click here to view this newsletter.

All newsletters will also be posted onto at the Wisconsin Fruit website, available at www.fruit.wisc.edu. There you will also be able to search by category or tag, to find crops and/or subject material of interest to you on a particular day.

# Wisconsin Pest Bulletin for 6-9-16

Krista Hamilton, Entomologist, WI Dept of Agriculture, Trade and Consumer Protection

Volume 61 Issue No. 7 of the Wisconsin Pest Bulletin is now available at: https://datcpservices.wisconsin.gov/pb/pdf/06-09-16.pdf

INSIDE THIS ISSUE

LOOKING AHEAD: More corn borers, stalk borers and armyworms expected next week

FORAGES & GRAINS: Alfalfa blotch leafminer appearing in southwestern WI alfalfa

CORN: Damage caused by slugs common in Wisconsin cornfields

SOYBEAN: Soybean aphids found in only three of 53 fields sampled from June 2-8

FRUITS: Codling moth treatments beginning in apple orchards

VEGETABLES: First squash vine borer moths expected emerge by June 16

NURSERY & FOREST: Downy mildew and hollyhock rust noted this week

DEGREE DAYS: Growing degree day accumulations as of June 8, 2016

# Wisconsin Pest Bulletin for 6-16-16

Krista Hamilton, Entomologist, WI Dept of Agriculture, Trade and Consumer Protection

Volume 61 Issue No. 8 of the Wisconsin Pest Bulletin is now available at: https://datcpservices.wisconsin.gov/pb/pdf/06-16-16.pdf

INSIDE THIS ISSUE

LOOKING AHEAD: Peak corn rootworm egg hatch expected June 22-26

FORAGES & GRAINS: Potato leafhopper nymphs appearing in alfalfa

CORN: Minor European corn borer infestations noted this week

SOYBEAN: Rose chafers and slugs common in Wisconsin soybean fields

FRUITS: Scouting for OBLR larvae recommended

VEGETABLES: Squash vine borer moths observed on June 10

NURSERY & FOREST: Sale of NR 40 regulated invasive plants a problem in some nurseries

DEGREE DAYS: Growing degree day accumulations as of June 15, 2016

## Save the Date – Agronomy/ Soils Field Day at Arlington Ag Research Station on August 31st

The Departments of Agronomy and Soil Science in conjunction with the Arlington Agricultural Research Station will host their annual field day on August 31, 2016 from 8:00a.m. to 2:30 p.m. The field day will highlight UW-Madison research on all facets of crop production and soil management. Look for more information in the weeks ahead.

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