PURDUE UNIVERSITY | Extension - Entomology

Pest&Crop newsletter

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Purdue Cooperative Extension Service and USDA-NIFA Extension IPM Grant

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In This Issue

Fall Armyworm Outbreaks Possible In Late-Planted And/Or Fall Crops

(Christian Krupke) & (John Obermeyer)

In recent weeks, fall armyworm infestations have been decimating some soybean and forage crops in Kentucky. The University of Kentucky Extension Entomologists, have recently reported in their *Pest News* of large populations of fall armyworm (FAW) moth captures. This likely occurred in southern Indiana counties as well. Just like a very similar species, the armyworm, the behavior is much the same in that they can consume large amounts of foliage as they move in large numbers. One major difference, whereas armyworm feeds primarily on grasses (e.g., corn, small grains, fescue), fall armyworm will feed on most plants, both grasses and broadleaves. Incidentally, this is the same insect that has been laying waste to corn and other crops across sub-Saharan Africa for several years now after reaching the continent in 2016 – it's an after-thought for most of us in the corn belt, but definitely one of the top pests of grain production worldwide.

In Indiana, those with late-season crops, (e.g., double-crop soybean, forages, cover crops, alfalfa) should be inspecting for feeding damage. This is very important for newly-seeded forages. You have been warned, get them early! When the worms are about an inch long, they can denude plants "overnight" when they are "marching." Too, larger worms are very difficult to control.

Alfalfa field denuded by fall armyworm in September. (*Photo Credit: John Obermeyer*)

Fall armyworm feeding on grasses, notice the Y-shape on its head. (*Photo Credit: John Obermeyer*)

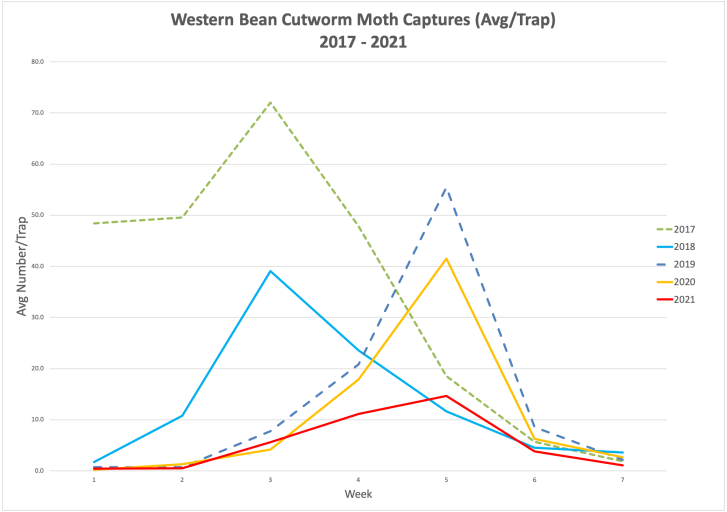
Fall armyworm feeding on the field edge of soybean plants, this after eating an adjoining forage field to the ground. (*Picture Credit: Luis Santiago*)

Western Bean Cutworm Moth Flight Much Lower This Season

(John Obermeyer) & (Christian Krupke)

Although some other states in the corn belt, and to the north in Ontario, Canada are seeing high moth flights (and we thought Indiana would follow suit), as it turns out, Indiana is a "have-not" state for WBC this year. Thanks to our network of pheromone trap cooperators throughout the state, we were able to assess the flight of western bean cutworm moths the last seven weeks. As you can see from the graph below, this year's numbers have been much lower, though the peak period of mid-July remained intact. Certainly, the accompanying good news is that larval damage reports, so far, have essentially been zero.

Hopefully we can convince the trappers to again monitor for this pest next season, to determine if this decline is a trend or is a one-year blip on the curve.



2021 Western Bean Cutworm Pheromone Trap Report

(John Obermeyer)

		WBC Trapped						
		Wk 1 6/17/21-6/23/21	Wk 2 6/24/21-6/30/21	Wk 3 7/1/21-7/7/21	Wk 4 7/8/21-7/14/21	Wk 5 7/15/21-7/21/21	Wk 6 7/22/21-7/28/21	Wk 7 7/29/21-8/4/21
County	Cooperator							
Adams	Roe/Mercer Landmark	0	0	0	1	0	0	0
Allen	Anderson/NICK	0	0	0	2	7	3	0
Allen	Gynn/Southwind Farms	0	0	0	0	2	0	0
Allen	Kneubuhler/G&K Concepts	0	0	0	0	2	0	0
Bartholomew	Bush/Pioneer Hybrids	0	0	0	0	0	0	0
Boone	Emanuel/Boone Co. CES	0	0	0	0	0	1	0
Clay	Mace/Ceres Solutions/Brazil	0	0	0	0	0	0	0
Clay	Fritz/Ceres Solutions/Clay City	0	0	0	0	0	0	0
Clinton	Emanuel/Boone Co. CES	0	0	1	1	0	0	0
Dubois	Eck/Dubois Co. CES	0	0	0	0	0	0	3
Elkhart	Kauffman/Crop Tech Inc.	0	0	2	6	6	1	1
Fayette	Schelle/Falmouth Farm Supply Inc.	0	0	0	0	0	0	0
Fountain	Mroczkiewicz/Syngenta	1	1	8	13	0	0	0
Hamilton	Campbell/Beck's Hybrids	0	0	0	0	0	0	0
Hancock	Gordon/Koppert Biological Systems	0	0	0				
Hendricks	Nicholson/Nicholson Consulting	0	0	0	0	0	0	0
Hendricks	Tucker/Bayer	0	0	0	0	0	0	0
Howard	Shanks/Clinton Co. CES	0	0	0	0	3	0	1
Jasper	Overstreet/Jasper Co. CES	0	2	6	22	81	10	0
Jasper	Ritter/Dairyland Seeds	0	2	68	104	62	6	
Jay	Boyer/Davis PAC	0	0	0	0	0	0	7
Jay	Liechty/G&K Concepts	0	0	0	0	0	0	0
Jay	Shrack/Ran-Del Agri Services	0	0	0	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	0
Kosciusko	Jenkins/Ceres Solutions/Mentone	3	0	30	53	109	47	1
Lake	Kleine/Rose Acre Farms	0	0	1	1	2	10	4
Lake	Moyer/Dekalb Hybrids/Shelby	0	2	9	55	79	8	9
Lake	Moyer/Dekalb Hybrids/Scheider	0	1	13	63	78	11	2
LaPorte	Rocke/Agri-Mgmt. Solutions	1	1	16	55	30	38	22
Marshall	Harrell/Harrell Ag Services	0	1	5	14	24	8	0
Miami	Early/Pioneer Hybrids	0	1	10	41	31	9	0
Montgomery	Delp/Nicholson Consulting	0	0	0	0	0	0	0
Newton	Moyer/Dekalb Hybrids/Lake Village	0	0	19	27	52	6	0
Porter	Tragesser/PPAC	0	1	1	7	5	4	1
Posey	Schmitz/Posey Co. CES	0	0	0	0	0	0	2
Pulaski	Capouch/M&R Ag Services/Medaryville	1	0	0	5	89	9	0
Pulaski	Leman/Ceres Solutions	1	0	4	23	10	0	1
Putnam	Nicholson/Nicholson Consulting	0	1	0	0	0	0	0
Randolph	Boyer/DPAC	0	0	0	0	0	0	0
Rush	Schelle/Falmouth Farm Supply Inc.	0	0	0	0	0	0	0
Shelby	Fisher/Shelby County Coop	0	0	0	0	0	0	0
Starke	Capouch/M&R Ag Services/Monterey	3	4	42	71	56	5	1
Starke	Capouch/M&R Ag Services, San Pierre	3	0	17	26	25	3	0
St. Joseph	Carbiener/Breman	0	0	2	4	11	0	0
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 1	0	0	0	3	5	10	1
St. Joseph	Deutscher/Helena Agri-Enterprises, Trap 2	0	0	0	2	16	21	0
Sullivan	McCullough/Ceres Solutions/Farmersburg	9	0	0	0	0	0	0
Tippecanoe	Bower/Ceres Solutions	2	6	60	15	27	0	0
Tippecanoe	Nagel/Ceres Solutions	0	0	0	0	0	0	1
Tippecanoe	Obermeyer/Purdue Entomology	0	1	0	4	3	1	0
Tippecanoe	Westerfeld/Bayer Research Farm	0	0	0	0	2	0	0
Tipton	Campbell/Beck's Hybrids	0	0	0	0	0	3	0
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	0	0	0	0	0
White	Foley/ConAgra	0	1	0	3	3	0	0
Whitley	Boyer/NEPAC/Schrader	0	1	3	2	0	0	1
Whitley	Boyer/NEPAC/Kyler	0	1	1	2	0	0	0

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

Sheep Refusal To Eat Hay Emphasizes The Importance Of Using Your Senses To Evaluate Hay

(Keith Johnson)

I received a phone call from a shepherd many years ago. He was confused as to why his ewes refused to eat what appeared to be beautiful alfalfa hay. I asked the shepherd to send me a couple of representative flakes from the small square bales the ewes did not want to eat.

Using the senses of sight, smell, and touch along with chemical analysis determine forage quality. (*Photo Credit: Keith Johnson*)

Several days later, a sturdy brown box arrived from the shepherd. I opened the box and inside was some beautiful alfalfa hay; emerald

green, late bud to early flower and great leaf retention. Very visually appealing hay. Why would any sheep refuse to eat such a fine specimen I asked myself as I moved my hand towards the hay in the box? Ouch! Within the beautiful smelling hay was a trace of Canada thistle, a very small trace, which was not visible to my eye. The spines on the thistle pierced my skin and several spines remained as I quickly withdrew my hand from the hay.

I called the shepherd back and told him what I had found in the hay. He said he would call me right back after he made a trip to the barn to inspect the mouths of his ewes. Within 30 minutes the shepherd called me back and reported that the mouths of the ewes were definitely irritated. If you can feel empathy for sheep, I was experiencing this emotion. I would refuse to eat this hay, too, even though a laboratory analysis would likely show that it had a protein content over 18 percent and a total digestible nutrient content in the mid 60's.

This reminded me of some research that had been done evaluating the nutritional quality of different weeds. Canada thistle was one of the weeds evaluated. Its nutrient profile was similar to alfalfa hay! Looking at a forage analysis wasn't going to tell me that Canada thistle was in this hay.

I truly believe that forage testing is a best management practice that all livestock owners should do. Laboratory results can be used to feed different hays in inventory in the right order as nutritional needs of cows, does, and ewes change as they go through their yearly cycle of maintenance, different months of gestation and lactation. A supplementation strategy can be developed, too. Excellent information about forage testing such as how to sample hay or silage, where to purchase hay probes and locations of certified laboratories can be found at the website *www.foragetesting.org*. Many Purdue Extension offices have a hay probe that can be loaned for use.

My experience with the shepherd and his ewes refusal to eat high quality hay as detailed by the numbers on a laboratory report, reminded me of how important it is to use your senses to evaluate hay, too. Previous to this encounter of hand meeting thistle, I would have used the words "visual appraisal" as hay was being assessed. However on this day, I opted to change the physical evaluation of hay to sensory analysis.

Sight can tell us what species are found in the hay, maturity of the crop at harvest, leaf retention or loss during harvest, whether there is mold, and the presence of foreign objects. But it wasn't sight that first told me that this beautiful looking hay had a problem waiting for the ewes; it was touch. **Touch** can tell you whether the hay was made too moist and whether it is heating due to this excess moisture. Palatability can be reduced if hay is so coarse that it irritates the mouth of the consuming animal. **Smell** can determine whether hay is musty from the presence of molds that are not noticeable with the eyes. Hay that smells more like tobacco rather than hay is an indication that it heated during the curing process and likely has a high unavailable protein content. A vinegar smell is an indication that hay was recently baled with organic acid preservatives at baling to reduce the microorganism population that causes heating and molds to form. I haven't opted to use taste or hearing to evaluate forages, but rest assured your livestock have used taste to assess the feed source that you provide.

For more information about sensory analysis of hay, Purdue Extension publication "Sensory Analysis of Hay Quality for the First Time Buyer" can be found at *https://www.extension.purdue.edu/extmedia/AY/AY-374-W.pdf*.

A small trace of Canada thistle spines found in alfalfa hay led to refusal of ewes consuming the hay. (*Photo Credit: Brooke Stefancik, Purdue University Sullivan County Extension Educator – Agriculture and Natural Resources*)

July/August Corn Water Needs

(Lyndon Kelley (MSU/Purdue Extension Irrigation Educator)) & *(Beth Hall)*

The water needs of corn peak in July and taper off in August as we near dent stage.

Irrigated corn has its highest water use and realizes its greatest potential benefit from irrigation during the week of tasseling and the following three weeks. Most irrigation scheduling programs have corn using 115-120% of a 6-inch grass reference evapotranspiration (ET), which translates to a water need for as much as 2 inches per week in cornfields in the peak water use stages.

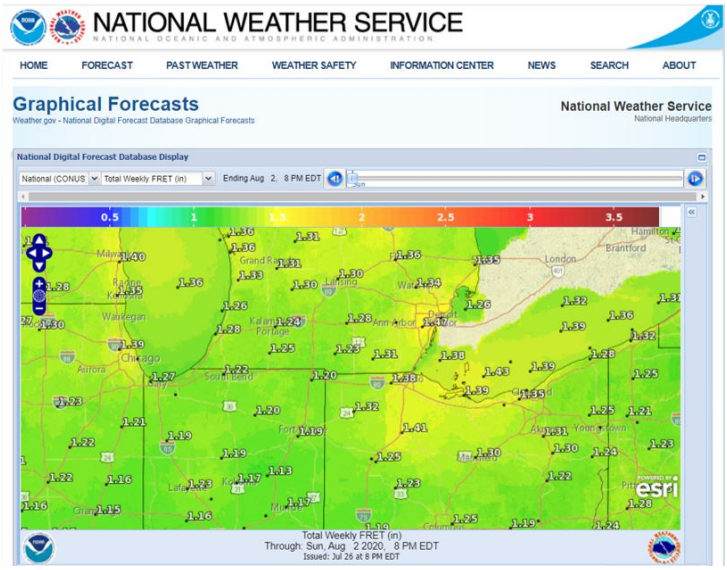
Irrigated corn has its highest water use and realizes its greatest potential benefit

from irrigation during the week of tasseling and the following three weeks then taper off as the crop enters dent stage. (*Photo Credit: Lyndon Kelley, MSU Extension*)

Supplying adequate water during the week before and three weeks after tasseling is critical to obtain top corn yields. This period often occurs during the dry point in the summer when rainfall rarely meets crop water needs. In early and late summer, producers can save irrigation water and energy by using rainfall and "stored" soil moisture as much as possible. Irrigators striving for water and energy saving will let the crop deplete the available soil moisture to almost 50%, the point at which corn leaves will start to roll on a hot afternoon. During the critical week before and three weeks after tassel emergence, maintaining higher soil moisture reduces yield risk and maximizes water use efficiency. Although using a lower daily water use (100% of ET), corn at beginning dent stage through full dent needs adequate water to avoid light test weight grains.

Reference evapotranspiration (ET) is a calculated weather value that represents how much water a solid seeding of 6-inch grass would use on a given day. ET_0 for an average summer day during July is 0.19 inch per day or 1.3 inches per week. We convert the ET to crop water use by multiplying a crop coefficient value (Kc). The week a corn crop tassels, it will use 120% of the ET_0 or a Kc of 1.2. That results in about 0.23 inch a day (1.6 inches per week) of water use. A cool, cloudy week would result in corn water use of 1.4 inches and a hot, dry week would result in a corn water use of 2 inches. The water need will decrease by 20% (100% of ET) at beginning dent stage through full dent.

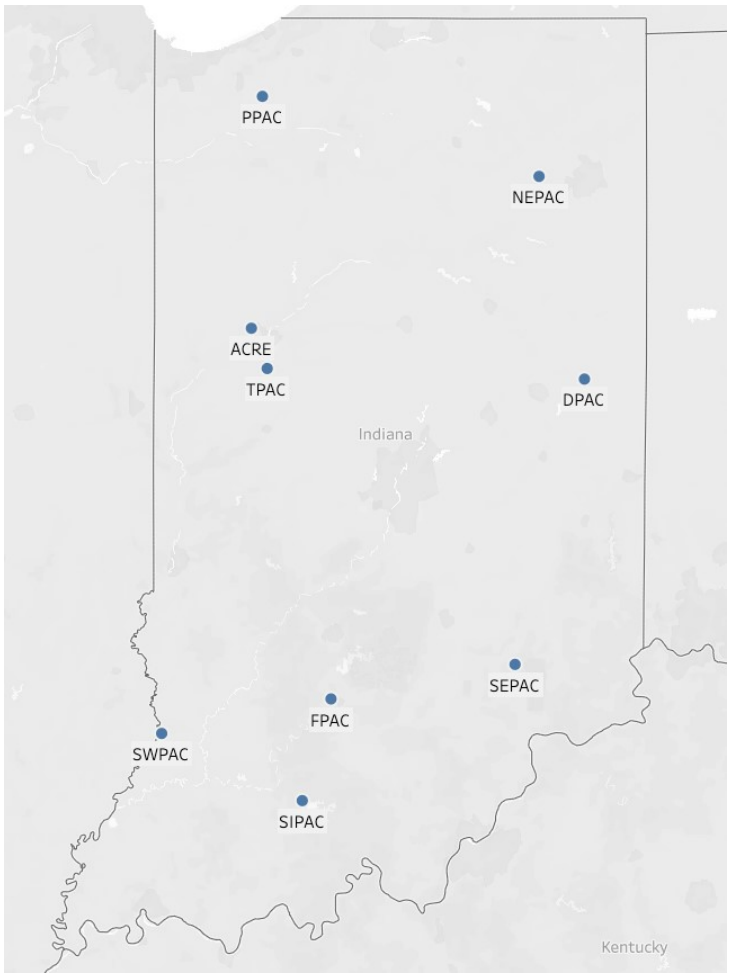
The National Weather Service is now providing daily and weekly Forecast of Reference Evapotranspiration (FRET). The interactive map tool allows an irrigator to pinpoint his section of the state and find estimated ET_0 value forecast for the next week. Simply multiply the published weekly FRET value by the Kc of 1.2 to find water use for a corn crop for the week of tasseling and the three weeks to follow. You can find the information for your area at National Digital Forecast Database and use the drop down box at the top of the map and scroll down to the bottom of the list to find the Water Resources.



The Nation Weather Service is now providing daily and weekly Forecast of Reference Evapotranspiration (FRET) proving an estimate of upcoming crop water needs. Created using the National Weather Service Forecast of reference Evapotranspiration (FRET).

Michigan and Indiana producers close to the state line can have daily ET data sent to them by email or text by signing up for the service at Michigan State University Enviroweather website. Messages are sent at 5:30 a.m. each day providing ET data for the previous four days and estimates of projected ET for the following seven days from any of the network's 87 stations. Estimates of ET can also be found by going to the Enviroweather website and following the link to "More weather" and then navigate to the "Water-Use Tool heading".

The Indiana State Climate Office provides real-time monitoring of ET along with other input parameters for the weather stations of the Purdue Mesonet with the Potential Evapotranspiration Monitoring Tool. Users can click on a station and view tables of values or time series graphs of the various parameters.



Station locations offering real-time monitoring of ET0 and other parameters.

To make the best use of irrigation water at the time of peak water need, producers will want to try to provide five or six day's worth of crop water use per application, typically 1 to 1.25 inches. These larger irrigation applications increase the amount of effective water available to the crop by reducing the water lost by evaporation in the corn canopy and on the residue and soil surface—about 0.1 inch per application regardless of the amount of irrigation water applied. A producer making two 0.5-inch applications provides 0.8 inch of effective water, compared to a producer making a single 1 inch application that provides 0.9 inch of effective water. Irrigators with center pivots that apply water faster than the water can infiltrate into the soil are forced to use smaller applications (less than 0.5 inch) to avoid irrigation runoff.

By the time corn reaches tassel emergence, the plant has achieved 100% of its effective rooting depth of about 3 feet. A 3-foot deep reservoir of soil moisture can hold as little as 3 inches on sand to as much as 6 inches on loam soils. Our most typical irrigated soils, sandy loams, hold between 3.5 and 4 inches in 3-feet of soil. Even with the low capacity of sandy soils, well-timed 1-1.25-inch applications rarely result in loss of water out the root zone.

For irrigators that want to avoid using the checkbook system for managing irrigation applications, soil moisture monitoring tools or digging to the depth of the wetted front 12 hours after irrigation provides an indication of irrigation need. Ideally, at least every other application should wet the soil down to 18 inches or half the rooting depth. At peak water use, corn that is inadequately watered will dry the lower rooting zone to the point that reduces nutrient uptake.

Corn plants can roll-up their leave to reduce sunlight interception when they cannot pull water in as fast as the plant needs it. This happens at a cost to productivity and profits. Irrigators need to meet the water needs of the crop, but without the expense of over watering.

Visual signs of water stress in corn occur too late to use as a good irrigation scheduling method without lowering yields. The corn plant has a natural defense mechanism that rolls the leaves up to cut the amount of sunlight that is captured. During extremely hot days, corn may roll even if it has adequate soil moisture. A good indication of under-watering is when corn leaves are still rolled into the early evening hours or in mid-morning hours. This symptom represents severe stress and will likely reduce potential yield. Compacted areas or sandier parts of fields can be monitored for leaf rolling, providing an early warning of the field's moisture status for the rest of the crop.

Many of the irrigation systems in Indiana and Michigan do not have the pumping capacity to keep up with the peak water use of the crop. That results in the crop drawing down the soil moisture reserves. Irrigation systems that can provide 5 gallons per minute (gpm) per acre of irrigated land can provide 1 inch of water every four days or 0.25 inch per day if run continuously. Irrigation systems with less than 5 gpm per acre capacity, or when crop water use is greater than 0.25 inch per day, are reliant on the soil moisture reserves to provide soil water or yield loss can occur.

The time of day irrigation water is applied has not been critical. We have seen no major advantage or disadvantage of irrigating crops either during the night or day as far as water use efficiency. Avoiding afternoon irrigation, making multiple small applications and using pivot drop nozzles are all management practices developed for the arid west and have little to no advantage in irrigating Indiana and Michigan fields. Applying water when the crop needs it should be the producer's most important mission.

While time of day of irrigation is normally not critical, irrigation applications made prior to the heat of the day can be beneficial to pollinating corn when afternoon temperatures are extremely high. By wetting the canopy and soil surface, temperatures are lowered and the relative humidity is raised, both of which can help the pollination process. The myth of "cold shock" to the crop scares some producers into avoiding irrigation just when it is needed the most.

For more information on irrigation water use and when to irrigate, see the Irrigation Scheduling Tools fact sheet and the Soil Water Balance Sheet from MSU Extension and Purdue Extension.

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August Forage Training Events Will Be Participant Interactive

(Keith Johnson)

Two forage educational events are being held in southern Indiana on August 20 and 21. Preregistration is required for both events.

The Purdue University Crop Diagnostic Training and Research Center is offering a daylong program at the Feldun-Purdue Agricultural Center located just west of Bedford on Friday August 20. Complete details about this training is at the "Upcoming Events" tab at the Indiana Forage Council website (www.indianaforage.org).

The Southern Indiana Purdue Agricultural Center, located near Dubois, is hosting four Saturday afternoon field days beginning on August 21. The first field day is forage focused. "Private Applicator Recertification Program" points will be offered at this training. Details can be found here SIPAC FORAGE.pdf.

Both training events will be interactive. So interactive in fact, that you likely will leave with grass stains, soil smudges, and hay/silage smells on your clothes!

What am I? Forage training participants work together to identify the pearl millet plant. (*Photo Credit: Keith Johnson*)

Irrigation Webinar Series

(Lyndon Kelley (MSU/Purdue Extension Irrigation Educator))

Contact: events@anr.msu.edu

July 7, 21; August 4, 18; September 1, 15 Noon-1 p.m.

Held virtually via zoom

No cost to attend, but pre-registration is requested

Let's Talk Irrigation!

This six session series focuses on irrigation topics such as irrigation management, irrigation efficiency, new and expanding irrigation projects and a weather and crop update.

Topics that will be covered each week:

- Past and forecasted crop water usage compared to rainfall for the last week and next week. (5 minutes)
- Ways to improve irrigation management and efficiency – Irrigation Specialist from MSU and Purdue (15 minutes)
- New and expanding irrigation considerations – Lyndon Kelley, MSU/Purdue Extension Irrigation Educator (15 minutes)
- Updates on irrigation topics related to field crops, vegetable, fruit and ornamental crops by MSU and Purdue specialists and extension educators (15 minutes)
- Open Irrigation question and answer period (from chat or pre-submitted e-mail questions). Please feel free to email irrigation related questions to Betsy Braid at braidbet@msu.edu before the programs.

Sessions will be held every other week on Wednesdays at Noon. They will begin on July 7 and conclude on September 15.

Draft Topic Agenda

August 4

- Monitoring leaf wetness duration to predict disease infection period– Dr. Younsuk Dong , MSU BAE Irrigation Specialist
- Irrigation water supply: how much water do I need? – Lyndon Kelley, MSU/Purdue Extension Irrigation Educator
- Irrigation of blueberries and other small fruit – Mark Longstroth, MSU Fruit Educator Emeritus

August 18

- Irrigation management and efficiency – Dr. Younsuk Dong , MSU BAE-Irrigation Specialist
- Irrigating fresh market vegetables for top quality – Dr. Ron Goldy, MSU Vegetable Educator Emeritus
- Irrigating tree fruit – Nikki Rothwell, MSU Tree Fruit Educator, Northwest Horticulture Experiment Station
- Irrigation for Ornamental Horticulture – Dr. Tom Fernandez (*not yet confirmed)*

September 1

- Timing the last irrigation– Dr. Younsuk Dong , MSU BAE Irrigation Specialist
- Timing and designing your project for minimized cost – Lyndon Kelley, MSU/Purdue Extension Irrigation Educator
- Considering growing cereals under irrigation: opportunity to provide change in rotation, produce second crop soybeans or snaps, annual forage and better manage fertility and weeds – Dennis Pennington, MSU Wheat Production Specialist

September 15

- Maximizing irrigation energy efficiency: how much energy did I use compared to the average? – Dr. Younsuk Dong, MSU BAE Irrigation Specialist
- Water use registration and reporting – Lyndon Kelley, MSU/Purdue Extension Irrigation Educator.
- Michigan site specific review options and the alternatives for registration – Andy Lebaron, MI- EGLE

RUP credits will be available for these sessions.

Updated August Climate Outlook Slightly Favoring Above-normal Precipitation

(Beth Hall)

The national Climate Prediction Center updates their monthly climate outlooks in the middle and last day of each month. The outlook for August that was released on July 31st provides too much uncertainty with respect to how temperatures might be (i.e., above normal, normal, or below normal), but the models are slightly favoring above-normal precipitation. Conditions across the state over the last few weeks have been on the drier side and evapotranspiration rates are high this time of year. Therefore, it is relatively common to have some drying across the state. Timing can be everything, though. If August does end up with above-normal precipitation, will it all fall on just a few days or spread out across the month? At this point, the 6-to-10-day outlook (August 10-14) is favoring above-normal precipitation and the 8-to-14-day outlook (August 12-19) is indicating normal rainfall for that time of the year. Hopefully, this will translate to a relative spread of precipitation events throughout the month that should lower the risk of significant drought conditions developing.

Temperatures are strongly favored to be above normal for the first few weeks of August. There are early indications of potential risks of extreme temperatures near the middle of the month (Figure 1). Climatologically speaking, Indiana usually experiences its hottest day of the year in early July (Figure 2). It is looking as if this year may not be fit into that climatological average! Figures 3 and 4 show modified growing degree-day accumulations and comparisons to recent years.

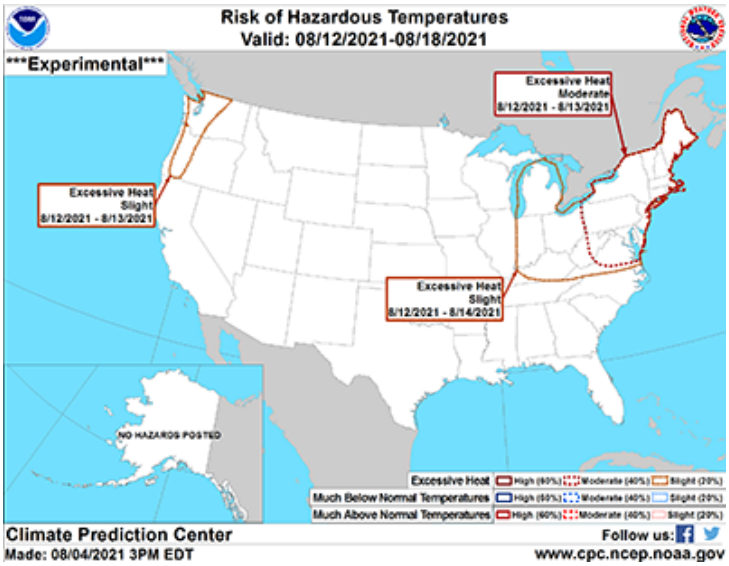

Figure 1. Predicted risk of hazardous temperatures as of 4 August 2021.

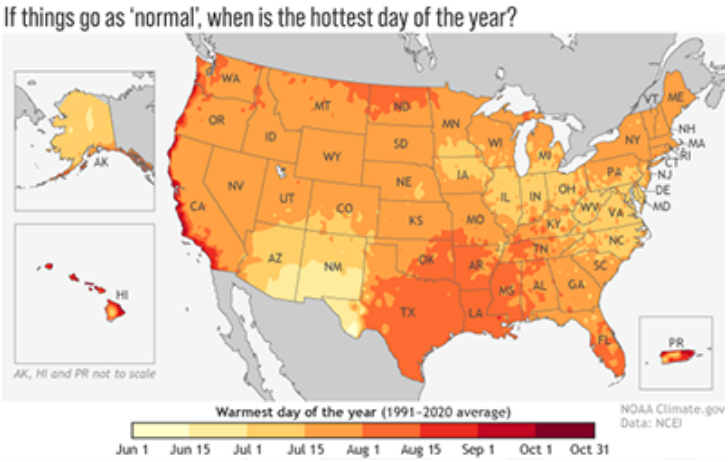

Figure 2. The average warmest day of the year based upon data from 1991 through 2020.

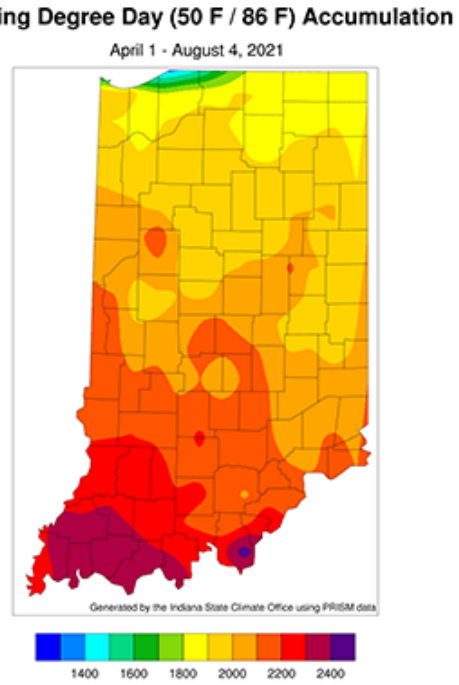

Figure 3. Modified growing degree day accumulations from April 1 to July 28, 2021.

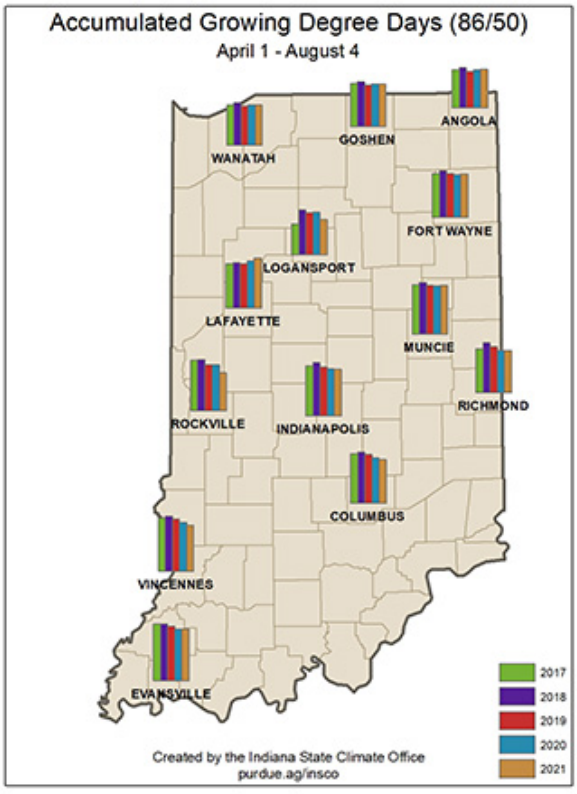

Figure 4. Comparison of 2021 modified growing degree day accumulations from April 1 – August 4 to the past four years.

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