PURDUE UNIVERSITY | Extension ENTOMOLOGY

Pest&Crop newsletter

Issue: 2020.17
July 24, 2020

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

Why Are Corn Leaves Turning White?

(Christian Krupke) & (John Obermeyer)

Corn blotch leafminer, *Agromyza parvicornis*, is a leaf-feeding insect normally considered an “occasional or non-economic” pest. The adult is a gray to brown fly 1/4 inch in length. To most of us, it looks very similar to a housefly. In the early spring, adults insert eggs in either the upper or lower leaf surface of corn. The larva, or maggot, is yellowish and about 1/4 inch long when full grown. The larva pupates in a damaged leaf, or in the soil. Although there are several generations in a season, damage to only certain corn leaves indicates that infestations occur once per season. Larvae eat out the leaf interior leaving a transparent area or “mine.” Often many mines appear and sometimes merge on a single leaf. This can be quite an eye catcher, as leaves may appear completely bleached resembling herbicide damage.

There are no sampling methods or economic thresholds for corn blotch leafminer. The damage from this pest is believed to be of little economic importance as only a few leaves per plant (typically older, lower leaves that aren’t contributing much anyway) are usually damaged. It has been suggested by colleagues at the University of Nebraska that the hail adjuster’s charts can be used to estimate potential losses from the leafminer damage. This data is available on pages 34-35 of the Corn and Soybean Field Guide, 2004 Edition (ID 179). From this chart, in order to expect a 5% yield loss, it would require **70%** leaf defoliation (mining) in 7-leaf corn. In 10, 12, or 15-leaf corn it would require 45, 40, and 30% mining respectfully for a 5% yield loss. Corn in the silking to blister stage could have significant yield losses at 15-20 percent leaf defoliation.

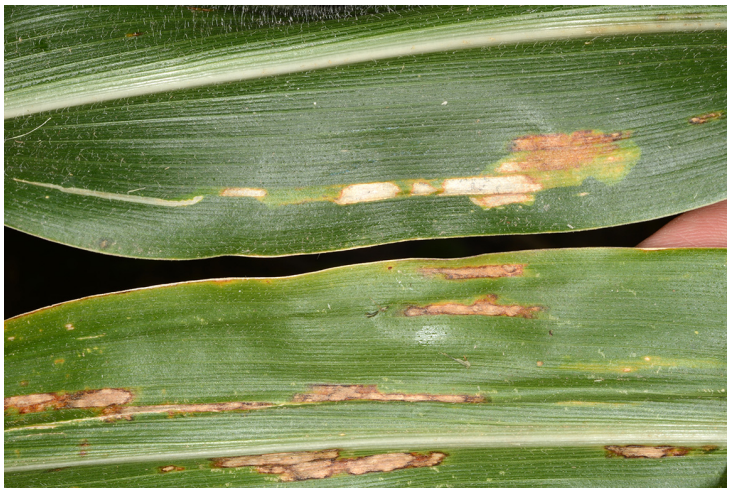
Plants on the end row with corn blotch leafminer damage.

Even if a control were attempted, it would likely fail because the larvae are protected within the corn leaves. Treatments would have to target the adult flies, which would be difficult with one insecticide application. It is possible that foliar insecticides may worsen the damage. In short, there is no reliable way to control them. That’s the bad news. The good news is that we have never seen anything approaching these thresholds, in terms of damage. Parasitoids take a heavy toll on this species, and this helps keep their numbers in check as well.

An early investigator of this insect, W. J. Phillips wrote in 1914: “With such a host of... constantly on the watch, we need not concern ourselves seriously with remedies so long as conditions continue as they are now. In the event that a combination of circumstances should occur that would restrain the parasites and give free rein to their host, the blotch miner would undoubtedly prove a pest very difficult of control. This species seems to furnish an instance in which only the barrier of parasites stands between the farmer and what may easily become temporarily at least, a very serious pest.” Speculation as to why there is an “outbreak” of corn blotch leafminer points to either unique environmental conditions, which includes many variables, or practices that are inhibiting the natural parasites (e.g., multiple broadcast pesticide applications).

Corn blotch leafminer removed from its mine.

Early instar western bean cutworm larva on the silks near a pollen anther.



Corn blotch leafminer (top) compared to gray leaf spot (bottom).

VIDEO: Scouting Western Bean Cutworm Post-Whorl, Possible But Tedious

(Christian Krupke) & *(John Obermeyer)*

The vast majority of cornfields in the northwestern counties of Indiana have reached or have passed pollination. However, western bean cutworm moths are still flying and laying eggs. In the last week or so, scouting emphasis has shifted from sampling for egg masses in pre-tassel corn to finding early instar (VERY tiny and elusive) larvae in the ear zone of pollinated corn. The following video will hopefully assist you in scouting for and understanding this pest while it attempts to establish in developing corn ears. Remember, this is a pest that requires scouting to manage properly. The vast majority of Bt corn hybrids planted currently will not offer control of these larvae. Scouting and insecticide treatments at threshold are your only reliable option.

2020 Western Bean Cutworm Pheromone Trap Report

(John Obermeyer)

		WBC Trapped						
		Wk 1 6/18/20-6/24/20	Wk 2 6/25/20-7/1/20	Wk 3 7/2/20-7/8/20	Wk 4 7/9/20-7/15/20	Wk 5 7/16/20-7/22/20	Wk 6 7/23/20-7/29/20	Wk 7 7/30/20-8/5/20
County	Cooperator							
Adams	Roe/Mercer Landmark	0	0	0	0	0		
Allen	Anderson/NICK	0	0	2	1	5		
Allen	Gynn/Southwind Farms	0	0	0	2	5		
Allen	Kneubuhler/G&K Concepts	0	0	4	0	0		
Bartholomew	Bush/Pioneer Hybrids	0	1	2	0	0		
Boone	Emanuel/Boone Co. CES	2	1	1	0	0		
Clay	Mace/Ceres Solutions/Brazil	0	0	1	1	0		
Clay	Fritz/Ceres Solutions/Clay City	0	1	0	0	2		
Clinton	Emanuel/Boone Co. CES	0	3	0	1	0		
Dubois	Eck/Dubois Co. CES	0	0	0	0	0		
Elkhart	Kauffman/Crop Tech Inc.	0		2	8	62		
Fayette	Schelle/Falmouth Farm Supply Inc.	0	0	0	0	0		
Fountain	Mroczkiewicz/Syngenta	0	0	10	47	5		
Fulton	Jenkins/Ceres Solutions/Talma	0	0	0	95	17		
Hamilton	Campbell/Beck's Hybrids	0	0	0	0	0		
Hendricks	Nicholson/Nicholson Consulting	0	0	0	0	0		
Hendricks	Tucker/Bayer	1	0	0				
Howard	Shanks/Clinton Co. CES	0	0	0	0	1		
Jasper	Overstreet/Jasper Co. CES	0		15	327	1066		
Jasper	Ritter/Dairyland Seeds	3	7	25	45	99		
Jay	Boyer/Davis PAC	0	0	2	0			
Jay	Shrack/Ran-Del Agri Services	0	0	1	0	0		
Jennings	Bauerle/SEPAC	0	0	0	0	0		
Knox	Clinkenbeard/Ceres Solutions/Freelandville	0	0	0	0	0		
Lake	Kleine/Rose Acre Farms	0	0	1	3	5		
Lake	Moyer/Dekalb Hybrids/Shelby	0	8	8	21	171		
Lake	Moyer/Dekalb Hybrids/Scheider	0	8	17	86	266		
LaPorte	Rocke/Agri-Mgmt. Solutions	0	0	38	68	108		
Marshall	Harrell/Harrell Ag Services	0	0	0	26	5		
Miami	Early/Pioneer Hybrids	0	0	3	14	15		
Montgomery	Delp/Nicholson Consulting	0	0	0	0	0		
Newton	Moyer/Dekalb Hybrids/Lake Village	0	1	0	36	91		
Porter	Tragesser/PPAC	1	0	0	7	13		
Posey	Schmitz/Posey Co. CES	0		0	0			
Pulaski	Capouch/M&R Ag Services	1	4	4		74		
Pulaski	Leman/Ceres Solutions	0	0	7	49	33		
Putnam	Nicholson/Nicholson Consulting	0	0	0	0	1		
Randolph	Boyer/DPAC	0	0	3	0			
Rush	Schelle/Falmouth Farm Supply Inc.	2	4	0	0	0		
Shelby	Simpson/Simpson Farms	0	0	0	1			
Starke	Capouch/M&R Ag Services	1	0	9		28		
St. Joseph	Battles/Mishawaka	0	0	0	11	13		
St. Joseph	Carbiener/Breman	0	1	1	5			
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 1	0	0	0	8	25		
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 2	0	0	0	5	16		
Sullivan	Baxley/Ceres Solutions/New Lebanon	0	0	0	1	0		
Sullivan	McCullough/Ceres Solutions/Farmersburg	0	1	4	1	4		
Tippecanoe	Bower/Ceres Solutions	0	32	61	40	15		
Tippecanoe	Nagel/Ceres Solutions	0	0	0	0			
Tippecanoe	Obermeyer/Purdue Entomology	0	0	0	3	0		
Tippecanoe	Westerfeld/Bayer Research Farm	0	0	2	0	6		
Tipton	Campbell/Beck's Hybrids	0	0	0	0	0		
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	0	0	0		
White	Foley/ConAgra	0	0	1	1	0		

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

Decapitation Of Corn Plants By Deer

(Bob Nielsen)

White-tailed deer (*Odocoileus virginianus*) are among the common mammal pests of field corn in Indiana. The sight of deer grazing in harvested fields for dropped ears of corn is quite common in the fall, but these animals are also attracted to corn fields at other times of the year and can leave permanently damaged plants in their wake.

Early in the growing season, deer will sometimes feed on the whorls or tops of young plants from about growth stage V10 (ten leaves with visible leaf collars) to about V16 when the immature tassel, still inside the whorl, is 4 to 6 inches long. Rather than actually eat the whorl leaves, the deer are apparently attracted to the succulent immature tassel. The results are decapitated plants whose young whorl leaves have simply been pulled out and (I can only imagine) the tassel somehow teased out and eaten. The mostly intact, though no longer attached, whorl leaves are left behind on the ground along with the tell-tale evidence of hoof prints and deer scat. The decapitated plants usually survive and ear development will continue through pollination and on to maturity, though the ears are usually less than full size owing to the fact that most of the photosynthetic leaf area above the ears is missing.

These animals are also attracted to corn fields at about the time kernels reach milk stage of development (R3), often referred to as the “roasting ear” stage, in early to mid-August. The common symptoms resulting from deer feeding on corn at this stage of development are decapitated ears. The ear symptoms are sometimes mistaken for bird damage, but differ because of the distinct appearance of “cut” husks and missing ends of cobs resulting from the deer “chomping” off the ends of the ears. Bird damage (crows, blackbirds, etc) more typically results in shredded ends of husks and barren cob tips.

Fortunately, deer damage to corn is often limited to the outer rows around the field edges. However, small fields of corn completely surrounded by woodlots or forest areas can sustain significant damage throughout the entire field by deer grazing in mid-August. Deer damage to plants or ears of corn during the grain filling period often results in disease infection of the damaged plant tissue by common smut (*Ustilago maydis*) spores. This disease eventually develops into the ugly or beautiful (eyes of the beholder) mass of fungal tissue on damaged plant parts.

Related reading

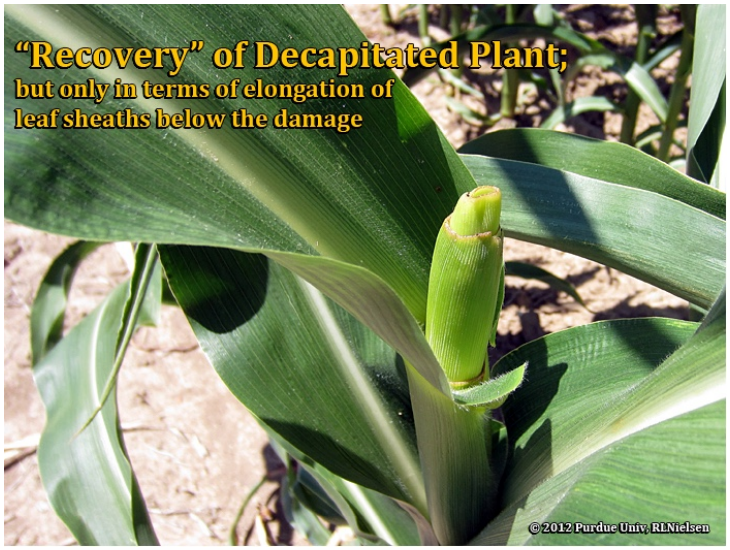
Anderson, Eric and James DeDecker. 2019. How to keep your crop field from becoming a wildlife food plot. Michigan State Univ. Extension. https://www.canr.msu.edu/news/how-to-keep-your-crop-field-from-becoming-a-wildlife-food-plot [URL accessed July 2020]

MacGowan, Brian, Lee Humberg, James Beasley, Travis DeVault, Monica Retamosa and Olin Rhodes, Jr. 2006. Corn and Soybean Crop Depradation by Wildlife. Purdue Univ, http://www.extension.purdue.edu/extmedia/FNR/FNR-265-W.pdf [URL accessed July 2020].

Pierce, Robert. 2019. Controlling Deer Damage in Missouri. Univ. of Missouri Extension. https://extension2.missouri.edu/mp685 [URL accessed July 2020]

White-tailed Deer (Odocoileus virginianus). 2012. Purdue University Wildlife Crop Damage Site. http://www.agriculture.purdue.edu/fnr/cropdamage/wildlife/deer.htm [URL accessed July 2020].


A View Down Into the
Whorl-less Void...
© 2012 Purdue Univ. RLNielsen


"Recovery" of Decapitated Plant;
but only in terms of elongation of
leaf sheaths below the damage
© 2012 Purdue Univ. RLNielsen


Immature Tassel From Inside
the Whorl of ~ V10 Corn Plant
© 2012 Purdue Univ. RLNielsen


Decapitated Plants Resulting
From Earlier Deer Feeding
© 2009 Purdue Univ. RLNielsen


Top of Decapitated Stalk
Below the Missing Whorl
© 2012 Purdue Univ. RLNielsen


Decapitated Plants Resulting
From Earlier Deer Feeding
© 2004 Purdue Univ. RLNielsen

Notched Leaf Edges In Corn

(Bob Nielsen)

The "notched leaf edge" symptom in corn is a curious genetic leaf "disorder" that appears in certain hybrid families during periods of rapid development. Affected leaves exhibit a ragged or notched edge that looks a little like somebody did a poor job of attempting to cut paper dolls out of the leaves. One descriptive comment from an Internet post suggestes that the symptom "*looks like some kids found an old set of ear notchers left over from the "Hog" days*."

Sometimes the notching occurs only on one leaf edge with the other normal, other times the notching occurs on both leaf edges. Typically, only a few of the leaves are affected. The symptom seems to be most commonly reported on corn that is well into its rapid growth phase (sometime after leaf stage V7).

While it is tempting to blame this symptom on the feeding activities of certain insects (e.g., armyworm, stinkbug, corn borer), the symptomology is different. Some have also blamed nutrient deficiencies (e.g., calcium) for the symptom.

Feedback from some of my seed industry colleagues indicates that the ragged leaf edge symptom is a genetic characteristic that seems to express itself during periods of rapid crop development. The thought is that, for some unknown reason, the edges of one or more leaves deep down in the whorls of plants become "sticky" and so the leaves cannot unwrap normally during their continued expansion from the whorl. The leaf edges become damaged as the leaves continue to unwrap; thus leading to the ragged or notched leaf edge symptom when fully emerged from the whorl. The "sticky" leaf theory behind the "notched leaf edge" symptom may be similar to that proposed for the "twisted whorl" symptom (Nielsen, 2019).

This symptom appears to be a simple genetic oddity with little consequence to further development of the crop canopy. The percent loss in photosynthetic leaf represented by these ragged leaf edges is minor and likely has no effect on ultimate grain yield of the plants.

Related Reading

Nielsen, RL (Bob). 2019. Yellow Tops and Twisted Whorls in Corn. Corny News Network, Purdue Univ. [online] http://www.kingcorn.org/news/timeless/TwistedWhorls.html [URL accessed July 2020].

Notched leaf edge in corn.

Notched leaf edge in corn.

Notched leaf edge in corn.

Notched leaf edge in corn.

Environmental Conditions Affect Time To Safe Hay Baling

(Keith Johnson)

Environmental conditions that exist when forages are ready to be harvested influences the amount of hours that it takes to get to a safe baling moisture. A growing forage will have 75 to 80 percent moisture. A moisture content of 20 percent is considered a safe baling moisture for small rectangular bales and will be slightly less for large round bales and large rectangular bales. The following tables are from the Purdue Forage Field Guide (Purdue publication ID-317) and provide useful information regarding the effects temperature, relative humidity, and soil moisture condition have on the time it takes from cutting to baling.

When relative humidity is 90 percent, cut hay will never get to a safe baling moisture content of less than 20 percent moisture regardless of temperature (Table 1). With a relative humidity of 70 percent or less, the higher the temperature the lower the predicted moisture will be for hay in storage, although a 70 degree F temperature at 70 percent relative humidity will not achieve a safe baling or storage moisture

level.

Effects of soil moisture condition and solar radiation on the number of hours to achieve 20 percent moisture alfalfa are found in Table 2. This research indicates that the number of hours when conditions are cloudy with wet soil moisture are approximately three times longer than when sunny and dry soil conditions occur.

It is critical that environmental conditions be considered when making dry hay. Haymaking conditions are likely to never be the same within a harvest season.

Table 1. Predicted Final Moisture Content Of Baled Hay

Temperature (°F)	Relative Humidity (%)			
	30	50	70	90
70	10	13	21	39
80	8	12	20	38
85	7	10	18	37
95	5	8	16	36

Source: Silage and Hay Preservation (Natural Resource, Agriculture, and Engineering Service publication NRAES-5)

Table 2. Predicted Hours To Dry Alfalfa From 80% To 20% Moisture

Sun[1]	Soil Condition[2]	Air Temperature (°F)				
		50	60	70	80	90
Cloudy	Wet	44	41	38	35	33
Cloudy	Dry	36	34	31	29	27
Sunny	Wet	16	16	15	15	15
Sunny	Dry	14	13	13	12	12

[1]Cloudy = 100 Btu/hr-ft^2 solar radiation. Sunny = 280 Btu/hr-ft^2 solar radiation.
[2]Wet soil = 20% moisture content. Dry soil = 9% moisture content.
*Source:*Silage and Hay Preservation (Natural Resource, Agriculture, and Engineering Service publication NRAES-5).

Raking hay into a windrow before baling occurs. (*Photo Credit: Keith Johnson*)

Be On The Lookout For Borers

(Marguerite Bolt, mbolt@purdue.edu)

For many hemp growers, things have been calm in the field. We have seen low disease incidence and most growers are in the swing of in season crop management—mostly scouting for males and monitoring plant health. However, there have been some panicked calls about stalk boring pests.

The two main culprits right now are the common stalk borer and the Eurasian hemp borer, but we also see European corn borer in hemp. Managing stalk boring pests is challenging, once they are inside the plant, they are well protected. One of growers that saw a surge in the common stalk borer noticed entry holes and bulging several days after mowing large weeds around the field. This borer can move quickly from mowed or sprayed weeds and tunnel into a new host, in this case, CBD hemp.

Common stalk borer larva found in CBD hemp in Cass County, IN.

What is a grower to do? Well at this point in the season, not much. Common stalk borer was likely in the field the previous year. It would be wise to avoid planting susceptible crops in fields that have a history of common stalk borer. Managing weeds within and around the field before planting hemp is advisable since larvae often start in small weeds and move to larger plants as the larvae mature. Fortunately, there is only one generation per year. Adult moths lay eggs in late summer and fall. Managing weeds when there is not a crop in the field can disrupt the lifecycle. Some states recommend spraying or mowing weeds in the early summer and apply an insecticide between the weeds and the crop. Unfortunately, I couldn't find much on efficacy of different insecticides for this pest and we have short list of products available for use in hemp fields (most need to be consumed by the pest to be effective). Good sanitary practices are advised for the Eurasian hemp borer, which means not holding over stems and stalks from infested fields. Overall, the incidence of stalk borer damage has been low so far. Growers need to keep an eye out for these types of pests so we can better understand how widespread and severe damage could be in the field.

Look for bulging in the stem, an entry hole and frass (insect poo) when scouting for borers. The size of the bulge depends on the size of the larva. This damage is from Eurasian hemp borer, larvae are much smaller than the common stalk borer.

VIDEO: Volunteer Corn Control In Enlist and Xtend Soybeans

(Marcelo Zimmer)

In the last couple of years, we have received multiple calls regarding the control of volunteer corn in Enlist and Xtend soybeans systems.

The following video addresses some important considerations to make when spraying synthetic auxin herbicides such as 2,4-D and dicamba with graminicides (ACCase inhibitor herbicides) such as clethodim and quizalofop.

Hope For A Heat Wave Relief Period

(Beth Hall)

For the first time in what seems like months, the 8-to-14-day climate outlook is not showing significant confidence for above-normal temperatures in Indiana (Figure 1). Even the precipitation outlook seems to provide a bit of uncertainty (Figure 2). What this means is there was not a strong enough agreement among multiple computer climate models that conditions were more likely to be above or below normal. That does not necessarily mean that hot days are unlikely or precipitation events will be evenly occurring. It simply means the predictive confidence pointing towards these extremes was lacking. Therefore, without a strong consensus among the science, it may be safe to assume temperature and precipitation will be "seasonable" for this time of year. What is "seasonable" for Indiana? This means variable conditions from day to day with few temperature and precipitation records expected to be broken.

Figure 1. Temperature outlook for July 30 – August 4, 2020 where shading indicates the level of confidence for above- or below-normal temperatures.

Figure 2. Precipitation outlook for July 30 – August 4, 2020 where shading indicates the level of confidence for above- or below-normal precipitation.

The climate outlook for August (issued July 16, 2020 by the national Climate Prediction Center) does show confidence for above-normal temperatures with only southern Indiana having confidence for above-normal precipitation (Figure 3). This leaves some uncertainty for drier conditions to persist that may be exacerbated by higher than normal evapotranspiration rates over the next 4-8 weeks.

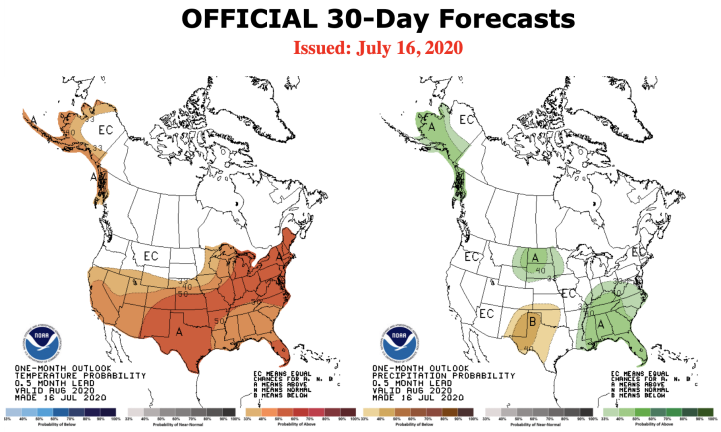


Figure 3. Temperature and precipitation monthly outlook for August 2020 where shading indicates the level of confidence for above- or below-normal conditions.

It is still summer, though, so days continue to be hot and humid, helping to accumulate significant modified growing degree-day units each day. Figures 4 and 5 show accumulations from April 1 through July 22, 2020 along with how this year compares to the past several years.

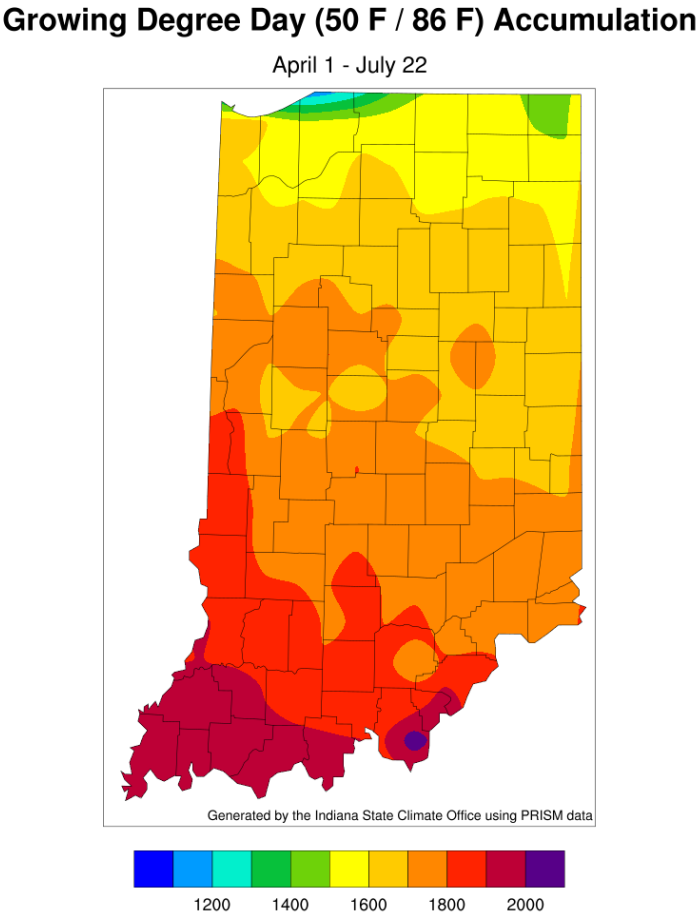


Figure 4. Modified accumulated growing degree-day units for April 1 – July 22, 2020.

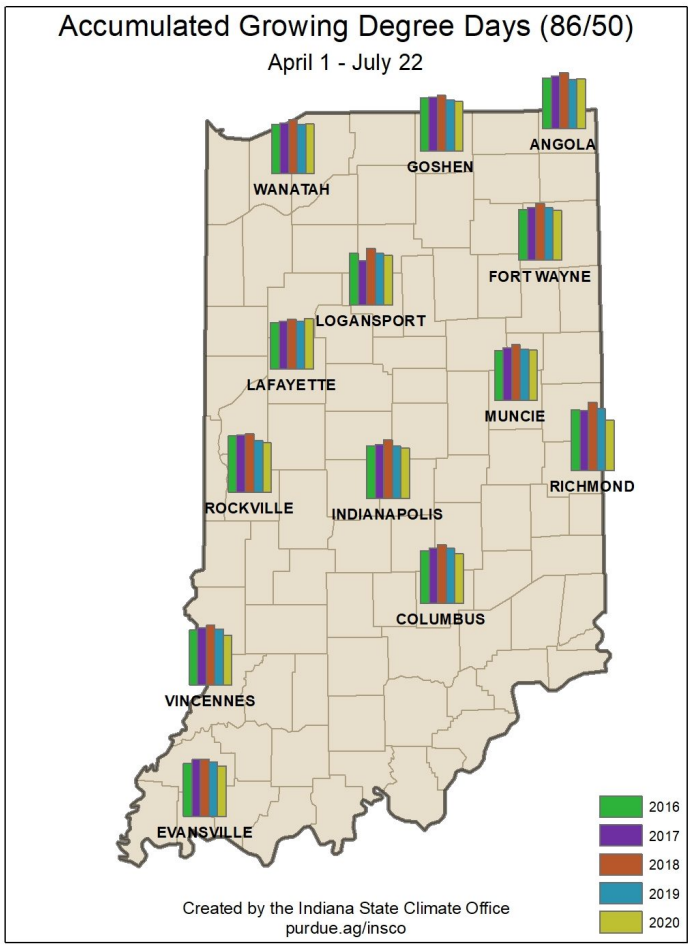


Figure 5. Comparison of accumulated modified growing degree days for April 1 through July 22 for 2016 through 2020.

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