PURDUE UNIVERSITY | Extension ENTOMOLOGY

Pest&Crop newsletter

Issue: 2020.19
August 7, 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

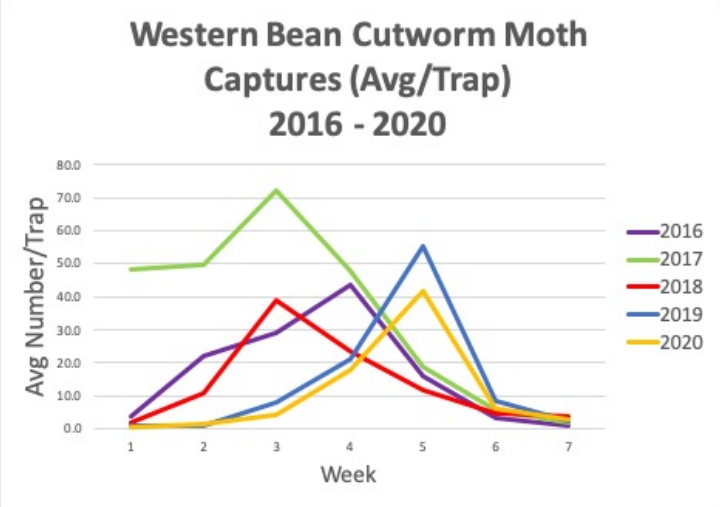
- Western Bean Cutworm: Overall, An Uneventful Moth Flight
- 2020 Western Bean Cutworm Pheromone Trap Report
- VIDEO: Split Applications Of Soil Residual Herbicides In Corn
- Kernel Set Scuttlebutt
- The Forage Producer's Toolkit
- Will August Be Warmer Or Cooler Than Normal?

Western Bean Cutworm: Overall, An Uneventful Moth Flight

(John Obermeyer)

Tracking the western bean cutworm moth flight wouldn't be possible without the many pheromone trap cooperators in our network, see following "Western Bean Cutworm Pheromone Trap Report." To those volunteers, we are so grateful! Please thank any of those cooperators that you may know for their efforts in helping us track this pest.

In looking at a comparison of the 5-year moth captures (see graph below), there were plenty of moths flying the third week of July (week 5 of trapping), same as last year. At that time, we were getting reports of egg masses and being found on pre-tassel corn. Since then, no reports of larval ear infestations have been received from northern Indiana counties, where risks are greatest. Hopefully, the delayed moth emergence, likely due to a cool spring, is good news for the 2020 corn crop!



Bryan Overstreet, trapping cooperator, checking for larval ear feeding.

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	0	1
Allen	Anderson/NICK	0	0	2	1	5	5	0
Allen	Gynn/Southwind Farms	0	0	0	2	5	0	0
Allen	Kneubuhler/G&K Concepts	0	0	4	0	0	1	2
Bartholomew	Bush/Pioneer Hybrids	0	1	2	0	0	0	0
Boone	Emanuel/Boone Co. CES	2	1	1	0	0	0	1
Clay	Mace/Ceres Solutions/Brazil	0	0	1	1	0	0	3
Clay	Fritz/Ceres Solutions/Clay City	0	1	0	0	2	0	0
Clinton	Emanuel/Boone Co. CES	0	3	0	1	0	1	2
Dubois	Eck/Dubois Co. CES	0	0	0	0	0	1	0
Elkhart	Kauffman/Crop Tech Inc.	0		2	8	62		5
Fayette	Schelle/Falmouth Farm Supply Inc.	0	0	0	0	0	0	0
Fountain	Mroczkiewicz/Syngenta	0	0	10	47	5	0	0
Fulton	Jenkins/Ceres Solutions/Talma	0	0	0	95	17	0	1
Hamilton	Campbell/Beck's Hybrids	0	0	0	0	0	0	0
Hendricks	Nicholson/Nicholson Consulting	0	0	0	0	0	0	0
Hendricks	Tucker/Bayer	1	0	0				
Howard	Shanks/Clinton Co. CES	0	0	0	0	1	0	0
Jasper	Overstreet/Jasper Co. CES	0		15	327	1066	21	7
Jasper	Ritter/Dairyland Seeds	3	7	25	45	99	2	
Jay	Boyer/Davis PAC	0	0	2	0	0	0	3
Jay	Shrack/Ran-Del Agri Services	0	0	1	0	0	0	0
Jennings	Bauerle/SEPAC	0	0	0	0	0	0	0
Knox	Clinkenbeard/Ceres Solutions/Freelandville	0	0	0	0	0	0	2
Lake	Kleine/Rose Acre Farms	0	0	1	3	5	3	0

		WBC Trapped						
		Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7
		6/18/20-	6/25/20-	7/2/20-	7/9/20-	7/16/20-	7/23/20-	7/30/20-
County	Cooperator	6/24/20	7/1/20	7/8/20	7/15/20	7/22/20	7/29/20	8/5/20
Lake	Moyer/Dekalb Hybrids/Shelby	0	8	8	21	171	20	0
Lake	Moyer/Dekalb Hybrids/Scheider	0	8	17	86	266	54	6
LaPorte	Rocke/Agri-Mgmt. Solutions	0	0	38	68	108	25	2
Marshall	Harrell/Harrell Ag Services	0	0	0	26	5	0	0
Miami	Early/Pioneer Hybrids	0	0	3	14	15	3	1
Montgomery	Delp/Nicholson Consulting	0	0	0	0	0	0	0
Newton	Moyer/Dekalb Hybrids/Lake Village	0	1	0	36	91	25	5
Porter	Tragesser/PPAC	1	0	0	7	13	4	3
Posey	Schmitz/Posey Co. CES	0		0	0	1	3	5
Pulaski	Capouch/M&R Ag Services	1	4	4		74	64	11
Pulaski	Leman/Ceres Solutions	0	0	7	49	33	3	0
Putnam	Nicholson/Nicholson Consulting	0	0	0	0	1	0	0
Randolph	Boyer/DPAC	0	0	3	0	0	1	5
Rush	Schelle/Falmouth Farm Supply Inc.	2	4	0	0	0	0	0
Shelby	Simpson/Simpson Farms	0	0	0	1	0	0	0
Starke	Capouch/M&R Ag Services	1	0	9		28	13	3
St. Joseph	Battles/Mishawaka	0	0	0	11	13	4	4
St. Joseph	Carbiener/Breman	0	1	1	5	5	2	2
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 1	0	0	0	8	25	28	17
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 2	0	0	0	5	16	17	29
Sullivan	Baxley/Ceres Solutions/New Lebanon	0	0	0	1	0	0	0
Sullivan	McCullough/Ceres Solutions/Farmersburg	0	1	4	1	4		4
Tippecanoe	Bower/Ceres Solutions	0	32	61	40	15	0	0
Tippecanoe	Nagel/Ceres Solutions	0	0	0	0	0	0	0
Tippecanoe	Obermeyer/Purdue Entomology	0	0	0	3	0	0	0
Tippecanoe	Westerfeld/Bayer Research Farm	0	0	2	0	6	2	2
Tipton	Campbell/Beck's Hybrids	0	0	0	0	0	0	0
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	0	0	0	0	0
White	Foley/ConAgra	0	0	1	1	0	0	0

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

VIDEO: Split Applications Of Soil Residual Herbicides In Corn

(Bill Johnson) & (Marcelo Zimmer)

Corn growing under ideal weather conditions can quickly reach growth stage restrictions for postemergence herbicide applications. In this video, Dr. Bill Johnson discusses the benefits of splitting applications of preemergence herbicides as to obtain season long weed control in corn.

Kernel Set Scuttlebutt

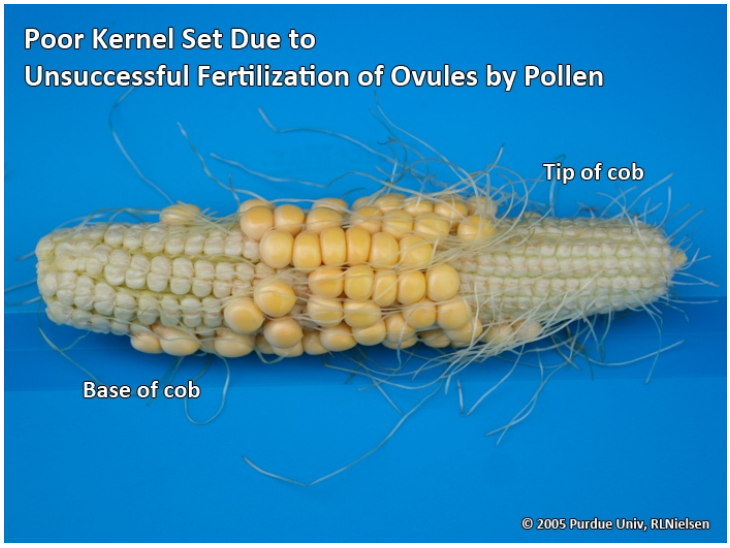
(Bob Nielsen)

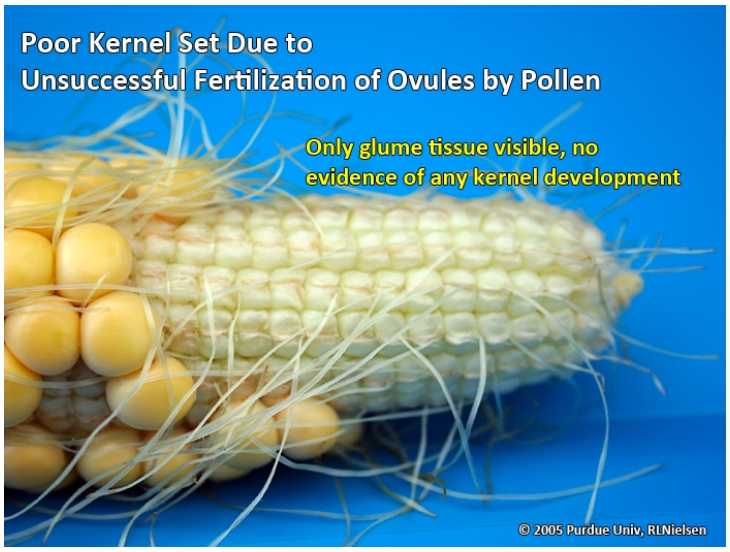
"Scuttlebutt": The cask of drinking water on ships was called a scuttlebutt and since sailors exchanged gossip when they gathered at the scuttlebutt for a drink of water, scuttlebutt became U.S. Navy slang for gossip or rumors. A butt was a wooden cask, which held water or other liquids; to scuttle is to drill a hole, as for tapping a cask.

Nautical Terms and Phrases, NAVAL HISTORY and HERITAGE CENTER, Washington DC 20374-5060. https://www.history.navy.mil/content/history/nhhc/browse-by-topic/heritage/speak-like-a-sailor/nautical-terms-and-phrases-their-meaning-and-origin.html [URL accessed Aug 2020].

The post-pollination scuttlebutt overheard in coffee shops throughout Indiana during late summer often revolves around the potential for severe stress that might reduce kernel set or kernel size in neighborhood cornfields. Growers' interest in this topic obviously lies with the fact that the number of kernels per ear is a rather important component of total grain yield per acre for corn.

Poor kernel set, meaning an unacceptably low kernel number per ear, is not surprising in fields that are obviously severely stressed by drought, but can also occur in fields that otherwise appear to be in good shape. Good or poor kernel set is determined from pollination through the early stages of kernel development; typically 2 to 3 weeks after pollination is complete.





Problems with kernel set stem from ineffective pollination, ineffective fertilization of the ovaries, kernel abortion, or all three. Distinguishing the symptoms is easy. Determining the exact cause of the problem is sometimes difficult.

Potential Yield Loss

The potential loss in grain yield caused by lower kernel numbers per ear can be estimated using the formula of the so-called Yield Component Method first described by the Univ. of Illinois many years ago (Nafziger, 2017; Nielsen, 2018b). For example, the loss of only 1 kernel per row for a hybrid with 16-row ears and a stand count of 30,000 ears per acre would equal a potential yield loss of approximately 5 to 6 bushels per acre (1 [kernel] x 16 [rows] x 30 [thousand ears per acre] divided by 85 [thousand kernels per bushel]).

Ineffective Pollination / Fertilization

Poor kernel set may be caused by ineffective pollination (the transfer of pollen from the tassel to the silks) and/or the subsequent failure of the pollen's male gametes to fertilize the female gametes of the ovules on the cob. Ineffective pollination is characterized by an absence of noticeable kernel development. In other words, all you see is cob tissue. Pollination problems may be due to several stress factors, sometimes working together to influence kernel set.

Severe drought stress, aggravated by excessive heat, can delay silk emergence to the extent that pollen shed is complete or nearly

complete by the time the silks finally emerge from the husk. Without a pollen source, ovule fertilization cannot occur.

Persistent severe silk clipping by insects such as the corn rootworm beetle or Japanese beetle throughout the active pollen shed period can also limit the success of pollination. The simultaneous effects of severe drought stress on silk emergence can easily amplify the consequences of severe silk clipping.

Severe drought stress coupled with excessive heat and low humidity can desiccate emerged silks to the point that they become non-receptive to pollen grain germination. I suspect this is low on the list of possible stressors for Indiana most years (because of our typically high humidity levels), but may play a role in some fields once in a while. Similarly, I doubt that pollen viability is usually NOT an issue for Indiana cornfields because temperatures in the low 90's are usually not great enough to kill pollen.

Consecutive days of persistent rainfall or showers that keep tassels wet for many hours per day over several days can delay or interfere with anther exsertion and pollen shed. Such weather does not typically occur in Indiana, but the remnants of Hurricane Dennis that visited many parts of Indiana in early July of 2005 influenced kernel set in some fields that were trying to pollinate during that week as a result of the many days of showery humid weather (coupled with the excessive cloudiness and its negative effect on photosynthesis).

Exceptionally long potential ears resulting from good weather during ear size determination sometimes fail to pollinate the final kernels near the tip of the cob. Remember, butt silks emerge first and tip silks emerge last. With oversized ears, sometimes tip silks emerge after all the pollen has been shed.

An increasingly common hybrid trait in recent years is an aggressive silking habit. The trait is associated with drought tolerance because silk emergence delays are less likely under severe drought stress and, thus, silk/pollen synchrony is better retained. However, favorable weather during silk elongation tends to result in silks emerging from the husk leaves several days prior to the availability of pollen from the tassels. Such unusually early silk appearance can result in silk aging / deterioration prior to the availability of pollen. The typical kernel set pattern associated with this situation is blank cob tissue near the basal end of the cobs.

Kernel Abortion

Poor kernel set can also be caused by kernel abortion following successful fertilization of the ovules on the cob. In contrast to ineffective pollination or fertilization, initial kernel development obviously precedes kernel abortion, so the symptoms are usually shriveled remnants of kernels that may be whitish- or yellowish-translucent.

The causes of kernel abortion are generally those stresses that greatly reduce the overall photosynthetic output of the plant during the first several weeks after the end of pollination as the kernels develop through the blister (R2) and milk (R3) stages of development. The risk of kernel abortion decreases significantly after the R3 stage of kernel development. Obvious photosynthetic stressors include severe drought & heat stress, consecutive days of excessively cloudy weather and significant loss of photosynthetically active leaf area (e.g., hail damage, leaf diseases, insect damage, nutrient deficiency).

Warm nights during pollination and early grain fill may indirectly affect survival of developing kernels. Research suggests that the increased rate of kernel development due to warmer temperatures lowers the available amount of photosynthate per unit of thermal time; which then becomes a stressor to kernel development particularly at the tip of the ear, leading to kernel abortion (Cantarero et al., 1999).

Final Food for Thought

A plethora (meaning a whole lot) of blank cob tips can quickly ruin the joy of walking a cornfield in the middle of August. Before getting too bent out of shape over the missing kernels, remember to count the

number of harvestable kernels on those ears. Sometimes, ears exhibit 1 to 2 inches of blank tips; yet still contain 16 rows by 30 to 35 harvestable kernels per row. Those are perfectly acceptable ear sizes in a year where dry weather has been a concern.

Related References

Cantarero, M.G., A.G. Cirilo, and F.H. Andrade. 1999. Night temperature at silking affects kernel set in maize. Crop Sci 39:703-710.

Nafziger, Emerson. 2017. Corn, in the Illinois Agronomy Handbook. http://extension.cropsciences.illinois.edu/handbook/ [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2016. A Fast & Accurate "Pregnancy" Test for Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/EarShake.html [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2018a. Effects of Severe Stress During Grain Filling in Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/GrainFillStress.html [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2018b. Estimating Corn Grain Yield Prior to Harvest. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/YldEstMethod.html [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2019a. Grain Fill Stages in Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/GrainFill.html [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2019b. The "Zipper" Pattern of Poor Kernel Set in Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/Zipper.html [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2020a. Silk Emergence. Corny News Network, Purdue Univ. Available http://www.kingcorn.org/news/timeless/Silks.html [URL accessed Aug 2020].

Nielsen, R.L. (Bob). 2020b. Tassel Emergence & Pollen Shed. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/Tassels.html [URL accessed Aug 2020].

The Forage Producer's Toolkit

(Keith Johnson) & (Brooke Stefancik, Sullivan County Extension Educator - Agriculture and Natural Resources)

Many professions must invest in tools specific to their trade to be successful. Besides the typical tools of wrenches, screwdrivers, chisels and hammers, what other items or gadgets would be helpful to be a successful forage producer?

- ***People***
    - Find professionals that are knowledgeable, responsive, and have a passion for forages – Advisors should provide value
    - Build good working relationships BEFORE a problem occurs
    - Your county's Purdue Agricultural and Natural Resources Extension Educator and Natural Resources Conservation Service office are valuable resources
- ***Join organizations that emphasize forages as a learning opportunity***
    - Excellent considerations would be the Indiana Forage Council (indianaforage.org) and your livestock interest association(s)
    - Provides an opportunity to network with people of like interests
- ***Resource materials that emphasize forages***
    - Forage magazines, websites, podcasts, apps, and publications
    - A great value is the Purdue Forage Field Guide (ID-317)
    - A helpful weed control guide is WS-16-W.
        - Order both at edustore.purdue.edu.
- ***Purdue Plant and Pest Diagnostic Lab*** (https://ag.purdue.edu/btny/ppdl/Pages/default.aspx)
    - A resource for helping identify issues in the field
    - Can help diagnose disease, insects, unknown plants, toxins, and more by utilizing a wide range of Purdue specialists
- ***Calendar***
    - Document important items on a calendar or in a work diary
        - When did seeding, fertilization, pesticide applications, machine harvest and rotation to another paddock occur?
        - What was found when scouting fields? What was done to take care of the concerns?
- ***Web Soil Survey*** (https://websoilsurvey.nrcs.usda.gov/)
    - Useful in sampling soil by soil type, forage species selection, and best location for building sites
- ***Soil probe***
    - Be consistent in timing of each sampling year if comparisons are made among years
    - Sample every three years or when big changes occur
    - Use soil test results to put a fertilizer management plan in action
- ***Insect sweep net***
    - Great resource for capturing aphids, potato leafhopper, and beneficial insects and to determine if there is an economic threshold
- ***Yardstick and algebra***
    - Equations are found in the Purdue Forage Field Guide
    - Helps determine length of stay in a pasture and stocking capacity
    - Move on to another paddock when there is 4" residual height
- ***Hay probe***
    - Test forages for nutritional value
    - Aids in formulating rations
    - Can test forage that may contain molds or other poisonous substances
    - Many different hay probe options – See

foragetesting.org

- ***Moisture and temperature hay bale probe***
    - Accurate testing of moisture and temperature determines whether hay in storage may become a concern.
        - Too dry – less than 15 percent – Dry matter and quality loss
        - Too wet
            - Heating – Unavailable crude protein, mold and spontaneous combustion
        - Test moisture before harvest; test moisture and temperature often after baling for 3 – 4 weeks
        - Know your “danger zones”
            - >20 % moisture without an organic acid preservative
            - > 125 °F: Begin monitoring temperature often
- ***Penn State Particle Separator***
    - Check chop length from a representative field sample and adjust forage harvester as needed
    - Correct chop length allows for best silo packing, lactic acid formation, and proper rumen function
- ***Use of an Unmanned Aerial Vehicle Worthy of Consideration***
    - Grazing pressure
    - Species composition
    - Plant disease concerns
    - Soil fertility problems
    - Insect pressure
    - Check on water tank function
    - Livestock well being

To be a successful forage producer it is important to invest resources in items that can help with forage production and harvest. From the items noted above, what will be your first of many investments that can improve your business?

Standard tools are necessary on the farm, but other “tools” are necessary investments, too. (*Photo Credit: Keith Johnson*)

Will August Be Warmer Or Cooler Than Normal?

(Beth Hall)

The climate outlooks issued by the national Climate Prediction Center are keeping things exciting for those trying to plan ahead. The 6-10-day (Figure 1) and 8-14-day (Figure 2) outlooks that approximately represent August 11-20 are showing significant confidence for above-normal temperatures across Indiana. Precipitation is more of a mixed bag where August 11-15 is likely to experience above-normal precipitation, but August 16-19 is likely to have below-normal precipitation. The experimental three-to-four-week outlooks continues to show confidence for above-normal temperature, but there is too much uncertainty about precipitation to lean wetter or drier. Seaming all of these sub-monthly outlooks together would imply that August is likely to be warmer than normal and precipitation will present itself through a variety of wet and dry periods. Seems fairly typical. Is this guidance at all useful? One would expect August to be warm and precipitation to come and go. The good news is the probabilistic information being provided is not indicating a month of hot, dry conditions that could exacerbate a drought. Nor is it calling for cool, wet conditions when crops could use all the growing degree-day accumulations to thrive. Therefore, while these climate outlooks appear a bit too predictable, remember that they could have been worse!

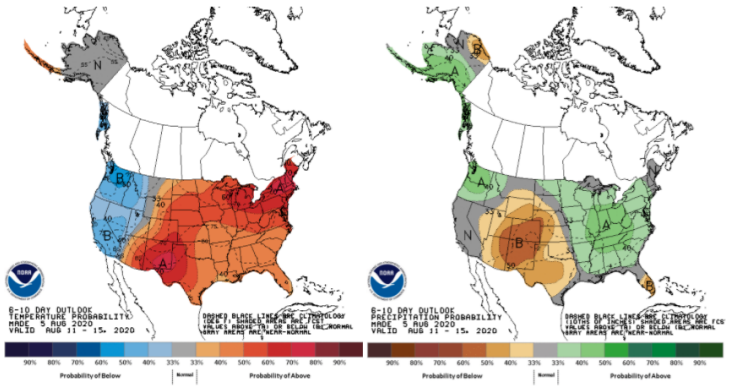


Figure 1. Probabilistic climate outlooks for temperature (left) and precipitation (right) for the period of August 11-15. Source: Climate Prediction Center.

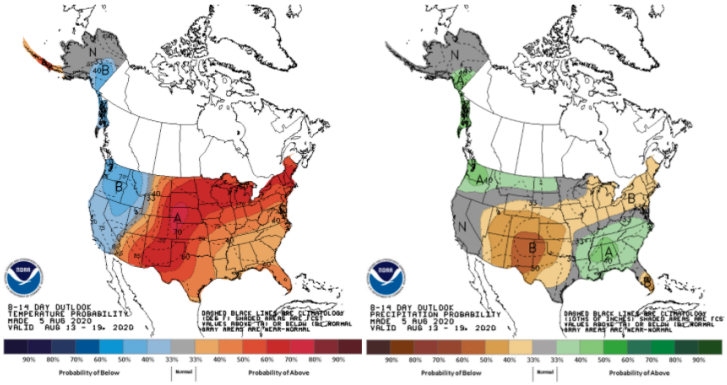


Figure 2. Probabilistic climate outlooks for temperature (left) and precipitation (right) for the period of August 13-19. Source: Climate Prediction Center.

Indiana was starting to dry out near the end of June into early July, causing the US Drought Monitor to gradual expand the region of "Abnormally Dry [D1]" and even introduce "Moderate Drought [D2]" across the state. However, by the end of July, a series of weather systems combined with convective ("pop-up") rain showers helped to replenish most of the moisture deficits and reduce the percentage of the state in dry conditions. Currently, the only parts of Indiana that seem to be lacking some good rainfall are the northeast counties. Perhaps those uncertain climate outlooks will favor this area!

Accumulated modified growing degree-day units continue to increase with the warm season. Figures 3 and 4 show the accumulations since April 15 along with the accumulated comparisons to past years.

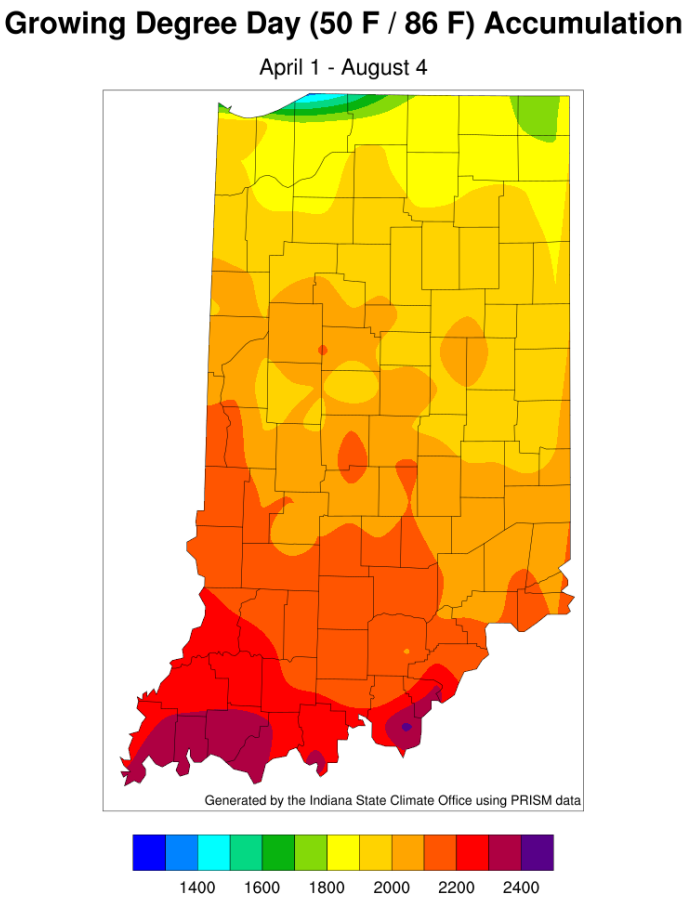


Figure 3. Modified accumulated growing degree-day units for April 1 – August 4, 2020.

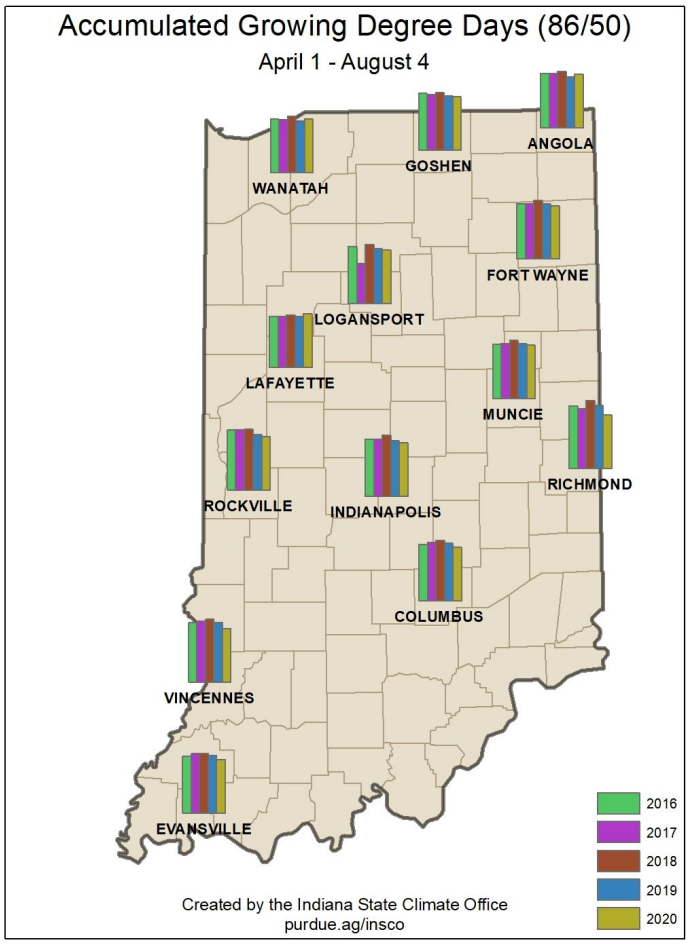


Figure 4. Comparison of accumulated modified growing degree days for April 1 through August 4 for 2016 through 2020.

It is the policy of the Purdue University that all persons have equal opportunity and access to its educational programs, services, activities, and facilities without regard to race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability or status as a veteran. Purdue is an Affirmative Action Institution. This material may be available in alternative formats. 1-888-EXT-INFO Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.

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