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Pest&Crop newsletter

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Seedcorn Maggots Damaging Early-Planted Soybean

(Christian Krupke) & (John Obermeyer)

Multiple samples of seedcorn maggot damaged soybean seedlings have been submitted to the Purdue Plant and Pest Diagnostic Lab. These damaged seedlings survived the recent snow and freezing temperatures, but not this early season soil pest! Remember that the adult female flies are attracted by rotting organic matter, this gives some clue about where infestations will be severe. Seeds planted into high crop residue, weedy growth, and/or where animal manure was applied are most often subject to attack by this pest.

Seedcorn maggot and damage to below ground cotyledons. (*Photo Credit: John Obermeyer*)

Seedcorn maggots are small, yellowish-white maggots up to 1/4 inch long. They are the larval stage of a fly, very similar to a housefly in appearance. Soils planted too wet often have open seed slots, attracting flies to climb down into the furrow and deposit eggs in decaying weeds next to the seed. Soybean and other crops are not the main target of this pest, but they will feed on them if they're available. When the eggs hatch, they burrow into seeds or underground portion of plants and feed. The damage is usually first observed as skips in the row where plants do not emerge, or if they emerge, die back. Seedling blights are usually suspected first by those inspecting the poor stands, but digging around in those blank spots can confirm presence of maggots.

Emerged soybean seedling showing remains of seedcorn maggot damage that occurred below ground. (*Photo Credit: John Obermeyer*)

Seed applied insecticides will offer some protection of the seed. However, as the seed germinates, below ground portions of the plant, e.g., hypocotyl, are more vulnerable. Slow growing plants are more vulnerable as the seedlings are slow to emerge and subject to continual attack by maggots. Cooler soils exacerbate this situation. Should replanting be necessary, seed-applied insecticide is probably not necessary, as the seedcorn maggot will probably have already pupated (light brown, oval cases) and soon to emerge as an adult fly, meaning the damage is done and risk of further infestations is extremely low.

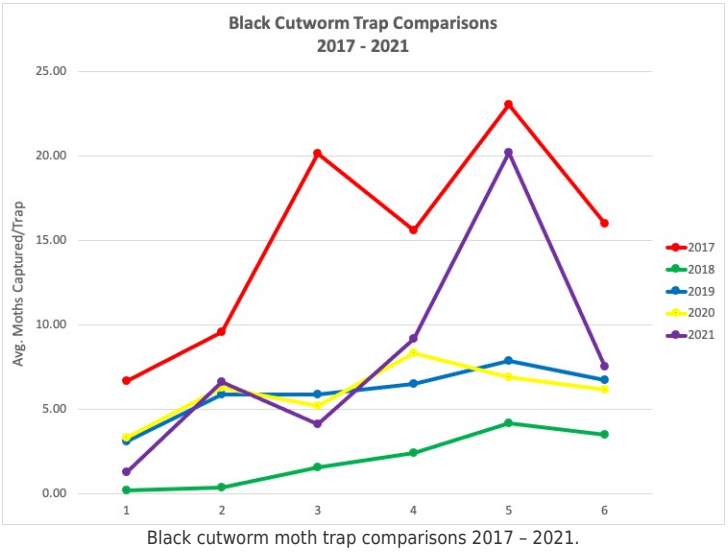
Finding pupa while digging for missing seedlings indicates that the damage has been done. (*Photo Credit: John Obermeyer*)

Black Cutworm Moth Trap Captures Compared

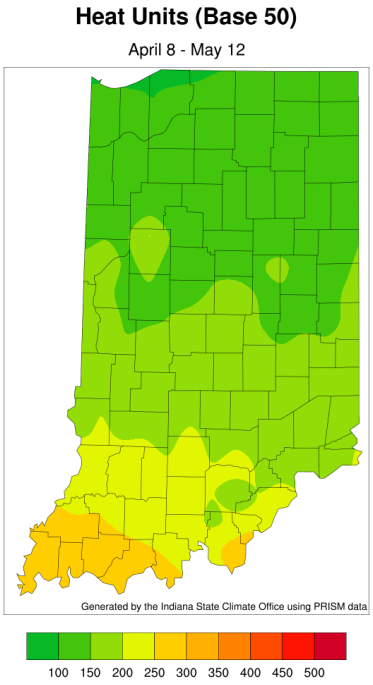
(John Obermeyer)

Every spring, cooperators throughout the state put forth considerable effort in trapping for the arrival and intensity of black cutworm moths. I'm personally indebted to these faithful bug counters, hoping you also appreciate their efforts as reported in the "Black Cutworm Adult Pheromone Trap Report." If you recognize a name or two on this list of reporters, by county, please thank them for their efforts!

This year's trap catches, compared to the previous four looked rather mediocre until the last of April…then quite a surge! Other than the first week of trapping, there have been multiple intensive moth captures over the monitoring period. Presumably, this tells us that the moths were well distributed throughout the state during their arrival. This is one piece of important information, as we now track larval development, and follow-up with scouting in high-risk fields! See the accompanying heat unit map for black cutworm development in your area. 300 accumulated heat units (50°F base), after intensive captures, could indicate black cutworm cutting to plants. Happy scouting!



Black cutworm moth trap comparisons 2017 – 2021.



HU 50 map

2021 Black Cutworm Pheromone Trap Report

(John Obermeyer)

		BCW Trapped					
		Wk 1 4/1/21 -	Wk 2 4/8/21-	Wk 3 4/15/21 -	Wk 4 4/22/21 -	Wk 5 4/29/21 -	Wk 6 5/6/21-
County	**Cooperator**	**4/7/21**	**4/14/21**	**4/21/21**	**4/28/21**	**5/5/21**	**5/12/21**
Adams	Roe/Mercer Landmark	5	15	10*	4	34*	22*
Allen	Anderson/NICK	0	1	0	0	0	1
Allen	Gynn/Southwind Farms	0	0	0	2	14*	4
Allen	Kneubuhler/G&K Concepts	0	0	2	8	20*	2
Bartholomew	Bush/Pioneer Hybrids	0	21*	6	2	11	12
Boone	Emanuel/Boone Co. CES	1	1	3	5	22*	7
Clay	Mace/Ceres Solutions/Brazil	6	7	2	12*	4	4
Clay	Fritz/Ceres Solutions/Clay City	0	3	5	3	7	0
Clinton	Emanuel/Boone Co. CES	1	12	10	6	30*	41*
Dubois	Eck/Dubois Co. CES	0	7	9	3	2	2
Elkhart	Kauffman/Crop Tech	2	0	0	7	31*	6
Fayette	Schelle/Falmouth Farm Supply Inc.	12	23*	29*	24*	46*	36*
Fountain	Mroczkiewicz/Syngenta	2	15*	4	15	28*	10
Hamilton	Campbell/Beck's Hybrids	5	17*	6	17	56*	5
Hancock	Gordon/Koppert Biological Systems				0	4	1
Hendricks	Nicholson/Nicholson Consulting	0	1	3	8	5	33*
Howard	Shanks/Clinton Co. CES	0	0	0	1	4	1
Jasper	Overstreet/Jasper Co. CES	0	0	0	2	2	1
Jasper	Ritter/Dairyland Seeds	0	0	0	1	1	0
Jay	Boyer/Davis PAC	0	29*	14	10	47*	46*
Jay	Liechty/G&K Concepts	2	13	6	21*	21*	5
Jay	Shrack/Ran-Del Agri Services	1	16	1	16*	51*	10
Jennings	Bauerle/SEPAC	0	22*	19	5	24*	14
Knox	Clinkenbeard/Ceres Solutions/Westphalia	0	0	0	3	0	1
Knox	Gretencord/Ceres Solutions/Fritchton	0	5	8	11*	4	3
Kosciusko	Jenkins/Ceres Solutions/Mentone	0	0	0	6	9	4
Lake	Kleine/Rose Acre Farms	3	22*	2	50*	71*	4

		BCW Trapped					
		Wk 1 4/1/21 -	Wk 2 4/8/21- 4/14/2	Wk 3 4/15/21 -	Wk 4 4/22/21 -	Wk 5 4/29/21 -	Wk 6 5/6/21- 5/12/2
County	Cooperator	4/7/21	1	4/21/21	4/28/21	5/5/21	1
Lake	Moyer/Dekalb Hybrids/Shelby	0	7	0	3	10	8
Lake	Moyer/Dekalb Hybrids/Scheider	1	7	2	3	15	4
LaPorte	Deutscher/Helena	0	4				
LaPorte	Rocke/Agri-Mgmt. Solutions	1	2	0	2	23*	4
Marshall	Harrell/Harrell Ag Services	0	0	2	3	27*	0
Miami	Early/Pioneer Hybrids	0	0	2	12	28*	11
Montgomery	Delp/Nicholson Consulting	2	0	4	36*	87*	7
Newton	Moyer/Dekalb Hybrids/Lake Village	1	5	3	2	5	3
Porter	Tragesser/PPAC	0	3	0	4	22	3
Posey	Schmitz/Posey Co. CES	–	2	0	0	2	3
Pulaski	Capouch & Chaffins/M&R Ag Services		4	6	38*	32*	3
Pulaski	Leman/Ceres Solutions/Francesville	3	5	4	16	23*	4
Putnam	Nicholson/Nicholson Consulting	0	7	8	10	11	3
Randolph	Boyer/DPAC	0	2	4	2	8	7
Rush	Schelle/Falmouth Farm Supply Inc.	0	14*	0	1	0	0
Stark	Capouch & Chaffins/M&R Ag Services, NW		0	0	0	1	1
Stark	Capouch & Chaffins/M&R Ag Services, SE		0	0	0	1	1
St. Joseph	Carbiener, Breman	2	2	1	10	30*	1
St. Joseph	Deutscher/Helena Agri-Enterprises	0	3	0	0	0	0
Sullivan	McCullough/Ceres Solutions/Farmersburg	0	0	2	3	4	12*
Tippecanoe	Bower/Ceres Solutions/Lafayette	2	0	0	8	20*	4
Tippecanoe	Nagel/Ceres Solutions/W. Lafayette	4	22*	23*	48*	74*	8
Tippecanoe	Obermeyer/Purdue Entomology/ACRE	1	5	2	13	24*	7
Tippecanoe	Westerfeld/Bayer Research Farm/W. Lafayette	0	3	2	2	11	11
Tipton	Campbell/Beck's Hybrids	4	10	3	9	25*	3
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	0	0	0	0
White	Foley/ConAgra/Brookston	3	3	2	3	1	0
Whitley	Boyer/NEPAC/Schrader	0	6	0	10	12	7
Whitley	Boyer/NEPAC/Kyler	–	–	0	10	16	3

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

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					
Jennings/SEPAC Ag Center	0	1	0	7	7	2					
Knox/SWPAC Ag Center	0	6	1	10	35	1					
LaPorte/Pinney Ag Center	27	50	12	393	189	42					
Lawrence/Feldun Ag Center	14	62	7	434	717	83					
Randolph/Davis Ag Center	0	0	0	0	0	0					
Tippecanoe/Meigs	1	0	0	16	31	12					
Whitley/NEPAC Ag Center	0	0	0	18	20	8					

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

Preemergence Herbicides And Soybean Seedling Injury

(Marcelo Zimmer) & (Bill Johnson)

Favorable weather and soil conditions for planting during the last two weeks of April allowed many growers to get their soybeans planted relatively early this year in many parts of Indiana. However, over the last 10 days, most of the State has experienced colder air temperatures and frequent precipitation, which slowed down soybean planting progress. Approximatly 36% of the State's soybeans were planted by May 10th, which is on par with average. The cold, wet weather that followed soybean planting is not ideal for soybean emergence, and increases the likelihood of herbicide injury, especially for fields treated with PPO-inhibiting herbicides (group 14).

The group 14 class of herbicides create oxygen radicals at toxic levels that destroy the lipids of cell membranes and create the necrotic spotting and burning that most of us recognize as leaf burning and blazing. These herbicides can be applied to soybean plants because of their ability to rapidly metabolize the herbicide and reduce the levels of toxic radicals when soybeans are actively growing. However, under stressful growing conditions, such as cold, wet weather, soybean plants are unable to metabolize these herbicides as quickly leading to injurious levels of oxygen radicals.

Wet soil conditions and frequent rain events following soybean planting are ideal for soybean injury by soil applied group 14 herbicides. The sustained cool, wet, soil conditions that soybean plants emerge in are less than ideal for rapid herbicide metabolism and thus lead to injury to some fields receiving one of these herbicides. Soybean injury may also increase due to heavy rainfall events that splash herbicides on the soil surface onto emerging soybean hypocotyls, cotyledon, and/or leaves depending on the soybean growth stage. Injury symptoms include crinkled leaves, necrosis of the hypocotyl and cotyledons, and necrotic spotting on leaves where the herbicide has been splashed during a rainfall event.

Typically, the risk of injury is higher in sandy and coarse soils and/or soils with low organic matter, although injury may occur in all soil types if extreme weather conditions occur. In the majority of cases, soybean plants are able to grow out of the initial injury and stunting and yield losses should not occur. Only in rare cases of severe injury to the hypocotyl and/or growing point will replanting be required. Fields should be considerd for replanting if significant stand losses occur from the combined herbicide, cold injury, drowning, seedling diseases, or any combination of these four factors that has occured. If you suspect injury from flumioxazin, sulfentrazone, or saflufenacil, or seedling diseases on soybean you can send a sample to Purdue Plant and Pest Diagnostic lab (https://ag.purdue.edu/btny/ppdl/Pages/default.aspx) for further confirmation.

The increased amount of soybean injury may cause some to avoid soil-applied herbicides. We have seen exceptional weed control out of these group 14, PPO-inhibiting herbicides at our marestail, waterhemp, and Palmer amaranth research sites. And what Bill likes to tell growers is "if they cause some visual symptomology to the soybeans, you know they are working on the weeds as well." So users of group 14 herbicides need to weigh their tolerance to temporary injury against quality control of problematic weeds such as Palmer amaranth, common waterhemp, and marestail. In the majority of years these products pose little threat of soybean injury and offer good control of some of our most problematic weeds.

Image 1. The left is a photo of a plot not receiving a preemerge herbicide and on the right a plot receiving a preemerge application containing flumioxazin. Notice the stunting injury of soybeans by the flumioxazin as well as the reduced population of Palmer amaranth that will be much more manageable as compared to the untreated plot.

Image 2. Soybean seedlings exhibiting injury from flumioxazin due to slowed metabolism and herbicide splash on the hypocotyl, cotyledons, and unifoliate leaves.

Control Of “Volunteer” Corn In A Corn Replant Situation

(Marcelo Zimmer) & *(Bill Johnson)*

Due to the recent cold wet weather, corn planted in April has either struggled to emerge or the corn that did emerge may have been injured by frost events or it looks bad because of the cold weather. There are also some fields planted in early May where standing water may result in poor corn stands due to poor water drainage. Therefore, there are a number of fields which may need to be replanted. The purpose of this article is to discuss the options to kill an existing stand of corn in a replant situation.

The first issue to address is what herbicide resistance traits are stacked in the corn you would like to remove from the field. If the corn is non-GMO (no herbicide-resistance traits), your options for control are tillage, glyphosate (e.g. Roundup, others), clethodim (e.g. Select Max, others), paraquat (e.g. Gramoxone, others) + metribuzin (e.g. Tricor, others), or glufosinate (e.g. Liberty, others). The best solution to control non-GMO corn will be to use tillage or glyphosate. Non-GMO corn is very sensitive to glyphosate and no waiting intervals are needed to replant. You can also use glyphosate or tillage to control Liberty Link corn hybrids (as long as the hybrid is not also Roundup Ready). For Roundup Ready corn that doesn’t carry the Liberty Link trait, tillage, Select Max, or paraquat + metribuzin (Gramoxone + Tricor) would be the logical methods for termination. Another option for corn that is not Liberty Link is to replant Liberty Link corn and apply a follow up treatment of Liberty postemergence to control plants that survived the first application. Use of 32 to 34 oz/A of Liberty has been effective for control of small corn (V1 to V3) in our research.

If your corn is NOT non-GMO, then the options are somewhat more complicated. Many popular commercial hybrids are stacked with either Roundup Ready and Liberty Link traits, or both traits. If you have corn stacked with both traits, our experience has been that tillage will be the most reliable method, and would not have the waiting interval associated with Select Max, but tillage is not desirable for those in a long-term no-till situation, or those with cover crops in the field.

Numerous clethodim products, including Select Max, can be used to control the stacked trait corn in a replant situation. The use of Select Max will provide better corn control than Gramoxone + Tricor, but it requires a waiting interval of 6 days after the field is treated with Select Max. The directions on the label indicate that up to 6 fl oz/A can be applied plus 0.25% NIS and 2.5 to 4 lb/A of AMS as the spray additives. Apply to corn that is 12 inches or less. Avoid overlapping the boom as overlaps may result in excessive crop injury. Growers should also be aware that synthetic auxin herbicides such as 2,4-D or dicamba can antagonize the activity of clethodim and other ACCase-inhibiting herbicides and result in reduced control of volunteer corn. Additionally, tank-mixing acetochlor with dicamba applications can accentuate the antagonistic effect of dicamba and reduce clethodim efficacy for “volunteer” corn control even further. Figures 1 and 2 demonstrate the antagonistic effect of dicamba and dicamba + acetochlor on the control of “volunteer” corn with clethodim in an Xtend soybean field. Split applications of auxinic herbicides (2,4-D or dicamba) and clethodim would be the only alternative to prevent herbicide antagonism when using these herbicides, since increasing the rate of clethodim would also extend the preplant interval for corn replant.

Another option to control “volunteer” corn stacked with both the Liberty Link and Roundup Ready traits is to plant Enlist corn and spray Assure II

(quizalofop) at 5-12 fl oz/A (plus 1% v/v of COC or 0.25% v/v of NIS) when the Enlist corn is between the V2-V6 growth stages. Enlist corn is resistant to ACCase-inhibiting herbicides in the aryloxyphenoxypropionate family (FOPs) such as Assure II, which is the only FOP herbicide labeled for POST applications to Enlist corn.

If you want to avoid the waiting interval to plant for clethodim and will not plant Enlist corn, your only herbicide option for termination of stacked trait corn is paraquat + metribuzin. In University research trials, 2-3 pt/A of Gramoxone + 4-6 oz/A of dry metribuzin (e.g. Tricor, others) has been effective for control of small corn (V1 to V3). Application of Gramoxone alone, without the addition of metribuzin, is likely to be less effective. Corn that has advanced past the V3 growth stage will generally be more difficult to control.

Information listed here is based on research and outreach extension programming at Purdue University and elsewhere. The use of trade names is for clarity to readers of this site, it does not imply endorsement of a particular brand nor does exclusion imply non-approval. Always consult the herbicide label for the most current and update precautions and restrictions.

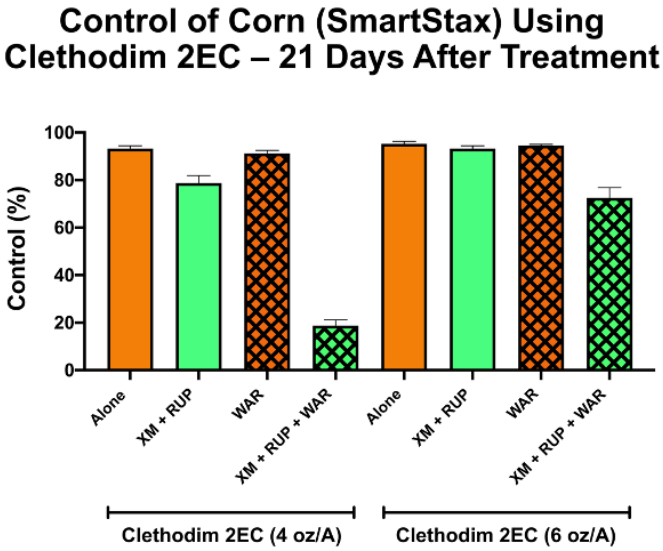


Figure 1. Antagonistic effect of dicamba and acetochlor on corn control with Clethodim 2EC. Abbreviations: XM = XtendiMax (22 oz/A); RUP = RoundUp PowerMax II (32 oz/A); WAR = Warrant (48 oz/A).

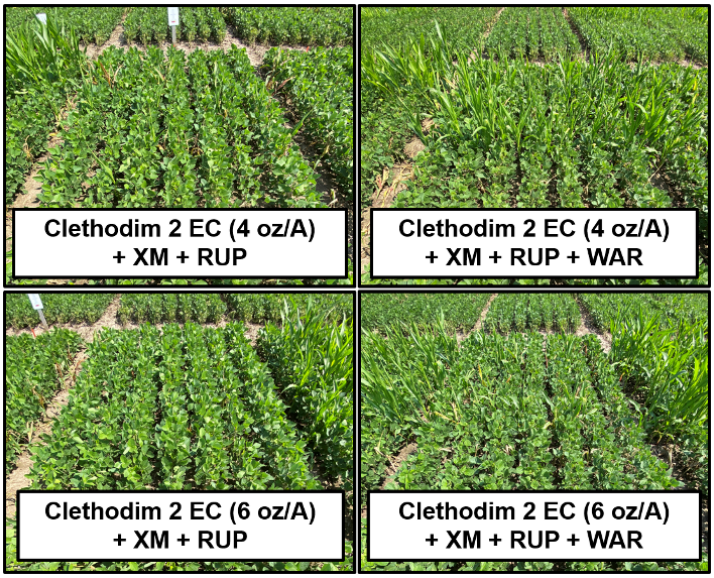


Figure 2. Antagonistic effect of dicamba and dicamba + acetochlor on corn control with Clethodim 2EC. Abbreviations: XM = XtendiMax (22 oz/A); RUP = RoundUp PowerMax II (32 oz/A); WAR = Warrant (48 oz/A).

Close Grazing, Close Mowing And Grazing/Mowing Too Often Makes A Forage Stand Weak

(Keith Johnson)

The 2021 grazing season has recently started and hay harvest is going to begin soon. As the pasture gets grazed and the forage growing in the field is mown, make sure to evaluate grazing and cutting height so perennial plants have better persistence.

A few years ago, I was called out to several pastures being grazed by horses to give recommendations regarding the improvement of the forages in the pastures. These are pastures that I travel by often. On any given day of the year my observations had been that the pastures looked more like a golf course putting green that it did a pasture for livestock. My first recommendation to the owner didn't include soil fertility, weed control or improved forage species. The recommendation I did provide was to reduce the number of horses being grazed or to buy more land. In other words, reduce the stocking rate so overgrazing would be avoided.

Horses grazing a dominant Kentucky bluegrass pasture to a low plant height.

Another common happening is to start a pasture with higher yielding forages like alfalfa, orchardgrass, and red clover and over the course of many years the stand transitions to Kentucky bluegrass, white dutch clover and weeds. Why does this occur? Over grazing reduces the growth and development of the improved forages because meristems, where growth and development begins, find their way to the mouth of the close-grazing livestock and never have a chance to differentiate into leaves and stems. This is especially a concern when pastures are continuously grazed. Preferably, pastures would be broken into paddocks so rotational grazing can occur. Plants within a paddock would preferably be grazed to no less than a 4-inch height and then livestock would move on to the next paddock where more growth exists. This provides necessary rest within the recently grazed paddock so plant vigor is improved. Kentucky bluegrass and white dutch clover meristems are so close to the soil surface that they can avoid being damaged by continuous close grazing. Similarly, a Kentucky bluegrass lawn can be mowed often at a three-inch height without loss of turf quality but the objectives are much different than when grazed by livestock. Kentucky bluegrass may persist better than many other forages when closely grazed, but it is not very drought tolerant and doesn't have the carrying capacity of higher yielding forage options. Likewise, Kentucky bluegrass isn't as productive when continuously closely grazed as compared to being in a properly stocked rotational grazing system.

Close grazing and mowing, as well as a hay harvest interval that is too short, essentially starves the plant. By removing too many leaves too often, photosynthesis can't occur in the time frame needed to keep a plant vigorous. Photosynthesis is the process in the plant factory, specifically located in the chloroplasts, that ultimately results in the transport of sucrose through the phloem, an internal plumbing network, to locations in the plant where energy is needed for respiration, growth or storage.

There have been many reports of orchardgrass decline after harvest of alfalfa-orchardgrass mixtures. Alfalfa meristems within crown buds are located very close to ground level. Alfalfa meristems avoid being harvested with a mower, even if cutting at a 2-inch height.

Alfalfa crown.

Orchardgrass tillers, on the other hand, have elevated stem bases that are the storage organs where carbohydrates are stored and necessary to initiate regrowth. To illustrate the concern over scalping orchardgrass, two orchardgrass plants were clipped at 4 inches or ½ inch on July 6. I came back to monitor regrowth of the same plants on July 9 and 13. As the pictures aptly show below, the scalping of orchardgrass is a deleterious practice as compared to cutting at the 4-inch height.

Two orchardgrass plants unclipped on July 6.

Same plants clipped to 4-inches & 1/2 –inch on July 6.

Same two orchardgrass plants on July 9.

Same two orchardgrass plants on July 13.

As you manage pastures and hay fields, remember to avoid overgrazing and cutting too low so the forage has great persistence for many years.

Grazing Schools Provide An Opportunity For Hands-on And Visual Learning

(Keith Johnson) & *(Brian Wallheimer)*

Livestock producers can get first-hand tips from experts on how to incorporate management-intensive grazing techniques during two-day seminars in June that will run in both northern and southern Indiana.

The Indiana Grazing School "Making A Difference with Improved Grazing Systems" programs will cover topics on best management practices, including: plant growth and development, soil fertility, forage identification, rotational grazing, animal nutrition, paddock and watering system design, fencing and pasture record keeping.

The school will run from 1-6 p.m. on Friday and 8 a.m.-4:30 p.m. on Saturday. Trainings will be held at two locations:

- June 4-5 at the Southern Indiana Purdue Agricultural Center (SIPAC), 11371 East Purdue Farm Road in Dubois.
- June 11-12 at Dave Wagoner Farm, 291 East 700 South in Cutler.

In addition to traditional presentations, the course will include pasture walks and field tours to provide hands-on opportunities, identify forage and weed species, explore fencing and watering options, and demonstrate rotational grazing concepts. There will also be small group discussions with seminar experts and fellow program participants.

Forages not only provide feed for livestock, but nesting habitat for many birds. (*Photo Credit: Susannah Hinds, NRCS Grazing Specialist*)

The fee to attend is $75, which covers management tools, materials, a Saturday meal and refreshments. Additional individuals from the same operation are permitted at a cost of $50, but materials and management tools will not be included.

Preferred online registration is available at the following links: Southern Indiana (SIPAC location) – https://bit.ly/3g8zWRV; or Northern Indiana (Cutler location) – https://bit.ly/3uLnYlg with phone registration available at 812-678-4427. The registration deadline is May 24, and the event will be held rain or shine.

The schools are hosted by the Indiana Forage Council, in partnership with Purdue Extension, the U.S. Department of Agriculture's Natural Resources Conservation Service, and the North Central Sustainable Agriculture Research and Education (SARE) program. Events are partially funded by the Indiana Livestock Promotion Grant from the Indiana State Department of Agriculture.

Soybean Stands: Emergence? Replant?

(Shaun Casteel)

Soybean planting progress was off to a good pace in April with 24% planted by the time we flipped the calendar to May. All of that came to a screeching halt with rains (and snow in some areas) over the past several weeks. As of May 9th, we have 36% planted and 12% emerged. The heavy rains and cold temperatures have raised some concerns with the soybean stand establishment.

Time to Emergence

Obviously, fields that are flooded and are excessively saturated with cold temperatures are the most likely to be replanted. The fields that are characterized as "cool and wet" over the past 2 to 3 weeks may still have hope. We have evaluated planting dates and planting operations for several management scenarios as well as documenting soybean phenology (development). The following information is really to help provide some guidelines to forecast soybean emergence. Heat unit accumulation is used in estimating the development of many crops (emergence to successive leaf development). However, field conditions can alter the precision/reliability of heat units needed for soybean emergence such as planting depth, residue cover (e.g., no till vs. conventional till), rainfall (and really, soil moisture), soil temperature, and soil crusting.

We would anticipate soybean emergence (greater than 50% or VE) with the accumulation of 140 to 160 GDDs (Table 1). Saturated conditions will limit oxygen for plant respiration (i.e., burning energy for growth), and thus, extending the time (calendar days and thermal time) for emergence. If your planted soybean fields are in the "cool and wet" situation and not emerged after 160 GDDs, you should determine the viability/progress of the seedlings in preparation for replanting decisions.

Table 1. Heat unit accumulation recorded for 25%, 50%, 75%, and 90% emergence of soybeans in 2015 and 2016. These values were averaged across seeding rates (50, 90, 130, 170 thousand seeds/acre) and planting speeds (5, 7.5, 10, 12.5 mph).

		Number of GDDs to Emergence			
Planting Date	**Tillage**	**25%**	**50%**	**75%**	**90%**
May 24, 2015	No-Till	125	141	161	192
April 19, 2016	Conventional	131	141	175	208
Average		128	141	168	200

Acceptable Plant Populations

Our normal goal is 100,000 to 120,000 plants per acre to optimize yield. However, we should not be quick to replant or overseed into an existing stand if the field is less than 100,000. Obviously, the distribution of plants at suboptimal stands will factor into the decision to replant. ***Approximately 70,000 plants per acre is the gray area for replanting or overseeding.*** If there are pockets that are much lower than 70,000 plants per acre, those can be filled in by overseeding. Soybeans will self-regulate so there should not be a concern of the "weed effect" from the different stages of development. Established plants will provide the majority of the yield (mainstem and branch pods); whereas, the overseeded plants will primarily provide yield from the mainstem.

Figure 1. Hula hoop method determined stand of 90,000 plants/acre. No replant needed.

Stand assessments need to count emerged soybeans AND the potential seeds or seedlings that may emerge. The below ground factor and weather forecast will play into these decisions. If the missing plants are due to seeds that have rotted below ground or the hypocotyls and cotyledons have snapped off, then the stand is what you have to work with in that field. Whereas, seedlings near the soil surface that need a softening rain could be the reinforcements that is needed for subpar stands.

Replanting/Overseeding

The replanting operation will cause damage to the established plants (nearly 20% stand loss when overseeding with a 30-inch planter at an angle) and you still at the mercy of Mother Nature to have the replanted seed establish plants. ***Young soybean plants (VC stage, cotyledons and unifoliates) are sensing light quality to determine the need for branching out.*** Basically, if a soybean plant has few neighboring plants (little to no shading), branches are initiated to fill the void literally and produce pods on those branches. We simply need to be patient as these plants develop and fill in the gaps. The yield potential of the earlier established plants (albeit low stand) is usually better than the soybeans seeded in the latter half of May and certainly June. Replanting into stands of soybeans that are V2 (two unrolled trifoliates) often become more cosmetic early if the overall stand was above 70,000 plants per acre.

For example, the yield of a stand of 66,000 plants per acre was 50.6 bu per acre. Yet, the same stand of 66,000 plants yielded 51.5 bu per acre when 132,000 seeds per acre were added with a 30-in planter, which was not different (Figure 2). Furthermore if the decision was to start over completely, the yield potential was severely hurt in this trial (~mid 50 bu vs. 38 bu) since that planting operation was well into the growing season. In other words, the replanted field had a much shorter growing season. If a field was to get replanted completely in the middle of May, the yield potential would still be fair to good provided the stand would be established.

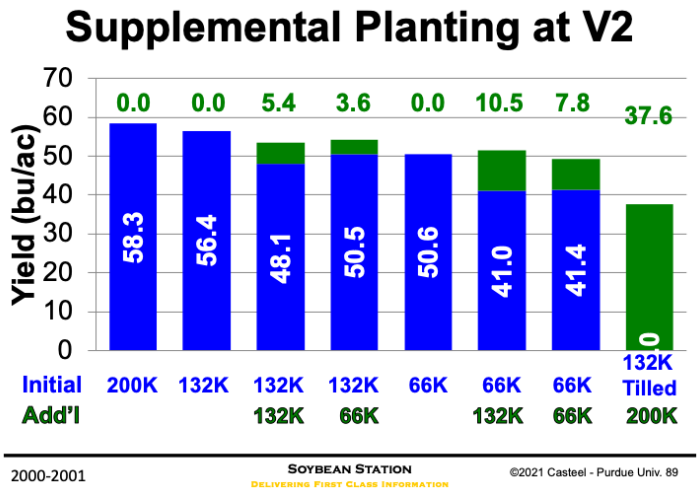


Figure 2. Yield effect of filling in various soybean stands in 7.5-in drilled rows (blue) with 30-in planter (green). (Semmel and Christmas, 2002).

Replanting recommendations will be field specific, but factors to consider are seeding rate, maturity group, planting pattern, and weed control. Variety selection for replanting can be difficult, because we ideally want the whole field to mature at the same time to ease harvest operations. At this point (middle of May), I would not consider changing the maturity group on a replanted field. However, if we are making this decision at the end of May into June then the decision is a little more complex. General rules of thumb include that a 3-week delay in planting is about 1-week delay in maturity. A shift in 1.0 maturity group (MG) unit is approximately 7 to 10 day difference in maturity. Again, these are given as guidelines and not absolutes. Field conditions in August to September can also cause hasten (hot and/or dry) or extend (adequate soil moisture such as those wet pockets that are replanted) the reproductive period, which influence maturity timeline.

Links to Soybean Stand Assessment Videos:

Drilled rows: Hula hoop
https://www.youtube.com/watch?v=CA7teyzb20w

15-in Rows: Linear method
https://www.youtube.com/watch?v=c8oMiqobvE0

Purdue Crop Chat Podcast 18, Heavy Rains Lead To Replant Decisions

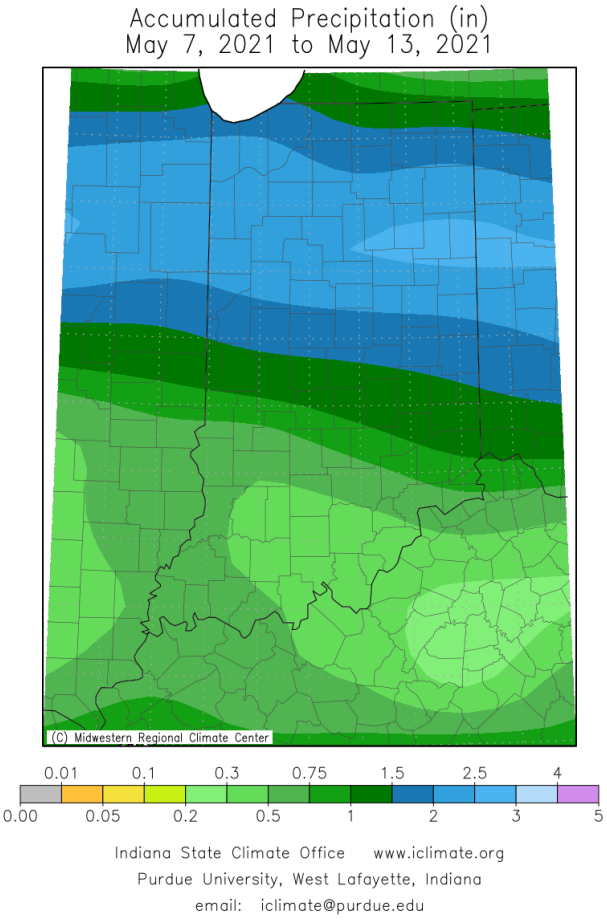
(Bob Nielsen) & *(Shaun Casteel)*

Purdue Extension Corn Specialist Bob Nielsen and Extension Soybean Specialist Shaun Casteel are back with another Purdue Crop Chat! On this episode, they discuss last weekend's heavy rains and the impact it might have on corn and soybeans, when you might start thinking about replant, and how the amount of growing degree days has been lacking to start the season.

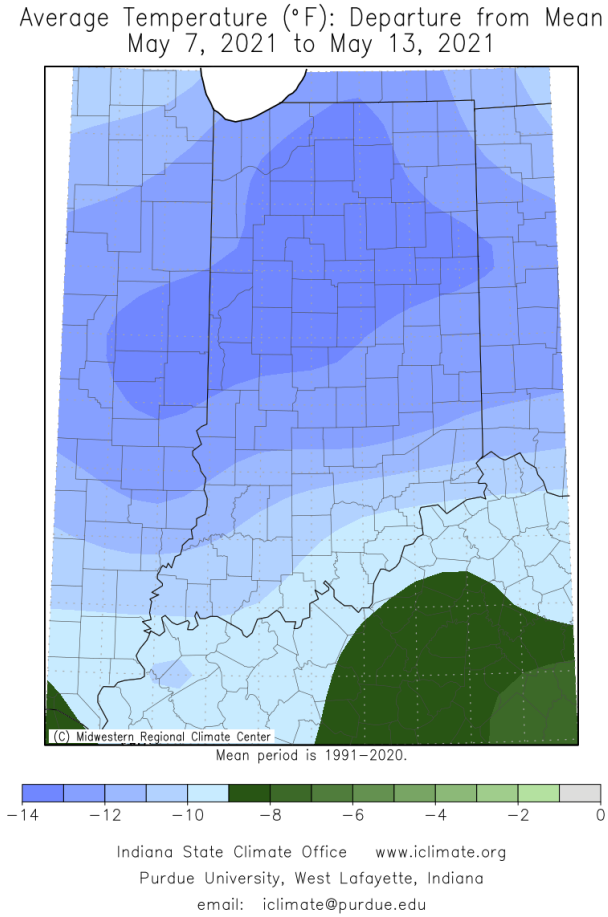
Hear the full podcast now on your preferred podcast platform, and it's available at the Purdue Crop Chat page on ***HoosierAgToday.com***.

Recent Temperatures And Rainfall

(Beth Hall)



Accumulated Precipitation May 7-13, 2021.



Average Temperature Departure from Mean May 7-May 13, 2021.

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