PURDUE UNIVERSITY | Extension - Entomology

Pest&Crop newsletter

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Western Bean Cutworm Flight Increases, Egg Hatch is Underway

(Christian Krupke) & (John Obermeyer)

The western bean cutworm (WBC) trapping season continues, and after a slow start, moth flights have rapidly increased in many northern Indiana county traps this past week. With warm temperatures continuing, egg development and hatch will happen within about 6-8 days after they are first placed by females. This will give little time for egg scouting, and unfortunately larval scouting is far more difficult, time-consuming and less reliable. In other words, some larvae have hatched and have already infested corn whorls, leaf axils, and/or ears – control is very difficult at this point and those just looking for egg masses beginning now will likely be underestimating the population.

Newly hatched western bean cutworm larvae in corn whorl where they are protected (photo credit: John Obermeyer, Purdue University)

However, it is not too late. Although some eggs have hatched, our current period of increased moth activity represents the peak for egg-laying, as the vast majority of WBC eggs will be laid over the next 2 weeks. Use moth trap catches and recent field histories as your guide for prioritizing scouting areas – unlike armyworms and black cutworms, these moths don't usually travel great distances before laying eggs. As you view the "Western Bean Cutworm Adult Pheromone Trap Report", notice the variability of moth captures, even within close proximity to one another. Although the relationship between trap catches and damage is not particularly strong (i.e., high trap counts does not always mean high damage), traps are a good timing mechanism and presence/absence indicator. When they spike suddenly, it's time to scout…for many that is right now, today.

Pre-tassel corn is preferred by egg-laying females. Research conducted at the University of Nebraska has shown that larvae survive best in late whorl stage corn. This is likely because this synchronizes their development with the onset of pollen shed, and pollen is a key, high-protein food source for young larvae before they move into corn ears.

These developing western bean cutworm larvae are feeding on pollen and anthers collected in the leaf axil before going to the ear (photo credit: John Obermeyer, Purdue University)

Scouting should begin once moths are being captured nightly. In five different areas of a field, inspect 20 consecutive plants for egg masses which are laid on the upper surface of the top leaves of corn and/or larvae that may have hatched and crawled to the whorl and begun to feed. Usually the newest, vertical leaf is the best place to look for egg masses. If 5% of plants have egg masses, the treatment threshold has been reached.

Young larvae need pollen to survive, and female moths are most attracted to cornfields that are just about to pollinate, although moths will lay eggs on whorl stage corn when pre-tassel/pollinating corn is not

available. Larvae may initially be found in leaf axils, feeding on pollen that has accumulated there and can still be controlled with insecticides that trickle down into these areas, but only for a short time. After this they move into the developing ear via the silks and are invulnerable to foliar sprays. Remember that this pest is resistant to the Cry1F insecticidal trait – found in the vast majority of "traited corn" planted in the state. So scouting and timely insecticide applications where needed are a must for most producers in WBC's zone of infestation, primarily the northern tier of counties in Indiana.

2021 Western Bean Cutworm Pheromone Trap Report

(John Obermeyer)

		WBC Trapped						
		Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7
		6/17/21-	6/24/21-	7/1/21-	7/8/21-	7/15/21-	7/22/21-	7/29/21-
County	Cooperator	6/23/21	6/30/21	7/7/21	7/14/21	7/21/21	7/28/21	8/4/21
Adams	Roe/Mercer Landmark	0	0	0	1	0		
Allen	Anderson/NICK	0	0	0	2	7		
Allen	Gynn/Southwind Farms	0	0	0	0	2		
Allen	Kneubuhler/G&K Concepts	0	0	0	0	2		
Bartholomew	Bush/Pioneer Hybrids	0	0	0	0	0		
Boone	Emanuel/Boone Co. CES	0	0	0	0	0		
Clay	Mace/Ceres Solutions/Brazil	0	0			0		
Clay	Fritz/Ceres Solutions/Clay City	0	0	0		0		
Clinton	Emanuel/Boone Co. CES	0	0	1	1	0		
Dubois	Eck/Dubois Co. CES	0	0	0	0	0		
Elkhart	Kauffman/Crop Tech Inc.	0	0	2	6	6		
Fayette	Schelle/Falmouth Farm Supply Inc.	0	0	0	0			
Fountain	Mroczkiewicz/Syngenta	1	1	8	13	0		
Hamilton	Campbell/Beck's Hybrids	0	0	0	0	0		
Hancock	Gordon/Koppert Biological Systems	0	0	0				
Hendricks	Nicholson/Nicholson Consulting	0	0			0		
Hendricks	Tucker/Bayer	0	0	0				
Howard	Shanks/Clinton Co. CES	0	0			3		
Jasper	Overstreet/Jasper Co. CES	0	2	6	22	81		
Jasper	Ritter/Dairyland Seeds	0	2	68	104	62		
Jay	Boyer/Davis PAC	0	0	0	0			
Jay	Liechty/G&K Concepts	0	0	0	0	0		
Jay	Shrack/Ran-Del Agri Services	0	0	0	0	0		
Jennings	Bauerle/SEPAC	0	0	0	0	0		
Knox	Clinkenbeard/Ceres Solutions/Freelandville	0	0	0		0		
Kosciusko	Jenkins/Ceres Solutions/Mentone	3	0	30		109		
Lake	Kleine/Rose Acre Farms	0	0	1	1	2		
Lake	Moyer/Dekalb Hybrids/Shelby	0	2	9	55	79		
Lake	Moyer/Dekalb Hybrids/Scheider	0	1	13	63	78		
LaPorte	Rocke/Agri-Mgmt. Solutions	1	1	16	55	30		
Marshall	Harrell/Harrell Ag Services	0	1	5	14	24		
Miami	Early/Pioneer Hybrids	0	1	10	41	31		
Montgomery	Delp/Nicholson Consulting	0	0	0		0		
Newton	Moyer/Dekalb Hybrids/Lake Village	0	0	19	27	52		
Porter	Tragesser/PPAC	0	1	1	7	5		
Posey	Schmitz/Posey Co. CES	0	0	0	0	0		
Pulaski	Capouch/M&R Ag Services/Medaryville	1	0	0	5	89		
Pulaski	Leman/Ceres Solutions	1	0	4	23	10		
Putnam	Nicholson/Nicholson Consulting	0	1	0				
Randolph	Boyer/DPAC	0	0	0	0			
Rush	Schelle/Falmouth Farm Supply Inc.	0	0	0	0			
Shelby	Fisher/Shelby County Coop	0	0	0	0	0		
Starke	Capouch/M&R Ag Services/Monterey	3	4	42	71	56		
Starke	Capouch/M&R Ag Services, San Pierre	3	0	17	26	25		
St. Joseph	Carbiener/Breman	1	0	2	4	11		
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 1	0	0	0	3	5		
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 2	0	0	0	2	16		
Sullivan	McCullough/Ceres Solutions/Farmersburg	9	0	0		0		
Tippecanoe	Bower/Ceres Solutions	2	6	60	15	27		
Tippecanoe	Nagel/Ceres Solutions	0	0	0				
Tippecanoe	Obermeyer/Purdue Entomology	0	1	0	4	3		
Tippecanoe	Westerfeld/Bayer Research Farm	0	0	0		2		
Tipton	Campbell/Beck's Hybrids	0	0	0	0	0		
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	0		0		
White	Foley/ConAgra	0	1	0	3	3		
Whitley	Boyer/NEPAC/Schrader	0	1	3	2			
Whitley	Boyer/NEPAC/Kyler	0	1	1	2			

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

Soil Residual Herbicides and Establishment of Cover Crops in the Fall

(Marcelo Zimmer) & *(Bill Johnson)*

Indiana growers have shown increased interest in utilizing cover crops in our corn and soybean production systems over the last decade. Concurrently, there has also been increased utilization of soil residual herbicides to help manage herbicide-resistant weeds such as marestail (horseweed), waterhemp, and giant ragweed in our corn and soybean production systems. Soil residual herbicides can remain active in the soil for a period of weeks to months after application. The length of time a residual herbicide remains biologically active in the soil is influenced by soil texture, soil pH, organic matter, rainfall, and temperature. Since these factors will vary from field to field, definitive time intervals of residual herbicide activity can be difficult to predict.

The use of residual herbicides in our corn and soybean production systems may interfere with establishment of fall seeded cover crops under certain conditions. Unfortunately, many of the species being used for cover crops were not evaluated for herbicide carryover when field research was conducted to support EPA's approved herbicide labels. As a result, data are lacking regarding rotational intervals of many residual herbicides for the establishment of many cover crop species.

About 5 years ago, we conducted experiments designed to evaluate the impact of commonly used residual herbicides on the establishment of many cover crop species. In addition, our colleagues in adjacent states have been conducting similar research and we feel like we have a better handle on this topic now than we did seven years ago. As was mentioned above, predicting herbicide persistence is complicated because so many different factors can influence herbicide dissipation in the soil.

As a general rule, residual herbicides that have activity on grass weeds can interfere with the establishment of some grass cover crop species, especially the smaller seeded ryegrass species. Residual herbicides from group 2 (ALS), group 5 (triazine), group 14 (PPO), or group 27 (bleacher) can interfere with the establishment of some of the broad leaf cover crop species.

More specifically we have learned the following:

- Corn herbicides
  - Pyroxasulfone (Zidua) and metolachlor (Dual, etc) can hinder annual ryegrass establishment.
  - Atrazine or simazine at > 1 lb/A will be problematic for legumes and mustards unless lots of rainfall occurs after application.
    - < 0.75 lb/A may allow for good establishment of most legume cover crops, mustards, and annual ryegrass.
    - Atrazine < 1 lb/A can allow cereal grain establishment. We have observed cereal rye survival with atrazine rates as high as 1.5 lb ai/A if we have near normal precipitation patterns.
  - Mesotrione (Callisto, Lumax, Lexar etc.), flumetsulam (Python) and clopyralid (Stinger, Hornet, SureStart) can be problematic for legumes and mustards like canola and forage radish.
- Soybean herbicides
  - Chlorimuron (Classic, Canopy, Cloak, etc.), imazethapyr (Pursuit), and fomesafen (Reflex, etc.) could be a problem for fall seeded legume or mustard covers including radish. However, establishment of cereal grains should be OK.

It is important to remember that herbicide application timing greatly influences the risk of carryover interfering with cover crop establishment. In general, herbicides applied at planting have a lower risk of interfering with cover crop establishment than herbicides applied postemergence later in the year. An example would be fomesafen, which can be applied both preemergence and postemergence in soybean. Fomesafen applied postemergence in late June is more likely to interfere with cover crop establishment than fomesafen applied at planting in April or May. We can use the knowledge we have about herbicide interactions with specific cover crops to assess risk of certain herbicide programs interfering with cover crop establishment.

However, it is important to prioritize controlling weeds in your cash crop rather than dropping certain herbicides from your program to ensure successful cover crop establishment.

This summarizes our current knowledge on establishment of cover crops following the use of residual herbicides. The final two things to mention is that if you have questions about specific situations, one way to address the residual herbicide left in a field is to do a bioassay. Simply collect soil from the area you would like to seed the cover crop into and an area with a similar soil type, but no herbicide residue, and plant seed from the cover crop you would like to use. Observe growth for 3 weeks and if the plants look the same in the untreated and treated soil, you should be safe to plant the desired crop. Another consideration if you do not have time to do a bioassay is to plant a cover crop mixture. Cover crop establishment may be more reliable when mixtures of grass and broadleaf species are purchased and planted. Residual herbicides may interfere with establishment of some species in the mix but have no effect on other species. The use of mixtures may allow one more protection from complete failure due to excessive herbicide residues in the soil. It would be important however to make sure that at least one or two of the species in the mixture is tolerant to the herbicides used in a specific field.

The following video from The Ohio State University also addresses herbicide carryover concerns on cover crop establishment: https://www.youtube.com/watch?v=ylr0zGnXMfs

Foliar Disease Update in Indiana Corn and Soybean

(Darcy Telenko)

It is important to continue to scout for diseases in both corn and soybeans. Recent rains have created favorable environmental conditions for the development of foliar diseases in both crops. In our scouting rounds this week we continue to find gray leaf spot, northern corn leaf blight, and tar spot in corn (Figure 1 and 3), and frogeye leaf spot, downy mildew and Septoria brown spot in soybean (Figure 2). In addition, we continue to add counties with active tar spot and southern rust in Indiana. The most frequent question I have received is, “Should we make a fungicide application?” My response – What diseases are you finding in your field? What is your hybrid/variety susceptibility and field history? What growth stage? Are you irrigating?

A fungicide application can be effective at reducing disease and protecting yield, but there are a number of factors that need to consider: the field history/previous crop, the amount of disease present in the field, hybrid/variety susceptibility, weather conditions, the value of the crop, and cost of fungicide application.

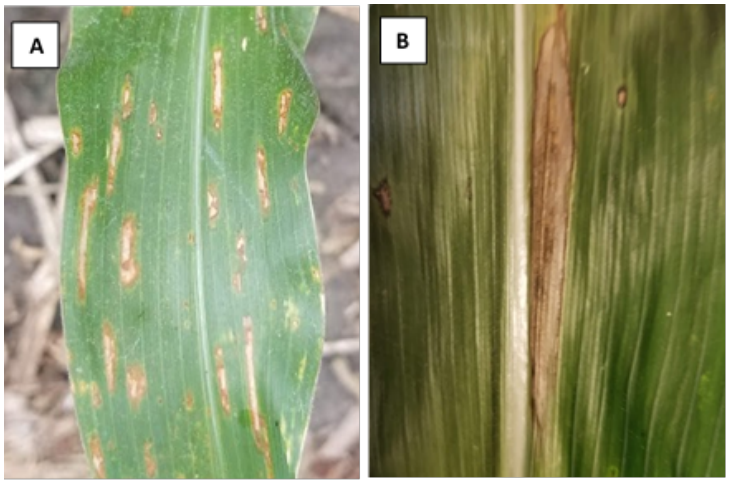


Figure 1. Foliar diseases in corn A. gray leaf spot, B. northern corn leaf blight. Photo credit: Darcy Telenko

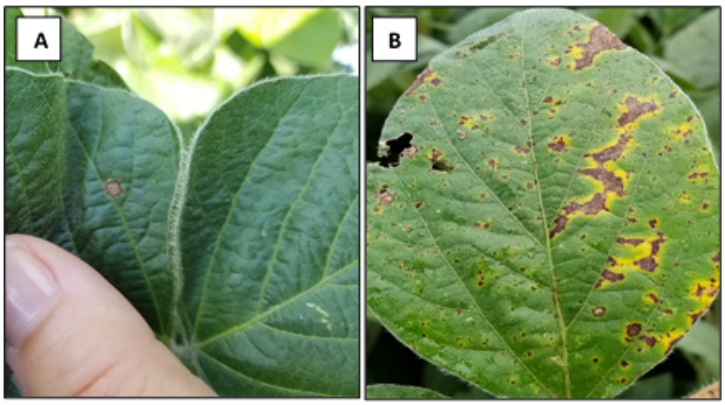


Figure 2. Foliar diseases in soybean A. frogeye leaf spot, B Septoria brown spot. Photo credit: Darcy Telenko

Tar Spot: Tar spot continues to be on everyone’s mind. We continue to add new counties where active tar spot lesion have been found in Indiana. This past week we have begun to see an increase in tar spot severity as it has begun to move up in the canopy (Figure 3). In addition, we have confirmed tar spot in Pulaski, Knox, Tipton counties, and suspect a site in Lake county. Tar spot had previously been found in 78 counties (gray color) in Indiana, with the northern part of the state most at risk. These early tar spot detections are like finding a needle in the haystack and required intensive scouting, but as the disease progresses it will be easier to find as the number of spots increase and it moves up the canopy. We will continue to monitor and update as the season continues.

We are working hard to try to understand this new disease to minimize losses. The good news is that we found a number of fungicides are highly efficacious against tar spot here in Indiana when applied from tassel (VT) to R2 (milk). I would recommend picking a product with multiple modes of action. The national Corn Disease Working Group has developed a very useful fungicide efficacy table for corn diseases (see link below). We will continue keeping a close eye on tar spot. I am interested in adding more locations in surrounding counties in northern Indiana if it is active in your field; please contact me if you suspect a field has tar spot please or send a sample to the Purdue PPDL for confirmation.

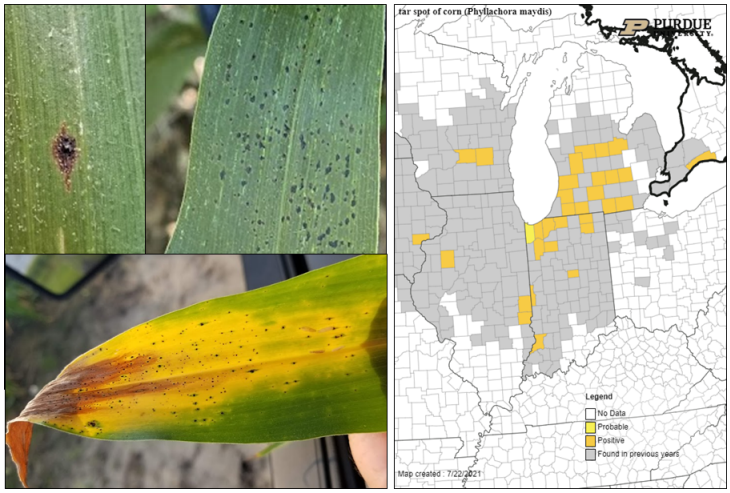


Figure 3. Tar spot lesion on corn in lower canopy. High resolution of the stroma formed on the leaf. Photo credit: Darcy Telenko

Southern Rust was officially confirmed in Indiana in Gibson county last week, since we have received reports and waiting on samples from Posey, Orange and Harrison (Figure 4). I suspect southern rust can be found in southern Indiana where spores settled after moving on weather systems from the south. **We need your help** – if you are out scouting field in the surrounding counties please let us know if you find any suspect samples please send to the Purdue Plant Pest Diagnostic Lab https://ag.purdue.edu/btny/ppdl/Pages/Submit-A-Sample.aspx

Southern rust pustules generally tend to occur on the upper surface of the leaf, and produce chlorotic symptoms on the underside of the leaf. These pustules rupture the leaf surface and are orange to tan in color. They are circular to oval in shape. We are also seeing some common rust as well and both diseases could be present on a leaf.

There are a few characteristics to use to try to distinguish southern rust from common rust. Common rust will form pustules on both sides of the leaf. In addition, common rust pustules tend to be spread out across the leaf, and less densely clustered. Common rust pustules have a brick red to brown coloration and may be more elongated than southern rust pustules

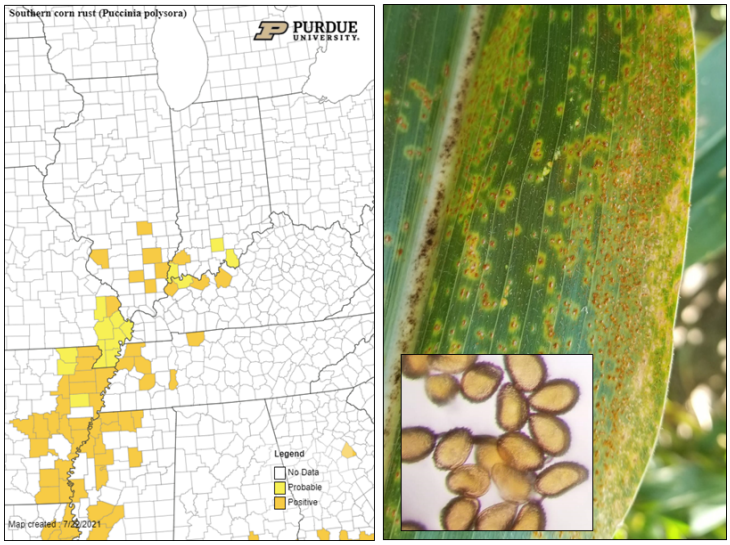


Figure 4. Distribution of southern rust in Indiana on July 22, 2021, orange counties are positive and yellow counties are probable (https://corn.ipmpipe.org/southerncornrust/) and an example of southern rust pustules on a corn leaf and diagnostic spores. Photo credits: Darcy Telenko and John Bonkowski.

Check out the southern rust publication for more images of southern rust and other diseases that might mimic it. This publication also has good information on determining when a fungicide application will be beneficial. The publication is at following link: https://crop-protection-network.s3.amazonaws.com/publications/cpn-2009-southern-rust.pdf

Each year the rust spores (urediniospores) travel on air currents from tropical regions to fields in Indiana. Short periods of leaf wetness are required for infection by both rust fungi. Morning dews in Indiana can provide the six hours of moisture required for infection and disease development. Generally, southern rust prefers warmer temperatures — with infection occurring between 77-82°F. Southern rust is usually detected in Indiana late August and September and generally not something to worry about. Now that we have found it mid-July it will be very important to keep eye out for southern rust in your field.

Both gray leaf spot and northern corn leaf blight disease can also be found in corn across the state. It is going to be **extremely important to be out scouting**, especially if you are trying to make a decision on a fungicide application.

Gray leaf spot is active in the lower to mid canopy at multiple sites across the state. The lesions are light tan in color and generally narrow and rectangular, and can be as long as 2 inches. As the lesions age they turn grey in color and are delimited by leaf veins (Fig. 1). This annual disease has become one of the most important foliar diseases in Indiana. Hybrid susceptibility and weather will have the greatest impact on the severity in a field. Fungicide options that are available for gray leaf spot would be a cost effective application in fields that have a history of disease and planted to susceptible hybrids in no-till or reduced-till system. As a reminder, fungicide applications add an additional cost to corn production. Therefore, economic factors and other disease issues need to be considered before deciding to apply a fungicide to manage gray leaf spot. Previous research has determined the best time to apply fungicides in preventing yield loss with the most economic return occurs when fungicides are applied in response to disease at tasseling (VT) through early silking (R1).

As a reminder the field history, disease activity, hybrid susceptibility, weather conditions, the value of corn and soybean, and cost of fungicide application are factors that should be considered in making a decision to apply a foliar fungicide. Several fungicides are available to help manage these foliar diseases with a recommended application occurring at late vegetative stages through R1 in corn, and R1- in soybean for white mold and R3 in soybean for frogeye leaf spot.

Resources:

- Fungicide efficacy table for corn diseases: https://cropprotectionnetwork.org/resources/publications/fungicide-efficacy-for-control-of-corn-diseases
- Fungicide efficacy table for soybean foliar diseases: https://cropprotectionnetwork.org/resources/publications/fungicide-efficacy-for-control-of-soybean-foliar-diseases
- Purdue Field Crop Pathology Extension Website with current maps https://extension.purdue.edu/fieldcroppathology/

*As a reminder due to th e need to monitor both southern rust and tar spot in Indiana, there will be **no charge for southern rust and tar spot samples submitted to the PPDL for diagnostic confirmation**. This service is made possible through research supported by the Indiana Corn Marketing Council. Please feel free to contact me (dtelenko@purdue.edu) or the PPDL (ppdl-samples@groups.purdue.edu) with any major disease issues you may have this season.*

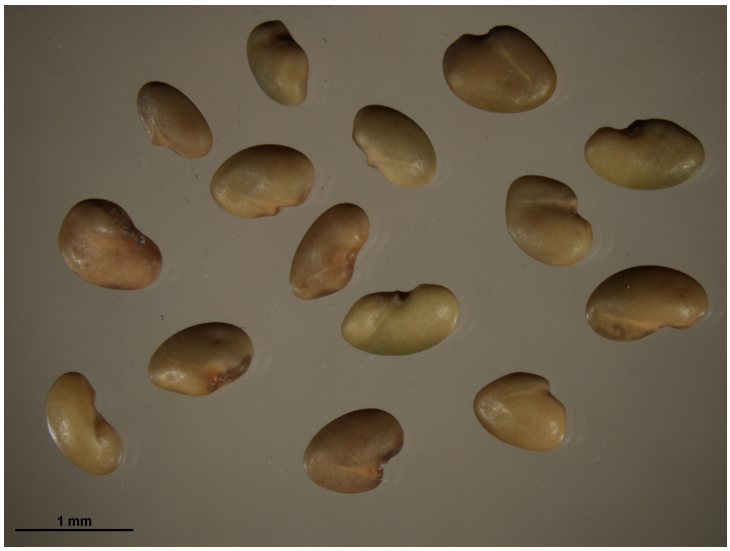
Communicate Seeding Date Carefully – Someone is Listening

(Keith Johnson)

I was asked to come to a field in early April many years ago by a young producer. The producer and the seedsman that sold the alfalfa to the producer met me at the field. The cause of concern was that there was an expectation of green alfalfa growing after breaking winter dormancy in Mid-March. Instead, what was seen at my height of 5' 10" was light brown soil; not a trace of green from anything was seen. I dropped to my knees and got my eyes within 12 inches of the soil surface. What I saw was what had been an outstanding stand of alfalfa seedlings, at least 24 dead alfalfa seedlings no more than 1-inch in height, that were the same color of the soil. I asked the producer when he seeded the field. He replied, "October 7". The "Best Management Practice" would have been to have the alfalfa seeded by late August. Timely alfalfa seeding is always important to getting an excellent stand, and when seeded so late does not have time to develop into a winter hardy plant. This caused me to reflect on how many times I had heard discussions about fall seeding alfalfa. If this novice alfalfa producer was part of one of these discussions, he did exactly what he was told or heard; he seeded on a beautiful fall day. This in-field experience resulted in me correcting anyone that talks about seeding alfalfa in the fall. The right time is to have the seeding task accomplished by mid-August in northern Indiana and very early September along the Ohio River Valley. The fall season doesn't begin until September 21.

The lesson from this event – Be specific when giving recommendations. Someone is listening!

P.S. for my beef cattle friends – Spring calving is after March 21, not in February or early March!



For a successful stand, alfalfa is best sown in the early spring or August. Photo source – Purdue University Crop Diagnostic Training and Research Center

Dry Conditions Expected Into Early August

(Beth Hall)

After several weeks of above-normal precipitation across much of Indiana, we are now entering a relative dry period. The national Climate Prediction Center is indicating enhanced chances for below-normal precipitation amounts over the next several weeks. Temperatures are also expected to be above normal over this period which will cause increased rates of evapotranspiration. This may induce the onset and establishment of a flash drought – defined as a rapid intensification of drought conditions and impacts sustained for a relatively short amount of time (e.g., less than a year). The key is to start planning and preparing for this now, even if a flash drought does not end up developing, so that one is being proactive rather than reactive to drought impacts.

Modified growing degree days range from about 1500 units (northern Indiana) to 200 units (southern Indiana) (Figure 1). With temperatures being relatively mild lately, this has kept accumulated MGDDs within about 100 units of what is average for this time of year. Southern Indiana locations are further behind previous years compared to northern locations (Figure 2).

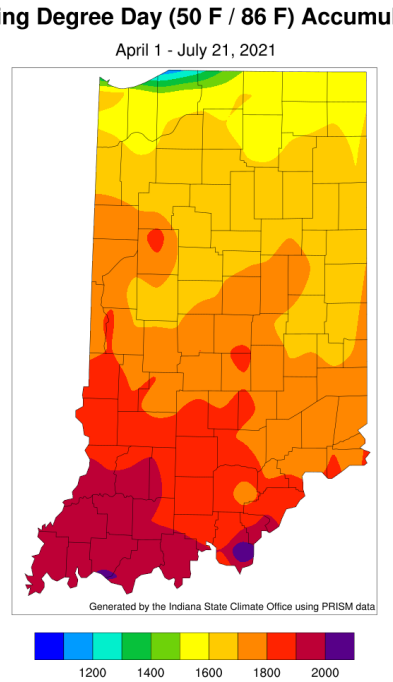
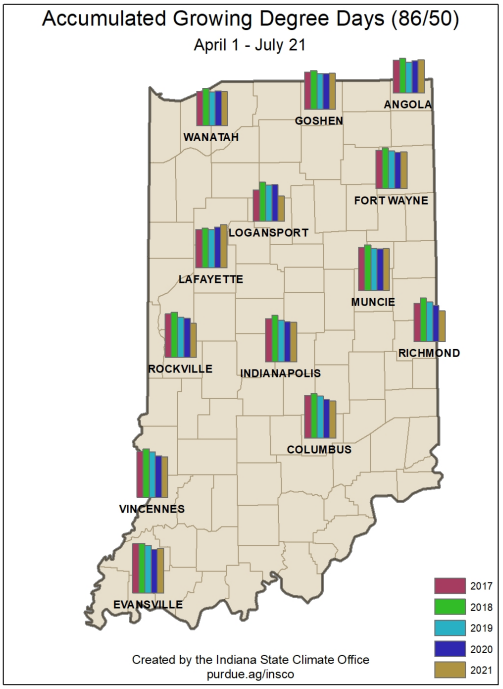


Figure 1. Modified growing degree day accumulations from April 1 to July 21, 2021.

Figure 2. Comparison of 2021 modified growing degree day accumulations from April 1 – July 21 to the past four years.



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