PURDUE UNIVERSITY | Extension ENTOMOLOGY

Pest&Crop newsletter

Issue: 2019.18
July 18, 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

Western Bean Cutworm Flight Increases, Egg Hatch Is Underway

(John Obermeyer)

The western bean cutworm (WBC) trapping season continues, and after a slow start, moth flights have 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 more difficult, less reliable and time-consuming. In other words, some larvae have hatched and have already infested corn and for those just looking for egg masses beginning now, they will likely be underestimating the population.

Scouting pre-tassel corn for western bean cutworm egg masses.

However, it is not too late. This increased moth activity is likely the key period 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 of each other. 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.

Scouting should begin once moths are being captured each night. 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. Young larvae need pollen to survive, and female moths are most attracted to cornfields that are just about to pollinate. 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 reach down into these areas, but only for a short time. After this they move into the plant itself via the silks and are invulnerable after that. Remember that this pest is resistant to the Cry1F insecticidal trait – this is 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.

2019 Western Bean Cutworm Pheromone Trap Report

(John Obermeyer)

		WBC Trapped						
		Wk 1 6/20/19-6/26/19	Wk 2 6/27/19-7/3/19	Wk 3 7/4/19-7/10/19	Wk 4 7/11/19-7/17/19	Wk 5 7/18/19-7/24/19	Wk 6 7/25/19-7/31/19	Wk 7 8/1/19-8/7/19
County	Cooperator							
Adams	Roe/Mercer Landmark	0	0	0	7			
Allen	Gynn/Southwind Farms	0	0	1	0			
Allen	Kneubuhler/G&K Concepts	0	0	0	1			
Bartholomew	Bush/Pioneer Hybrids	0		0	3			
Boone	Emanuel/Boone Co. CES	4	2	7	8			
Clay	Fritz/Ceres Solutions/Clay City	0	3	0	0			
Clay	Mace/Ceres Solutions/Brazil	0	0	8	0			
Clinton	Emanuel/Boone Co. CES	0	2	3	5			
Clinton	Foster/Purdue CES	0	0	0	4			
Dubois	Eck/Dubois Co. CES	0	1	3	3			
Elkhart	Kauffman/Crop Tech Inc.	1	2	28	118			
Fayette	Schelle/Falmouth Farm Supply Inc.	0	0	1	0			
Fountain	Mroczkiewicz/Syngenta	9	1	115	65			
Fulton	Jenkins/Ceres Solutions	1	0	15	96			
Fulton	Randstead/Ceres Solutions	0	0	23	17			
Hamilton	Campbell/Beck's Hybrids	0	1	3	1			
Hendri	Nicholson/Nicholson Consulting	0	0	1	3			
Hendricks	Tucker/Bayer	2	1	2	6			
Howard	Shanks/Clinton Co. CES	0	0	0				
Jasper	Overstreet/Jasper Co. CES	0	1	31	252			
Jasper	Ritter/Dairyland	5	3	7	114			
Jay	Boyer/Davis PAC	0	0	6	8			
Jay	Shrack/Ran-Del Agri Services	0		2	1			

		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
Jay	Temple/Jay Co. CES/Pennville	1	1	2	2			
Jay	Temple/Jay Co. CES/RedKey	3	3	9	6			
Jennings	Bauerle/SEPAC	0	0	0	0			
Knox	Clinkenbeard/Ceres Solutions/Freelandville	0	0	0	0			
Kosciusko	Klotz/Etna Green							
Lake	Kleine	0	1	4	10			
Lake	Moyer/Dekalb Hybrids/Shelby	0	1	12	16			
Lake	Moyer/Dekalb Hybrids/Scheider	1	0	0	19			
LaPorte	Rocke/Agri-Mgmt. Solutions/Wanatah	4	1	40	45			
Marshall	Harrell/Harrell Ag Services	1	1	5	16			
Marshall	Klotz/Nappanee	0	0	8	105			
Miami	Early/Pioneer Hybrids	0	2	25	82			
Montgomery	Delp/Nicholson Consulting	0	0	14				
Newton	Moyer/Dekalb Hybrids/Lake Village	1	0	11	48			
Porter	Tragesser/PPAC	0	0	1	9			
Posey	Schmitz/Posey Co. CES/Cynthiana	0	0	0				
Pulaski	Capouch/M&R Ag Services	6	0	0	30			
Pulaski	Leman/Ceres Solutions	2	0	0	1			
Putnam	Nicholson/Nicholson Consulting	1	1	0				
Randolph	Boyer/DPAC	0	1	20	12			
Rush	Schelle/Falmouth Farm Supply Inc.	0	2	1	0			
Shelby	Fisher/Shelby County Co-op	0	0	0	0			
Shelby	Simpson/Simpson Farms			4	15			
St. Joseph	Carbiener/Breman	0	0	5				
St. Joseph	Deutscher/Helena Agri-Enterprises	0	0	5	10			
Starke	Capouch	0	0	1	21			
Sullivan	Baxley/Ceres Solutions/Sullivan	0	0	4	0			
Sullivan	Baxley/Ceres Solutions/New Lebanon	0	0	3	0			
Sullivan	McCullough/Ceres Solutions/Farmersburg	0	0	0	0			
Tippecanoe	Bower/Ceres Solutions/Lafayette	0	5	34	3			
Tippecanoe	Nagel/Ceres Solutions	0	0	1	1			
Tippecanoe	Obermeyer/Purdue Entomology	0	0	0	0			
Tippecanoe	Westerfeld/Monsanto Research Farm	1	1	2				
Tipton	Campbell/Beck's Hybrids	0	0	1	8			
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	0	0			
Wabash	Enyeart/Ceres Solutions		2	3				
White	Foley/ConAgra	0	1	2	4			
Whitley	Boyer, Richards/NEPAC/Schrader	0	0	1	8			
Whitley	Boyer, Richards/NEPAC/Kyler	0	0	2	11			

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

Update on Corn Diseases In Indiana: Part 1: Tar Spot

(Darcy Telenko)

It is time to get out and scout for corn diseases. Even though recent weather conditions have been hot and dry, there are a number of corn diseases emerging in the lower canopy. We have confirmed both tar spot and southern rust this week in Indiana as some fields are starting to tassel (VT). 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 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 be considered: the field history/previous crop, the amount of disease present in the field, hybrid susceptibility, weather conditions, and the price of corn and cost of fungicide application.

Tar Spot: This disease is on everyone's mind. The first confirmation in the Midwest occurred in Porter County, Indiana on July 12. Tar spot was identified at an extremely low incidence in this field. Since then I have found active tar spots in two other fields – one each in Porter and LaPorte Counties (see Figure 1).

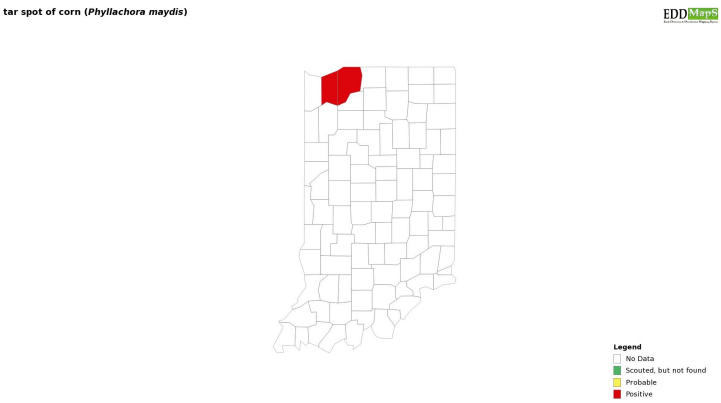


Figure 1. 2019 Distribution map of counties confirmed for tar spot of corn in Indiana. Website: https://corn.ipmpipe.org

My observations at these sites:

1. Field with history of severe tar spot in 2018
2. Corn is at tassel (VT)
3. Infection occurred at 4th or 5th leaf and only 1-2 spots were found on a leaf
4. Two of the three confirmed sites are under irrigation

These initial findings are like finding a needle in the haystack and required intensive scouting. See image of the tar spots (Figure 2). Our current hot and dry weather is not conducive to tar spot – the infections we found most likely occurred back in mid-June with all the rain. In addition, we continue to have suspect reports that turned out to be insect frass. Please see last week's article on how to distinguish between insect frass and tar spot (https://extension.entm.purdue.edu/newsletters/pestandcrop/article/an-update-on-corn-tar-spot-what-to-do-if-you-suspect-it-is-in-your-field/).

Figure 2. Tar spot lesion on corn in lower canopy. High resolution of the stroma formed on the leaf. (*Photo Credit: Darcy Telenko*)

We are working hard to try to understand this new disease to minimize losses, but still don't have good information on optimum fungicide timing and efficacy for Indiana corn production – multiple trials are in place this year to try to address these questions. The current calculated tar spot risk based on the Tarspotter app for July 16, 2019, at multiples locations in Indiana, is generally low to none (Figure 3). The low risk is based on the hot and dry conditions we have seen across the state. This is compared the high risk back on June 15, 2019, when we had high moisture conditions. These conditions most likely led to the infections we have currently identified.

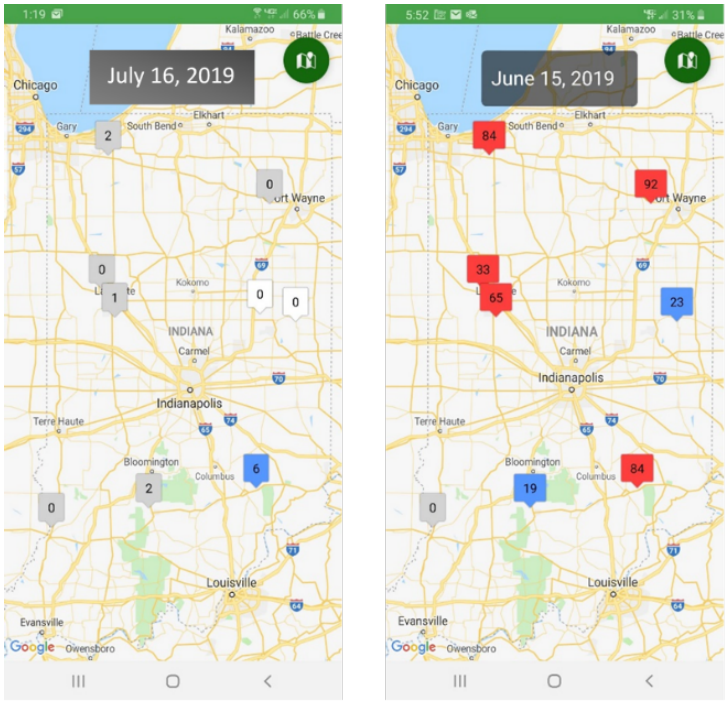


Figure 3. Tarspotter risk predictions for the state of Indiana on July 16, 2019 vs. June 15, 2019.

Due to the hot and dry weather, I would only consider a fungicide spray if a field met **ALL** four conditions listed below. I would also leave a test strip to evaluate effectiveness and benefit of the fungicide application.

1. Field history of severe tar spot in 2018 and replanted to corn.
2. Corn nearing VT (this is also the optimum timing for management of other foliar diseases when active such as gray leaf spot and northern corn leaf blight).
3. Field is irrigated and receiving water weekly, and/or weather conditions change with lots of rain in the forecast.
4. You find more than a few plants with tar spot when scouting a field.

Only if all four conditions are met, a fungicide application might be justified. Otherwise, I'm not recommending any action at this point in time. Again, this hot and dry weather is not conducive to tar spot – the infections we have found most likely occurred back mid-June.

Several fungicides are labelled to help manage tar spot. 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. It can be found at https://crop-protection-network.s3.amazonaws.com/publications/cpn-2011-corn-fungicide-efficacy-for-control-of-corn-diseases.pdf.

We will continue keeping a close eye on risk models and intensely scouting more fields. I am interested in adding more locations in surrounding counties in northern Indiana; please contact me if you are interested in helping.

If you suspect a field has tar spot please contact us and send a sample to the Purdue PPDL for confirmation.

Update on Corn Diseases In Indiana: Part 2 Gray Leaf Spot And Southern Rust

(Darcy Telenko)

Gray leaf spot is also active in the lower 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 are 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).

Figure 1. Multiple gray leaf spot lesions (tan with yellow halos) found lower leaves in canopy of a field of continuous corn, surrounding a single tar spot (black arrow). (*Photo Credit: Darcy Telenko*)

Southern Rust

Corn pathologists have been tracking the movement of southern rust as it has been active in the south the last few weeks. We just received a **positive confirmation of southern rust in Vigo County, Indiana** (Figure 2). The field where it was found had very light symptoms, but we need to keep a close eye. If you suspect field has southern rust, please send a sample to the PPDL for positive identification or contact myself or your local extension.

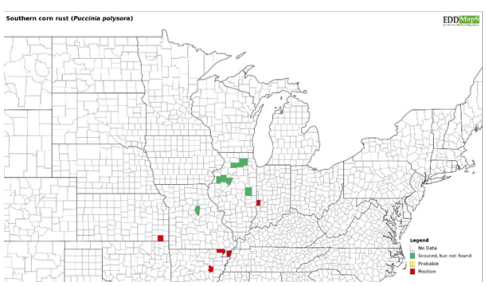


Figure 2. Map of southern rust of corn as of 7/16/2019. EDDMapS https://corn.ipmpipe.org/

Common and southern rusts do not overwinter in Indiana. 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 and much of our corn crop is at least a month behind, it is very important to keep eye out for southern rust.

Favorable weather can cause the infection to repeat in a disease cycle as short as seven days, resulting in secondary infections and new pustules. Each pustule can produce thousands of spores that can infect corn leaves and produce additional pustules. Disease intensity can reach epidemic levels very quickly as these cycles continue. The speed at which corn rust can reach damaging levels is why it is necessary to pay careful attention to the level and timing of initial disease infection in susceptible hybrids. Young leaves are more susceptible to rust infection than mature leaves. Our late-planted corn may be at greater risk for infection since the rust spores are now here in Indiana and much of our corn is still in the mid-vegetative stages. Recent weather conditions continue to favor disease development therefore I cannot stress enough how important it will be to scout your corn fields and be on the lookout.

There are no research-based thresholds for Indiana to assist in making a decision to apply a fungicide for rust. In high-value corn production, a few pustules on 50% of observed plants could prompt a fungicide application. Fungicides are usually most effective in preventing yield loss in seed corn and sweet corn production when they are applied at disease onset in a susceptible inbred or hybrid. Fungicide applications may need to be reapplied at seven- to 14-days if weather conditions remain favorable for rust development. These thresholds do not apply to fungicide use in field corn.

Several fungicides are available to help manage southern rust, tar spot, gray leaf spot, and other leaf diseases with a recommended application occurring at late vegetative stages through R1 for most of these foliar diseases. The national Corn Disease Working Group has developed a very useful fungicide efficacy table for corn diseases. It is found at https://crop-protection-network.s3.amazonaws.com/publications/cpn-2011-corn-fungicide-efficacy-for-control-of-corn-diseases.pdf

Please feel free to contact me (dtelenko@purdue.edu) or the PPDL with any major disease issues you may have this season.

Weed Control Issues On Prevented Planting Fields

(Bill Johnson) & *(Marcelo Zimmer)*

We have been getting lots of inquiries lately about fields that didn't get planted to a corn or soybean crop, and have lots of weeds growing in them. With the challenging weather we have had, we didn't need any more challenges this year. Common sense tells us that something should be done to these fields to prevent the weeds from going to seed and increase weed control costs for many years to come. Keep in mind that weeds like foxtail and giant ragweed produce hundreds of seeds on each plant, and pigweeds, like waterhemp, redroot/smooth pigweed, and Palmer amaranth, can produce thousands and even hundreds of thousands of seeds per plant. Allowing them to go to seed is not a good idea since all weeds have built-in dormancy mechanisms, which result in large fractions of seeds germinating in flushes across multiple growing seasons, even as long as 10 years down the road.

Figure 1. Regrowth of grasses and ragweeds after failed herbicide application to large weeds. (*Photo Credit: Marcelo Zimmer*)

Figure 2. Failed herbicide application to field infested with horseweed (marestail). (*Photo Credit: Marcelo Zimmer*).

So what can we do on prevented planting acres? Here are options to consider and are listed in no particular order. You will have to decide

which one fits your operation the best.

1. Plant a cover crop and hope that establishment and growth of the cover crop suppresses weeds. You will need to control the existing weeds first to allow proper seed to soil contact for establishment of the cover crop. However, since we are now into mid summer, getting adequate rainfall for germination may be a challenge in some areas of the state. Never thought I would say that at the beginning of this growing season!
2. Plant a grass cover crop like cereal rye or wheat and use low cost herbicides like 2,4-D or dicamba to control broadleaf weeds. One of the benefits of planting a grass cover crop is that it allows you to use a broadleaf herbicide to control broadleaf weeds in the cover crop. If you use a cover crop mixture that contains grass and broadleaf species, you will not have the option of spraying herbicides to kill the weeds that come up in these mixed stands.
3. Till the ground to kill the weeds. Most likely you will have to do this more than once since additional flushes of weeds will emerge when rainfall events occur. Keep in mind that is important to uproot the large weeds so they die. Large weeds can re root themselves if soil moisture is present, continue growing and produce seed. Tillage operations must be thorough to kill the large established weeds.
4. Spray broad spectrum herbicide programs to kill the weeds. Most likely this would need to be done more than once if there is not a crop growing on the ground to provide weed suppression by shading. A couple of options include a) glyphosate + 2,4-D or dicamba, b) glufosinate + 2,4-D or dicamba + clethodim if tough grasses are present, c) gramoxone + sencor + 2,4-D or dicamba. We realize on these prevented planting acres, that most folks will attempt to keep costs down. However it's important to recognize that in many fields, the weeds have gotten relatively large, and we are in a weather pattern that is now causing the weeds to harden off and be more tolerant to herbicides. So for this reason higher rates of herbicides we'll be required to achieve complete control.
5. Mow down fields infested with large weeds, especially tough to control weeds like horseweed (marestail), giant ragweed, and the pigweeds. Spray the regrowth with broadleaf herbicides like 2,4-D and dicamba to finish them off. Large weeds won't be easily controlled with herbicide applications only (Figures 1 and 2) and mowing big plants will help reduce weed biomass and plant stored reserves. Make sure the weeds are actively growing before spraying herbicides.

In summary, I wish we could wave our magic wand and make the weeds go away. But that's not likely to happen anytime soon and it's going to require effort on your part to keep hammering away at the weeds, minimizing seed bank inputs in order to keep weed control costs in the future at reasonable levels.

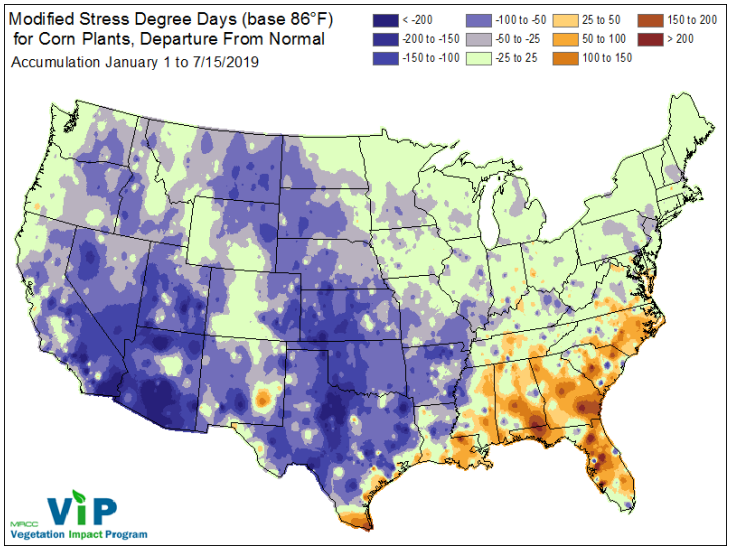
Indiana Climate And Weather Report – 7/18/2019

(Beth Hall)

While the remnants of Hurricane Barry brought some much-needed precipitation to the state, the next few weeks look to be on the dry side. Temperatures are also expected to be warmer than normal, so heat stress may become an issue for plants and animals. The Midwestern Regional Climate Center's (MRCC) Vegetation Impact Program (VIP) provides a modified stress degree-day (mSDD) tool (https://mrcc.illinois.edu/VIP/indexSDD.html) for corn plants that accumulates degree-day units when temperatures exceed 86°F. Modified SDD departures indicate most of Indiana to be near normal (Figure 1), however, excessive heat is in the forecast so mSDDs are expected to accumulate quickly.

Drought-like conditions are developing, particularly in northern Indiana. While the excessive spring and early-summer rains saturated soils, the sudden dryness is causing some stress where plant roots were not able to deeply establish. These changing weather conditions could leave plants more susceptible to external stresses from pests and diseases.

Fun Fact: Indiana experiences an average of 7-14 days with a Heat Index greater than or equal to 90°F and 3-7 days with a Heat Index greater than or equal to 100°F (source: MRCC Heat Index Climatologies; https://mrcc.illinois.edu/clim/heatIndex/index.jsp) So far in 2019, the Indianapolis weather station has recorded 14 days with a Heat Index over 90°F and 2 days with a Heat Index at or above 100°F.



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