PURDUE UNIVERSITY | Extension ENTOMOLOGY

# Pest&Crop newsletter

Issue: 2019.15
June 28, 2019

Purdue Cooperative Extension Service and USDA-NIFA Extension IPM Grant

This work is supported in part by Extension Implementation Grant 2017-70006-27140/ IND011460G4-1013877 from the USDA National Institute of Food and Agriculture.

In This Issue



## Beginning of the Western Bean Cutworm Flight

*(John Obermeyer)*

Our faithful pheromone trappers are back in business, as they are now monitoring for the emergence of western bean cutworm moths from the soil, see "Western Bean Cutworm Pheromone Trap Report." So far, the captures aren't too impressive. Remember, it is still early, as this pest's emergence happens over 6-8 weeks. What will be really interesting to observe this year is how the saturated soils affected this pest's ability to complete pupation and moth emergence. Too, because of such staggered corn planting this spring, egg-laying may be concentrated in those fields that were planted early. Stay tuned for updated moth flight numbers and scouting alerts in future issues of the *Pest&Crop*.

Western bean cutworm moth down in the whorl of corn.

## 2019 Western Bean Cutworm Pheromone Trap Report

*(John Obermeyer)*

| | | WBC Trapped | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 |
| | | 6/20/19- | 6/27/19- | 7/4/19- | 7/11/19- | 7/18/19- | 7/25/19- | 8/1/19- |
| County | Cooperator | 6/26/19 | 7/3/19 | 7/10/19 | 7/17/19 | 7/24/19 | 7/31/19 | 8/7/19 |
| Adams | Roe/Mercer Landmark | 0 | | | | | | |
| Allen | Gynn/Southwind Farms | 0 | | | | | | |
| Allen | Kneubuhler/G&K Concepts | 0 | | | | | | |
| Bartholomew | Bush/Pioneer Hybrids | 0 | | | | | | |
| Boone | Emanuel/Boone Co. CES | 4 | | | | | | |
| Clay | Fritz/Ceres Solutions/Clay City | | | | | | | |
| Clay | Mace/Ceres Solutions/Brazil | | | | | | | |
| Clinton | Emanuel/Boone Co. CES | 0 | | | | | | |
| Clinton | Foster/Purdue CES | 0 | | | | | | |
| Dubois | Eck/Dubois Co. CES | 0 | | | | | | |
| Elkhart | Kauffman/Crop Tech Inc. | 1 | | | | | | |
| Fayette | Schelle/Falmouth Farm Supply Inc. | 0 | | | | | | |
| Fountain | Mroczkiewicz/Syngenta | 9 | | | | | | |
| Fulton | Jenkins/Ceres Solutions | 1 | | | | | | |
| Fulton | Randstead/Ceres Solutions | 0 | | | | | | |
| Hamilton | Campbell/Beck's Hybrids | | | | | | | |
| Hamilton | Nicholson/Nicholson Consulting | 0 | | | | | | |
| Hendricks | Tucker/Bayer | | | | | | | |
| Howard | Shanks/Clinton Co. CES | 0 | | | | | | |
| Jasper | Overstreet/Jasper Co. CES | 0 | | | | | | |
| Jasper | Ritter/Brodbeck Seeds | 5 | | | | | | |
| Jay | Boyer/Davis PAC | 0 | | | | | | |
| Jay | Shrack/Ran-Del Agri Services | 0 | | | | | | |
| Jay | Temple/Jay Co. CES/Pennville | 1 | | | | | | |
| Jay | Temple/Jay Co. CES/RedKey | 3 | | | | | | |
| Jennings | Bauerle/SEPAC | 0 | | | | | | |
| Knox | Butler/Ceres Solutions/Vincennes | | | | | | | |
| Knox | Clinkenbeard/Ceres Solutions/Freelandville | 0 | | | | | | |
| Kosciusko | Klotz/Etna Green | | | | | | | |
| Lake | Kleine | 0 | | | | | | |
| Lake | Moyer/Dekalb Hybrids/Shelby | 0 | | | | | | |
| Lake | Moyer/Dekalb Hybrids/Scheider | 1 | | | | | | |
| LaPorte | Rocke/Agri-Mgmt. Solutions/Wanatah | 4 | | | | | | |
| Marshall | Barry | | | | | | | |
| Marshall | Harrell/Harrell Ag Services | 1 | | | | | | |
| Marshall | Klotz/Nappanee | | | | | | | |
| Miami | Early/Pioneer Hybrids | | | | | | | |
| Montgomery | Delp/Nicholson Consulting | 0 | | | | | | |
| Newton | Moyer/Dekalb Hybrids/Lake Village | 1 | | | | | | |
| Porter | Tragesser/PPAC | | | | | | | |
| Posey | Schmitz/Posey Co. CES/Cynthiana | 0 | | | | | | |
| Pulaski | Capouch/M&R Ag Services | 6 | | | | | | |
| Pulaski | Leman/Ceres Solutions | 2 | | | | | | |
| Putnam | Nicholson/Nicholson Consulting | 1 | | | | | | |
| Randolph | Boyer/DPAC | 0 | | | | | | |
| Rush | Schelle/Falmouth Farm Supply Inc. | 0 | | | | | | |
| Shelby | Fisher/Shelby County Co-op | | | | | | | |
| Shelby | Simpson/Simpson Farms | | | | | | | |
| St. Joseph | Carbiener/Breman | | | | | | | |

## Trap Report

*(John Obermeyer)*

| | | WBC Trapped | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 |
| County | Cooperator | 6/20/19-6/26/19 | 6/27/19-7/3/19 | 7/4/19-7/10/19 | 7/11/19-7/17/19 | 7/18/19-7/24/19 | 7/25/19-7/31/19 | 8/1/19-8/7/19 |
| St. Joseph | Deutscher/Helena Agri-Enterprises | | | | | | | |
| Starke | Capouch | 0 | | | | | | |
| Sullivan | Baxley/Ceres Solutions/Sullivan | 0 | | | | | | |
| Sullivan | Baxley/Ceres Solutions/New Lebanon | 0 | | | | | | |
| Sullivan | McCullough/Ceres Solutions/Farmersburg | 0 | | | | | | |
| Tippecanoe | Bower/Ceres Solutions/Lafayette | 0 | | | | | | |
| Tippecanoe | Nagel/Ceres Solutions | 0 | | | | | | |
| Tippecanoe | Obermeyer/Purdue Entomology | 0 | | | | | | |
| Tippecanoe | Westerfeld/Monsanto Research Farm | | | | | | | |
| Tipton | Campbell/Beck's Hybrids | | | | | | | |
| Vermillion | Lynch/Ceres Solutions/Clinton | 0 | | | | | | |
| Wabash | Enyeart/Ceres Solutions | | | | | | | |
| White | Foley/ConAgra | 0 | | | | | | |
| Whitley | Boyer, Richards/NEPAC/Schrader | 0 | | | | | | |
| Whitley | Boyer, Richards/NEPAC/Kyler | 0 | | | | | | |

* = Intensive Capture...this occurs when 9 or more moths are caught over a 2-night period

## Foliar Diseases of Alfalfa

*(Darcy Telenko)* & *(Keith Johnson)*

(*Photo Credits: L. Santiago and D. Walker, Purdue Extension*)

We have received a number of calls about leaf spots occurring in alfalfa. Many of the common foliar diseases of alfalfa are favored by the high moisture conditions this season in Indiana. These include common leaf spot (figures 1 and 2), Stemphylium leaf spot (figure 3), Leptosphaerulina leaf spot (or Lepto leaf spot) (figure 4), and downy mildew (figure 5). All these leaf spots can lead to defoliation, and reduce vigor, hay quality, and yield.

Below is a brief overview of each of these leaf diseases and the characteristic symptoms used for diagnosis. If you have questions about these, the Purdue Plant Pest Diagnostic Lab can provide a formal confirmation to assist with future management decisions, such as variety choice.

Common leaf spot (*Pseudopeziza medicaginis*): Symptoms of this disease include small, circular brown to black spots that develop on the leaflets (Figure 1). Fully developed lesions may reach 1-3 mm (Figure 2) but in general do not coalesce. On the upper surface within the lesion you may be able to observe the fungal fruiting body (psuedoapotheicum) which would appear light brown, raise and as large as 1 mm in diameter. Infected leaves will eventually turn yellow and drop as the disease progresses.


Figure 1. Common leaf spot (*Pseudopeziza medicaginis*). (*Photo Credits: University of Georgia Plant Pathology, University of Georgia, Bugwood.org*)


Figure 2. Common leaf spot (*Pseudopeziza medicaginis*). (*Photo Credits: Erik Stromberg, Virginia Polytechnic Institute and State University, Bugwood.org*)

Stemphylium leaf spot (*Stemphylium* spp.): Symptoms of Stemphylium leaf spot include oval light brown lesion with a dark brown border, which may often be surrounded by a light yellow halo. The lesions may expand and form concentric rings.

Figure 3. Stemphylium leaf spot (Stemphylium botryosum). (Photo Credit: Courtesy R. A. Kilpatrick—© APS. Reproduced, by permission, from Samac, D. A., Rhodes, L. H., and Lamp, W. O., eds. 2014. Compendium of Alfalfa Diseases and Pests, 3rd ed. American Phytopathological Society, St. Paul, MN.)

Leptosphaerulina (Lepto) Leaf Spot (*Leptosphaerulina briosiana*): Young leaves are most prone to Leptosphaerulina leaf spot. Symptoms will often start as small, black spots and may remain as a "pepper spots" or they may enlarge to form an "eyespot." The larger eyespots may be oval to elliptical with light brown to tan centers and darker brown borders. A halo might also form around the lesion. Favorable environmental conditions can promote infection and disease development that can lead to loss of leaflets and possible stunting of stems. Resistance cultivars are not available, but some may show reduced leaf loss as compared to others.

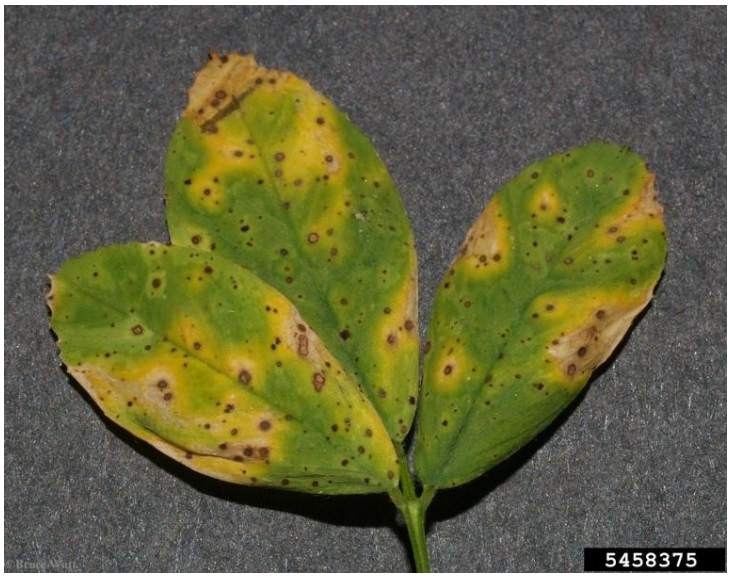



Figure 4. Leptosphaerulina leaf spot. (*Photo Credit: Bruce Watt, University of Maine, Bugwood.org*)

Downy mildew (*Peronospora trifliorum*): Downy mildew infection is characterized by chlorotic tissues. A localized infection will cause chlorotic tissue on leaves or shoots. Systemic infection can cause a bunchy rosette-type growth at plant apex. White to pale purple fungal growth can occur on the lower leaf surface of the leaves. Cultivars with resistance are available.

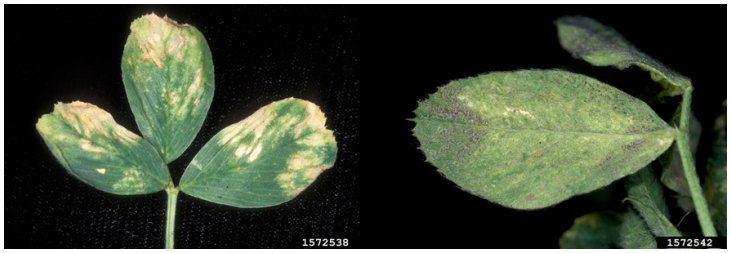



Figure 5. Downy mildew (Peronospora trifoliorum) upper chloric tissues and fungal growth on lower surface. (Photo Credits: Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org)

Management options:

Moderate and resistant varieties are available for common leaf spot and downy mildew; low to moderate for Stemphylium.

For all leaf spots, **Do not delay harvest**.

Harvesting the diseased tissue before leaf drop will help 1. remove inoculum from the field, 2. remove the younger, more susceptible leaves, and 3. open up the canopy to reducing the relative humidity and slow the disease cycle.

There are several fungicides labelled to use in alfalfa, but the economics of applying a fungicide may be inhibitory. See link below for a publication that describes the breakeven scenarios and probability of recovering fungicide costs by Smith, et al. 2015. Using Fungicides on Alfalfa for Dairy Production in Wisconsin.
https://learningstore.uwex.edu/Assets/pdfs/A4090.pdf

Additional information:

Frate and Davis. 2008. Alfalfa Diseases and Management.

https://alfalfa.ucdavis.edu/IrrigatedAlfalfa/pdfs/UCAlfalfa8296Disease_free.pdf

## Fusarium Head Blight (Scab) of Wheat: Things to Consider When Harvesting

*(Darcy Telenko)*

Wheat harvest has begun in Southern Indiana. Fusarium head blight (FHB) or scab is one of the most important diseases of wheat and most challenging to prevent. In addition, FHB infection can cause the production of a mycotoxin called deoxynivalenol (DON or vomitoxin). The environmental conditions have been extremely conducive to FHB development and it is not surprising that I have started to receive reports about issues with FHB and DON contamination. Our research sites in both West Lafayette and Vincennes have high levels of FHB develop in our non-treated susceptible variety checks and initial DON testing was at 7 ppm.

Fusarium head blight management is difficult and requires an integrated approach. This includes selection of varieties with moderate resistance and timely fungicide application at flowering. We are now past implementing either of these management options, but these are important to remember for next year. In addition, it will be important to assess your fields this season to determine if you have FHB. FHB can cause direct yield loss creating seeds that are shriveled and have a

rough, sunken appearance to complete head loss (which I have already seen in multiple fields around the state). FHB infection can also reduce seed quality and feeding value of the grain due to the risk of mycotoxin (DON/vomitoxin) production in infected seed.

The question now is *"I have scab in my field what do I need do?"* Here's a short list.

1. **Document** the issues in each field, so you have records for making decisions on future disease management. FHB is easy to see when the head is still green – it will be much more difficult to rate as the heads reach maturity. See images of FHB in the head both at green and more mature stages. You might be able to see the pink salmon sporulation and/or purple-black fruiting bodies on mature heads (Figure 1). In addition, it is good to note during the season what management tools were attempted – spray date and growth stage of crop, was there variability in the growth stages, weather conditions after fungicide applications. These all can play a role in effective disease management.

Figure 1. Wheat spikes showing bleached florets affected by scab. Salmon to pink sporulation may be visible and can help confirm once the spikes have reached maturity (pink arrows). Dark purplish-black fruiting bodies can also occur mature wheat heads (black arrows).

2. Harvest fields with lowest disease first; **adjust combine settings** to blow out the smaller, shriveled kernels and chaff; and separate loads from healthy and disease fields. Mycotoxin contamination is usually the highest in the more heavily disease kernels and if they can be removed that would help reduced mycotoxin level.
3. **Test for DON levels** in both kernel and straw before feeding to livestock. Scabby kernels do not always indicate high DON and vice versa. It is important to test and know what your DON numbers are in your grain, even if you don't see a high level of disease. Straw can also contain DON. DO NOT use straw for bedding or feed from fields with high level of scab.
4. Understand your elevators inspection and dockage procedures (each one can have a different practice). Levels of DON greater than 2 ppm may lead to price discounts.
5. It is not recommended to store grain from field with high levels of scab – accumulation of DON and other mycotoxins can continue in stored grain. Suspect grain, if stored, should be dried to 5% moisture as soon as possible after harvest and kept separate from the good quality grain.
6. Planting seed from fields that had moderate to heavy scab is not advisable. The infected seed will have low germination and poor vigor resulting in a thin stand. If going to use this seed, it should be cleaned thoroughly to remove the scabby seeds, and a fungicide seed treatment would be advised to protect germination and reduce seedling blight.

The next question "*Why was is it so bad? I followed the guidelines applied my fungicide at flowering but we still have poor control*."

Here's a few of my observations:

1. Highly favorable environmental conditions for Fusarium head blight (FHB)/scab occurred all spring.
2. Many wheat varieties have moderate resistance that help can reduce the risk of sever disease, and fungicides can help suppress the development, but this may only provide about 50% suppression. Therefore, even with the best management programs in place the extremely favorable conditions for FHB have led to high levels of infection this season.
3. There was extremely variable growth in individual fields this year – plants ranged from boot to full flower when trying to make a decision on fungicide timing. In addition, fungicides may only provide partial suppression of FHB and timing is a significant issue for obtaining moderate levels of control.
4. Frequent rains not only complicated planting, but any and every other trip across the field. Rain events closely following fungicide application may have diluted or washed off applications further reducing expected efficacy.

**Additional references:**


US Wheat and Barley Scab Initiative https://scabusa.org/

Cowger, C., and Arellano, C. 2013. Fusarium graminearum infection and deoxynivalenol concentrations during development of wheat spikes. Phytopathology 103:460-471. https://apsjournals.apsnet.org/doi/pdf/10.1094/PHYTO-03-12-0054-R

De Wolf, E. 2019. Fusarium head blight. https://www.bookstore.ksre.ksu.edu/pubs/MF3458.pdf

Salgado, J. D., Wallhead, M., Madden, L. V., and Paul, P. A. 2011. Grain harvesting strategies to minimize grain quality losses due to Fusarium head blight in wheat. Plant Dis. 95:1448-1457. https://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-04-11-0309

Wise, K. et al. 2015. Diseases of Wheat: Fusarium Head Blight (Head Scab) https://www.extension.purdue.edu/extmedia/BP/BP-33-W.pdf


## More Fiber Hemp Acreage Needed


*(Marguerite Bolt, mbolt@purdue.edu)*


It has been a difficult spring for farmers across the state, including those that are growing hemp for the first time. Many of our farmers are focusing on hemp for fiber, and approximately 1,500 of the 4,000 acres registered were intended for fiber hemp. Farmers growing fiber hemp have contracted with Sunstrand, a company located near Louisville Kentucky. Because this spring has been so unfavorable, Sunstrand is short their expected acreage by 1,000 acres. They are hoping to obtain

more acreage among licensed growers and will provide recommendations to their growers. Sunstrand will offer the seed at no cost and the payout is $75 per acre at emergence, $75 per acre at canopy closure, and $0.08 per lb. of dry hemp biomass. Sunstrand is hoping for two-four tons of dry biomass per acre, which would result in a payout of $470-790 per acre. Farmers are responsible for all other costs of production including the transport of the square baled hemp. Sunstrand recommends growers are within 100 miles of their facility in Milton Kentucky. If there are licensed hemp growers that would like more information, they can contact Jamie Campbell-Petty at the Midwest Hemp Council (jamiecampbell1124@gmail.com).

In other news, we will be hosting a hemp field day at Meigs farm on July 19th, with topic areas including; licensing and regulations around hemp, processing, planting and harvesting, agronomic practices, and pest management. Please pre-register by July 17th at https://bit.ly/2IZ8IuY

## Yellow Tops and Twisted Whorls in Corn

*(Bob Nielson)*

Twisted whorls sometimes develop in young corn plants early in the rapid growth phase. The cause is not well understood. The tightly twisted whorls eventually unwrap to reveal yellowish upper leaves that turn green after a few days of exposure to sunlight. Effects on yield are essentially nil.


"Yellow Top" Symptom shortly after twisted whorl finally unwraps.

The curious phenomenon often referred to as the "twisted whorl syndrome" is beginning to show up in some fields in recent days. This "problem" often occurs when young corn shifts quickly from weeks of slow development (cool, cloudy weather) to rapid development (warm, sunny weather). Earlier planted corn has certainly experienced such a change in weather conditions in recent weeks. The occurrence of the twisted whorl syndrome is not uncommon, but rarely affects a large number of fields in any given year or a large percentage of plants within a field.

The typical growth stage when growers notice the twisted whorls is late V5 to early V6 (five to six visible leaf collars, approximately knee-high). The lowermost leaves are typically normal in appearance, although some may exhibit some crinkled (accordion-like) tissue near the base of the leaf blade. Beginning with the sixth or seventh leaf, the whorl is tightly wrapped and often bent over at right angles to the ground.

Sometimes you can spot the early onset of this phenomenon one or two leaf stages prior to the dramatic appearance of the phenomenon. The early stages of twisted whorl are not dramatic to the casual observer, but will catch the eye of the seasoned crop scout.


Early stage of twisted whorl syndrome.

“Normal” V4 plant.

No one fully understands why this symptom develops. For some reason, the leaves of the whorl of affected plants do not unfurl properly, as if the rolled leaf tissue has lost its elasticity or has become “sticky”. In fact, some suggest that exudates from leaf edges contribute to such “stickiness”. Younger leaves developing deeper in the whorl are unable to emerge through the tightly wrapped upper leaves. The subsequently tightly twisted whorl then bends and kinks from the pressure exerted from the younger leaves’ continued growth.

A natural instinct is to blame the twisted growth on herbicide injury. Indeed, where cell growth inhibitor (Group 15) or growth regulator (Group 4) herbicides are applied pre-plant or pre-emergence, shoot uptake of the herbicide by the emerging seedlings can cause twisted growth of the young plants. Late application of growth regulators can also cause twisted whorls in older plants when leaves and whorl intercept a substantial amount of the herbicide. Widespread occurrence of the twisted whorl syndrome is not, however, always accompanied by the common thread of any particular herbicide application.

Some have questioned whether wind damage can give rise to this phenomenon by somehow damaging the young inner whorl leaves. I have not often tracked the occurrence of strong winds with the development of the twisted whorl symptom, but it’s no secret that there were a number of strong storm and wind events throughout the state over the past couple of weeks. In the past few days, strong winds have been accompanied by unusually warm temperatures.

In other situations over the years, this phenomenon has often been associated with a sharp transition from periods of slow corn development (typically, cool cloudy weather) to periods of rapid corn development (typically, warm sunny weather plus ample moisture).

Some have argued that it is the reverse, transitioning from rapid periods of development to slow. Or… maybe it is a transition from rapid development to slow and back to rapid that triggers the symptoms.

Whatever the cause, the appearance of the twisted whorl plants is indeed unsettling and one could easily imagine that the twisted whorls might never unfurl properly. Given another week, though, twisted whorls of most of the plants will unfurl and affected plants subsequently develop normally. It is not uncommon to see hybrids vary in the frequency of twisted whorls.

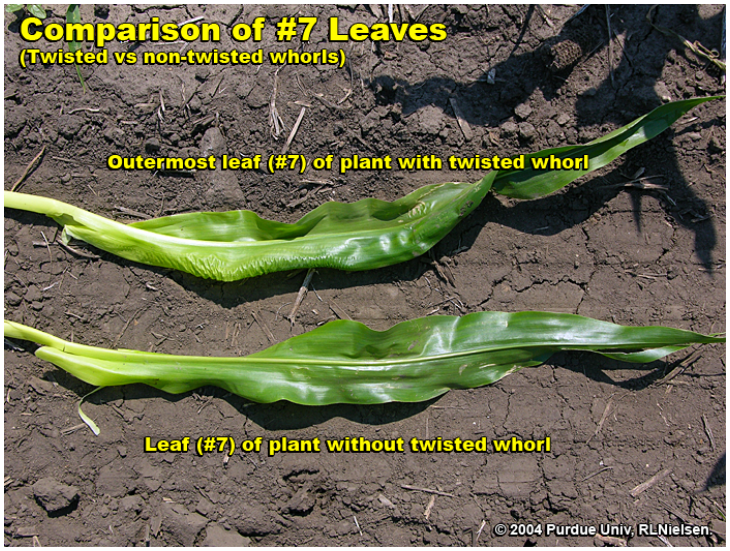
If you didn’t notice the twisted whorls to begin with, you may notice the appearance of “yellow tops” across the field after the whorls unfurl. The younger leaves that had been trapped inside the twisted upper leaves emerge fairly yellow due to the fact that they had not been exposed to sunlight for quite some time. Another day or two will green these up and the problem will no longer be visible. In addition to being fairly yellow, the affected leaves will exhibit a crinkly surface caused by their restricted expansion inside the twisted whorl.

**The Good News:** Yield effects from periods of twisted growth caused by weather-related causes are minimal, if any. By the time the affected plants reach waist to chest-high, the only evidence that remains of the previous twisted whorls is the crinkled appearance of the most-affected leaves.

Twisted whorl syndrome.

Twisted whorl syndrome.

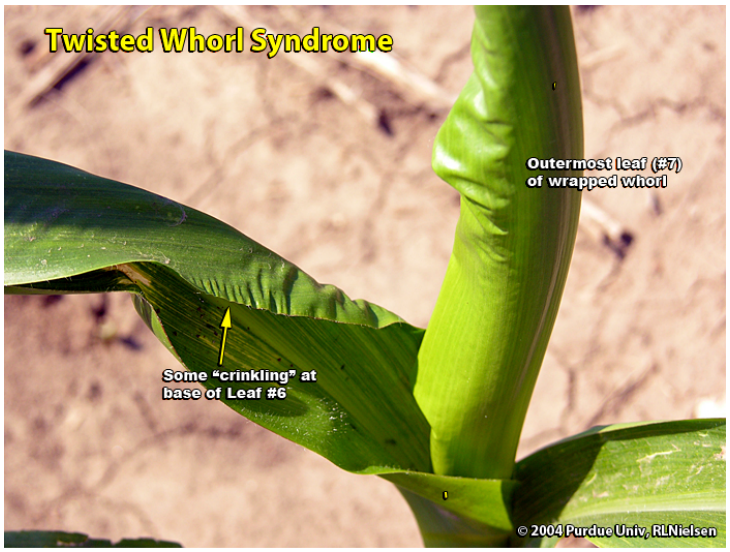
Twisted whorl on a V5 corn plant.



Leaf comparison between affected and unaffected plants.

Twisted whorls on a V5 corn plant.

Tightly twisted whorl.



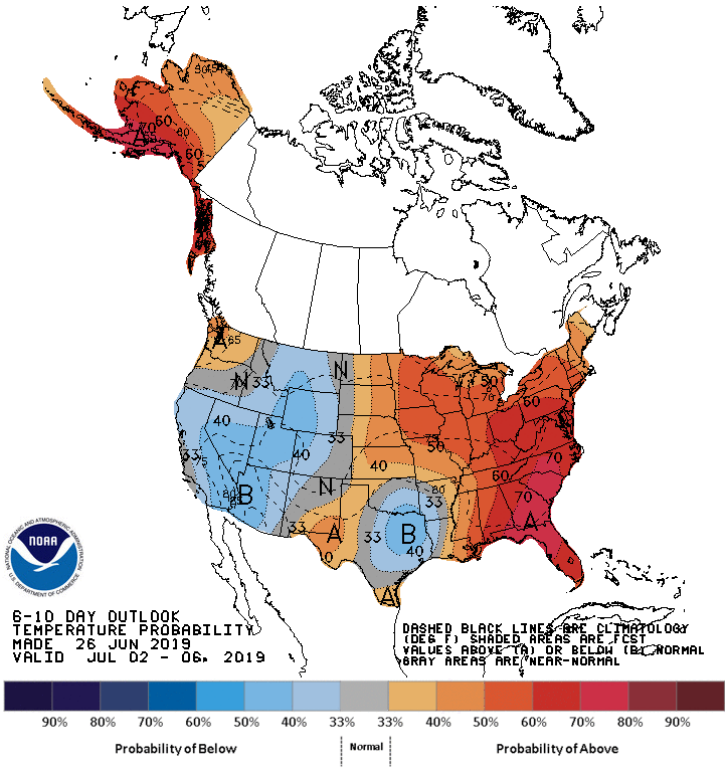
Crinkled leaf; another symptom of twisted whorls.

## Indiana Climate and Weather Report Crops – 6/26/2019

*(Hans Schmitz)*

Outlook into early next week looks favorable for a dry weekend, but chances for precipitation around the state pop back up around Tuesday. Those chances remain until Friday, jeopardizing 4th of July activities, although model confidence for exact timing or amounts of precipitation are low at this time. Meanwhile, temperatures are expected to be seasonal to slightly above seasonal, with northern Indiana potentially reaching the 90 degree mark as southern Indiana tops out in the low 90s.

For those considering growing degree days with any further potential planting of crops, growing degree day calculations generally have a maximum cutoff temperature of 86 degrees Fahrenheit. Therefore, above average temperatures this time of year do not necessarily equate to greater amounts of growing degree days. Additionally, low temperatures around the state in the next week are forecasted to stay near 70 degrees, increasing plant respiration rates and reducing energy resources devoted to crop growth.






Pest&Crop newsletter © Purdue University - extension.entm.purdue.edu/newsletters/pestandcrop
Editor: Tammy Luck | Department of Entomology, Purdue University, 901 W. State St., West Lafayette, IN 47907