PURDUE UNIVERSITY | Extension - Entomology

Pest&Crop newsletter

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In This Issue

"Throwing Good Money After Bad," A Simple IPM Photo Essay

(John Obermeyer)

This season, thousands of Indiana's acres of soybean were planted in early April because the soil and temperatures were ideal. In hindsight, we know the barrage of freeze/snow, multiple frosts, heavy rains, and crusted soils that those plants have been subjected to. As well, at the Diagnostic and Training Center, we got some plots planted in that early period. Through it all, the ugly (e.g., yellowish, crinkled, stunted, distorted, etc.) soybean plants are mostly still there, though growth is painfully slow. Soybean plots planted just a week ago, seem to be jumping out of the ground, and rivaling height of the early-planted. To add misery, bean leaf beetle has zeroed-in on these sick beans, right to the row. Is this bean leaf beetle feeding an additional stress that should be controlled!?!?

April 5 planted soybean plot, pictured on May 27, has struggled, yet mostly survived. (*Photo Credit: John Obermeyer*)

Bean leaf beetle feeding on "ugly" plants. (*Photo Credit: John Obermeyer*)

Comment: Your attention was immediately drawn to the damaged trifoliate leaf in my hand. Carefully view the other leaves/plants…not nearly the feeding. Plants at this stage of growth can withstand 40-50 percent defoliation (leaf removal) without impacting yield. For reference, the damaged leaf in my hand is about 25% defoliated.

A side view of the struggling, and defoliated V2 plants. (*Photo Credit: John Obermeyer*)

Comment: Again, we notice the holes in the leaves, among the other problems. Harsh environmental factors, over multiple weeks, can't be "fixed" by treating the beetles.

A bean leaf beetle munching away on a yellowish soybean. (*Photo Credit: John Obermeyer*)

Comment: Some will argue that additional stressors, e.g., beetle feeding, should be stopped to help these plants fully recover. “Just the facts ma’am” – these overwintering beetles are naturally dying off, as they have already done their mating and egg laying. The few beetles remaining in this field will be gone within days. Relook at the previous defoliation pictures, you will see that most damage is on older plant growth (lower leaves). For those wanting to solve this field’s woes with insecticide, it is “throwing good money after bad.”

Happy scouting!

Armyworm Pheromone Trap Report – 2021

(John Obermeyer)

County/Cooperator	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11
Dubois/SIPAC Ag Center	0	13	3	65	51	12	0	23			
Jennings/SEPAC Ag Center	0	1	0	7	7	2	2	1			
Knox/SWPAC Ag Center	0	6	1	10	35	1	12	11			
LaPorte/Pinney Ag Center	27	50	12	393	189	42	231	242			
Lawrence/Feldun Ag Center	14	62	7	434	717	83	79	43			
Randolph/Davis Ag Center	0	0	0	0	0	0	53	14			
Tippecanoe/Meigs	1	0	0	16	31	12	13	5			
Whitley/NEPAC Ag Center	0	0	0	18	20	8	32	22			

Wk 1 = 4/1/21-4/7/21; Wk 2 = 4/8/21-4/14/21; Wk 3 = 4/15/21-4/21/21; Wk 4 = 4/22/21-4/28/21; Wk 5 = 4/29/21-5/5/21; Wk 6 = 5/6/21-5/12/21; Wk 7 = 5/13/21-5/19/21; Wk 8 = 5/20/21 – 5/26/21; Wk 9 = 5/27/21-6/2/21; Wk 10 = 6/3/21-6/9/21; Wk 11 = 6/10/21-6/16/21

Welcome Dan Quinn, Purdue’s New Extension Corn Specialist

(Tammy Luck, luck@purdue.edu)

Dan grew up in a farming family in a small town in central Michigan. Dan attended Michigan State University and received both his B.S. and M.S. in Crop and Soil Sciences. During his time in Michigan, Dan worked in extension and applied field research of corn, soybean, wheat, sugarbeet, and potato cropping systems. Following the completion of his M.S., Dan travelled to the University of Kentucky to pursue a Ph.D. in Plant and Soil Science, where he studied the agronomic management of corn following a rye cover crop. Dan has worked in applied field research and extension throughout his time as graduate student and is excited to begin as the new Extension Corn Specialist at Purdue University. Dan can be contacted via djquinn@purdue.edu or (517) 775-5977.

Dan Quinn, Extension Corn Specialist

Corn Growth Stages VE To V3…What’s Going On?

(Dan Quinn)

As much of the corn across the state of Indiana has emerged and is beginning early vegetative growth, it is important to understand the characteristics of these early growth stages and what is happening in the plant at this specific time.

The **VE** growth stage is defined when the coleoptile breaks through the soil surface. The number of calendar days that this takes to occur is directly related to soil temperature. As farmers continue to push corn planting earlier and earlier, emergence can take much longer, which heightens the probability of corn seedling exposure to cooler temperatures and stress. As the coleoptile emerges, sunlight disrupts the mesocotyl (a white, tubular, root tissue between the seed and the base of the coleoptile) which fixes the depth of the corn growing point (~3/4 inch below the soil surface). In addition, through continued leaf expansion inside the coleoptile, the coleoptile tip is ruptured, the first true leaf begins to emerge, and photosynthesis begins.

Image 1: Corn at the VE growth stage. Image shows the emergence of the first true leaf.

Note: If seed is planted too shallow, the growing point is fixed closer to the soil surface which can result in floppy corn (e.g. leaning over) syndrome. This can also be caused by poor seed furrow closure or excessively dry conditions following emergence.

The **seminal root system** is the primary root system of the corn plant at this point up until V3-V4 and is used to anchor the corn seedling and facilitate minimal nutrient and water uptake. In the background, a second root system is forming which is known as the **nodal root system**. If damage occurs to the seminal root system prior to nodal root establishment, plant stunting or death can occur.

The **V1** growth stage is defined as plants with their first collared leaf. The first collared leaf is unique because it is oval shaped compared to the rest of the leaves which are pointed, this is also the starting point for growth staging plants using the leaf collar method. The first leaf of the corn plant is referred as the first true leaf because it is the first leaf of the plant to use photosynthesis to produce energy.

The **V2** growth stage is defined as plants with the second collared leaf visible. At this growth stage formation of the nodal root system has begun and can be identified apart from the seminal root system.

Note: nodal roots that grow aboveground are known as brace roots. These roots can help the plant acquire nutrients and water from the upper soil layers and also help stabilize the plant during the growing season.

The **V3** growth stage is defined as plant with three visible collared leaves. Up until this stage, corn seedlings are dependent primarily on the energy and nutrition reserves of the kernel for development. At V3, corn begins to shift its nutritional dependence to the nodal root system. This is an important transition stage in the corn plants life because successful transition will significantly influence the continued development of the corn plant. Success or failure at this growth stage can dictate whether stand establishment is successful or if stand establishment does not look so good. This transition period can also influence how well a corn plant can tolerate stress later on in the growing season which may influence yield potential.

Note: use of a starter fertilizer (e.g. 2×2) application at planting can help aid young corn plants as they transition from using kernel reserves to the nodal roots.

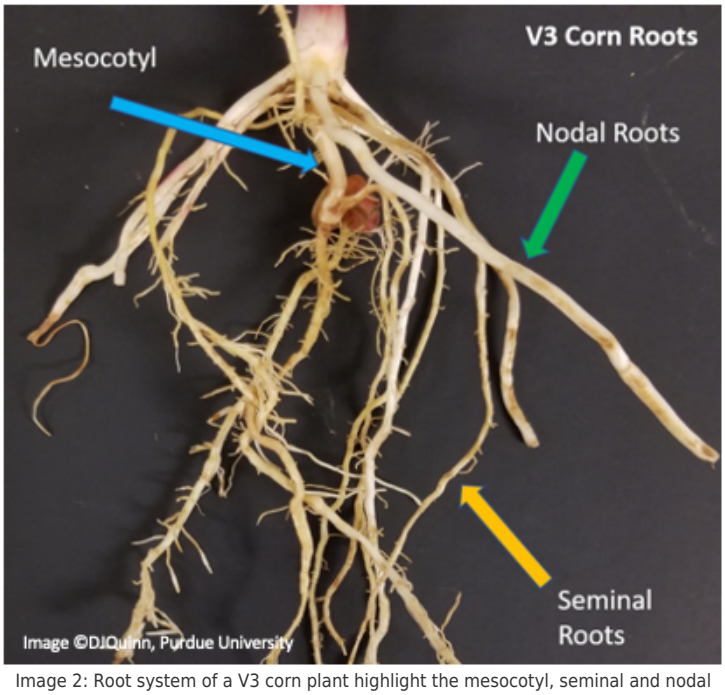

Image 2: Root system of a V3 corn plant highlight the mesocotyl, seminal and nodal roots.

The good news is that as the corn plant advances from V3 and begins to shift its nutritional dependence to the nodal root system, the photosynthetic capacity or "factory" of the plant begins to increase. This allows the plant to ready itself for take-off and often move from a yellow-green, ugly corn plant, to a dark-green, attractive corn plant, which always makes those who produce and study this crop for a living, feel pretty good.

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Hemp Growers Need To Be Aware Of Regulatory Changes

(Marguerite Bolt, mbolt@purdue.edu)

This growing season marks the first year of commercial hemp production in Indiana. As a reminder, hemp growers do not need to design a research project to obtain a license, but that does come with some other requirements.

The software that was developed for Office of the Indiana State Chemist, Mi-Corporation, must be used to apply for or make any changes to a license. Making changes to a license application that was already approved does come at a $50 cost. Growers need to make sure their registered site will still be their production location.

Growers will need to register their hemp site with their local Farm Service Agency (FSA) office. There seems to be confusion between growers and some FSA offices on what this actually means. All hemp growers must contact FSA and report their crop AFTER it has been planted. FSA has a crop acreage reporting sheet that explains what a cultivator will need to report crop acreage (https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2019/crop-acreage-reporting-19.pdf). In addition to the information found in the link, hemp cultivators will also need to provide their hemp license or license number.

By July 15 the FSA field and subfield number must be entered into the Mi-Corporation software for each variety grown on each plot. OISC has made a video on how to do this. https://www.youtube.com/watch?v=Pv6ExnWcF7o&feature=youtu.be

If there is any issue or push back from a local FSA office, please contact Don Robison (drobiso@purdue.edu) and provide the county office and

any details of the issue. This is a USDA requirement and a high priority at the federal level.

FSA Office Locator Tool
https://offices.sc.egov.usda.gov/locator/app?state=in&agency=fsa

Is Your Hay Too Hot?

(Keith Johnson)

Much hay has been made in Indiana the last two weeks. It is important to package hay at the correct moisture content to avoid excessive heating of bales when in storage. Target moisture to begin baling hay without an effective preservative is 20 percent, 18 percent and 17 percent for small rectangular bales, large round bales, and large rectangular bales, respectively. Excessive heating can result in mold formation by microorganisms, the binding of amino acids to soluble sugars that results in reduced available protein, reduced forage quality, and the possibility of storage structure fires.

Moldy hay caused by microorganisms because hay was made at too high a moisture content. (*Photo Credit: Brooke Stefancik, Purdue ANR Educator-Sullivan County*)

It is quite normal for a temperature rise to occur after hay is packaged, but anything greater than 125°F should be intently monitored. My observation has been that hay producers are watchful of the possibility of "hot" hay for several days after it is put into storage. After this time, the hay may be assumed to be okay and not monitored again. With hay storage structure fires, it may take three to four weeks before spontaneous combustion occurs. It is important to note temperature for an extended period of time and not just for a few days.

Hay in the foreground was removed from the hoop building because it was smoldering.
(*Photo Credit: Keith Johnson*)

Temperature probes are available through many agricultural vendors. An online search will provide many resources to consider. The probe should be strong so it can penetrate through tightly packed bales to a length of around six feet preferred. Options for making a probe that permits thermometer insertion on a string can also be found with an online search.

The following table provides temperature values and action steps that should be considered when hay is put into storage.

Critical temperature and action steps for hay in storage.

Hay Temperature	Action Steps
125°F or lower	***No action needed.***
150°F	***Entering the danger zone.*** *Check temperature twice daily. If possible, disassemble stacked hay to allow move air to move around and cool heated bales.*
160°F	***Reaching the danger zone.*** *Check temperature every couple of hours. If possible, disassemble stacked hay to allow more air to move around and cool heated bales.*
175°F	***Hot spots or fire pockets are likely.*** *Continue to check temperature frequently. If possible, stop all air movement around hay. Alert fire service of possible hay fire incident.*
190°F	***Fire is likely.*** *Remove hot hay with fire service assistance. The fire service should be prepared for the hay to burst into flames as it contacts fresh air.*

Hay Temperature	Action Steps
200°F or higher	***Fire is imminent.*** *Remove hot hay with fire service assistance. The fire service should be prepared for the hay to burst into flames as it contacts fresh air.*

Source: Extinguishing Fires in Silos and Hay Mows (*Natural Resource, Agriculture, and Engineering Service publication NRAES-18*).

Much effort goes into the production of high quality hay. Don't let the effort "go up in smoke"!

Last Call to Register For Grazing Schools

(Keith Johnson)

Want to learn how to improve your pastures? Attending a day and a half grazing school in early June will be a great start to improving pasture utilization by your livestock.

Properly managed pasture is beneficial to plants and livestock, too. (*Photo Credit: Keith Johnson*)

The fee to attend is $75. Additional individuals from the same farm are permitted at a cost of $50, but extra materials will not be included. *Registration must be completed before June 1.*

Preferred online registration is available at the following links.

- Southern Indiana – *June 4 and 5* at the Southern Indiana Purdue Agricultural Center – https://bit.ly/3g8zWRV
- Northern Indiana – *June 11 and 12* near Cutler, IN – https://bit.ly/3uLnYlg
- Phone registration is available at 812-678-4427.

Do your livestock a favor. Attend a Grazing School!

Seasonal Temperature And Precipitation Expected To Continue For Next Few Weeks

(Beth Hall)

Abnormally dry conditions are continuing to linger across Indiana as temperatures, and therefore evapotranspiration, increase (Figure 1). There have been and will continue to be intermittent storms passing through our area, but ongoing concerns focus on whether the precipitation can keep up with the evaporative demand. Additionally, the state has not fully recovered from the moisture deficits over the last few months. Figure 2 shows the precipitation differences from the 30-year average from just the last 30 days. There are areas with deficits of 1-2-inch as well as places with 1-2-inch surpluses. However, at this time of the year, the evaporative demand across the state can range from 1.0-1.5 inches. This means that to keep conditions stable, the same amount that is evaporating should be falling as precipitation. Any differences between these two factors can quickly lead to undesirable deficits or surpluses.

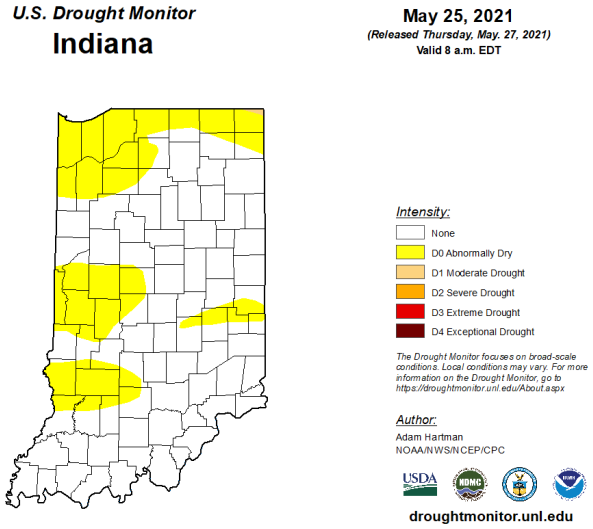

Figure 1. Drought intensity across Indiana from the US Drought Monitor as of May 25, 2021.

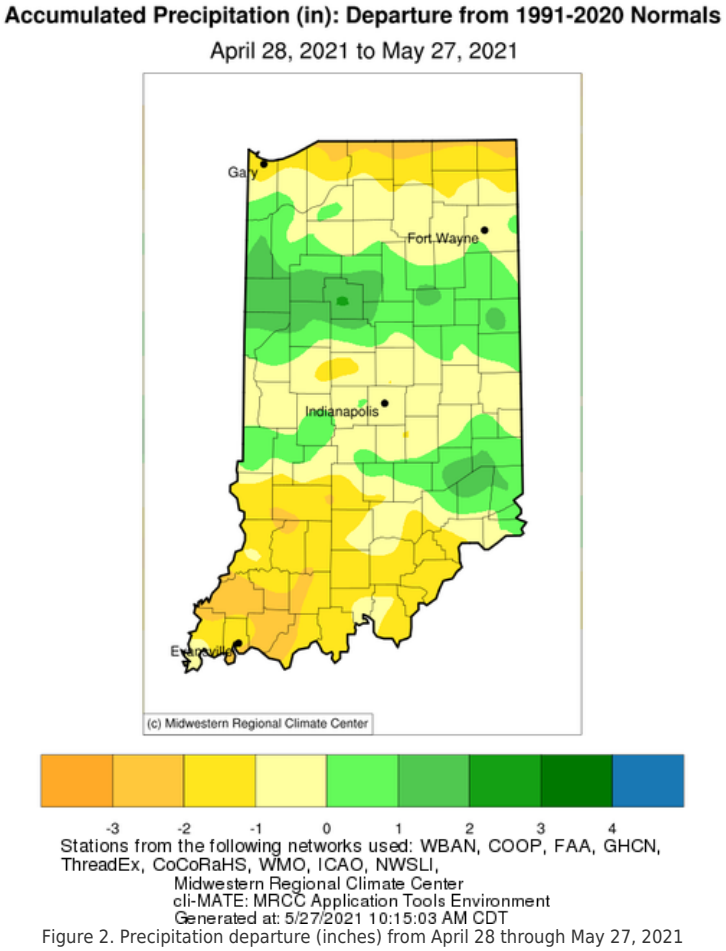

Figure 2. Precipitation departure (inches) from April 28 through May 27, 2021 compared to the 1991-2020 climate normals.

Warmer, muggier temperatures have been experienced the last few weeks. This has allowed modified growing degree days to accumulate at a strong pace (Figure 3). However, earlier cooler periods have caused accumulations this year to be slightly behind the most recent 30-year average. Figure 4 illustrates the MGDD departures for accumulations since April 15th. While southern counties are most behind the 30-year average, these negative departures are occurring across the entire state.

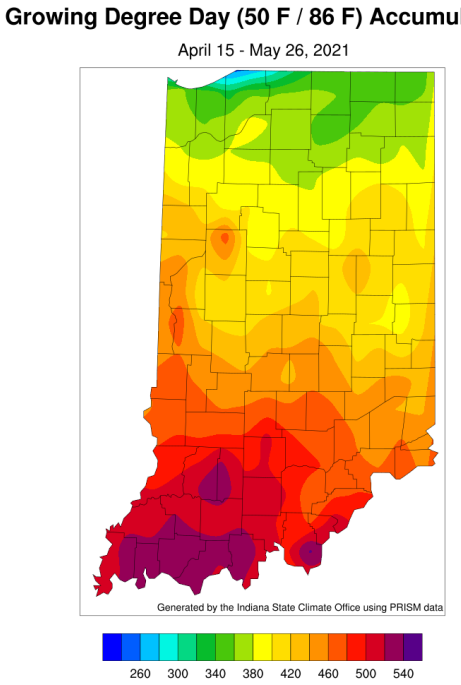

Figure 3. Accumulated modified growing degree days from April 15 through May 26, 2021.

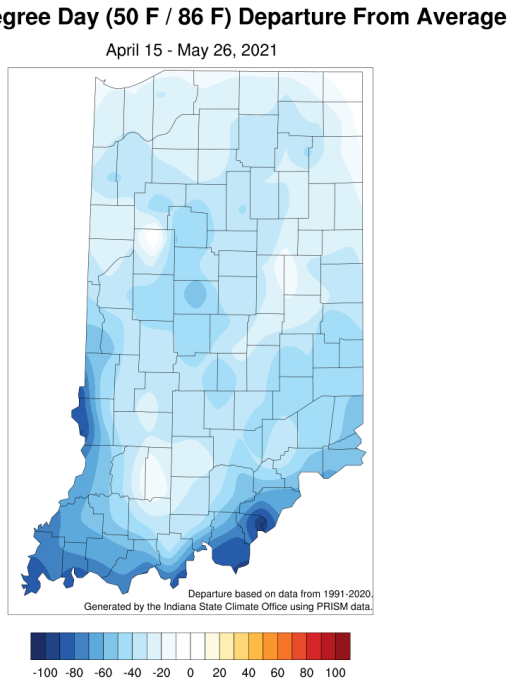

Figure 4. Modified growing degree day departures for the period April 15 – May 26, 2021 compared to the 1991-2020 climatological period.

Over the next two weeks, climate outlooks from the national Climate Prediction Center are favoring normal conditions for both temperature and precipitation. This would suggest seasonal temperatures along with periodic rainfall events. If this outlook holds true, the good news would be that drought conditions should not worsen rapidly. However, without above-normal precipitation in some key areas across the state, drought may intensify due to the longer-term precipitation deficits.

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