PURDUE UNIVERSITY Extension - Entomology

Pest&Crop newsletter

Issue: 2022.6
April 29, 2022

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

VIDEOS: Black Cutworm Arrival, Risk, and Management Considerations

(Christian Krupke) & *(John Obermeyer)*

When looking over the Black Cutworm Pheromone Trap Captures, you will notice that there have been some very busy traps! Again, we are so grateful to these volunteers throughout the state! They certainly keep us alert to this pest's arrival and densities into the state. However, this is only a part of the story!

Because of this season's late start, black cutworm become a greater threat to corn still to be planted, especially as weed control is continually delayed. The following videos address the many interacting variables that must converge before black cutworm is a significant risk to our corn crop. We hope these videos help make you more aware…happy scouting!

Black Cutworm: Midwest Arrival and Threat to Corn

Black Cutworm 2: High Risk Corn and Management Considerations

2022 Black Cutworm Pheromone Trap Report

(John Obermeyer)

		BCW Trapped					
County	**Cooperator**	**Wk 1 4/1/22 - 4/6/22**	**Wk 2 4/7/22-4/13/22**	**Wk 3 4/14/22 - 4/20/22**	**Wk 4 4/21/22 - 4/27/22**	**Wk 5 4/28/22 - 5/4/22**	**Wk 6 5/5/22-5/11/22**
Adams	Roe/Mercer Landmark/Decatur	7	9	6	48*		
Allen	Anderson/Blue River Organics/Churubusco	0	0	0	0		
Allen	Gynn/Southwind Farms/Ft. Wayne	0	0	1	3		
Allen	Kneubuhler/G&K Concepts/Harlen	9	29*	44*	39*		
Bartholomew	Bush/Pioneer Hybrids/Columbus	2	1	4	4		
Clay	Mace/Ceres Solutions/Brazil	1	1	4	7		
Clay	Fritz/Ceres Solutions/Clay City	0	2	0	0		
Clinton	Emanuel/Frankfort	9	19*	11	23*		
Daviess	Brackney/Daviess Co. CES/Montgomery			0	1		
Dubois	Eck/Dubois Co. CES/Jasper	0	3	38*	14*		
Elkhart	Kauffman/Crop Tech/Millersburg	0	3	6	6		
Fayette	Schelle/Falmouth Farm Supply/Falmouth	7	4	10*	6		
Fountain	Mroczkiewicz/Syngenta/Attica	0	1	1	6		
Hamilton	Campbell/Beck's Hybrids	0	10*	14*	31*		
Hancock	Gordon/Koppert Biologicals/Greenfield	15*	5	9	24*		
Hendricks	Nicholson/Nicholson Consulting/Danville	0	1	46*	328		
Hendricks	Tucker/Bayer/Brownsburg		4		15		
Howard	Shanks/Clinton Co. CES/Kokomo	0	1	2	7		
Jasper	Overstreet/Jasper Co. CES/Rensselaer	1	19*	8	18*		
Jasper	Ritter/Dairyland Seeds/McCoysburg	0	5	3	5		
Jay	Boyer/Davis PAC/Powers	17*	28*	10	54*		
Jay	Shrack/Ran-Del Co-Alliance/Parker City	0	52*	23*	32*		
Jennings	Bauerle/SEPAC/Butlerville	0	16	30*	10		
Knox	Clinkenbeard/Ceres Solutions/Edwardsport	0	0	0	3		
Knox	Edwards/Ceres Solutions/Fritchton	1	0	0	8		
Kosciusko	Jenkins/Ceres Solutions/Mentone	0	2	2	6		
Lake	Kleine/Rose Acre Farms/Cedar Lake	1	13	19*	83*		
Lake	Moyer/Dekalb Hybrids/Shelby	0	0	6	4		
Lake	Moyer/Dekalb Hybrids/Schneider	0	0	3	3		
LaPorte	Deutscher/Helena Agri/Hudson Lake	0	0	0	0		
LaPorte	Rocke/Agri-Mgmt. Solutions/Wanatah	0	22*	12	35*		
Marshall	Harrell/Harrell Ag Services/Plymouth	0	0				
Miami	Early/Pioneer Hybrids/Macy	0	1	3	5		
Montgomery	Delp/Nicholson Consulting/Waynetown	0	0	1			
Newton	Moyer/Dekalb Hybrids/Lake Village	0	0	1	1		
Perry	Lorenz/Lorenz Farms/Rome 1	0	0	0	0		
Perry	Lorenz/Lorenz Farms/Rome 2	0	0	0	0		
Porter	Tragesser/PPAC/Wanatah	0	3	3	16		
Posey	Schmitz/Posey Co. CES/Mt. Blairsville			28*			
Pulaski	Leman/Ceres Solutions/Francesville	0	0	2	7		
Putnam	Nicholson/Nicholson Consulting/Greencastle	1	3	10	19*		
Randolph	Boyer/DPAC/Farmland	3	5	4	11		
Rush	Schelle/Falmouth Farm Supply/Carthage	0	0	1	1		
Scott	Tom Springstun/Scott Co. CES/Scottsburg	0	0	3	1		
Shelby	Fisher/Shelby County Coop/Shelbyville	0	0	0	0		
St. Joseph	Carbiener/Breman	0	0	0			
St. Joseph	Deutscher/Helena/New Carlisle	0	0	0	3		

County	Cooperator	BCW Trapped Wk 1 4/1/22 - 4/6/22	Wk 2 4/7/22-4/13/22	Wk 3 4/14/22 - 4/20/22	Wk 4 4/21/22 - 4/27/22	Wk 5 4/28/22 - 5/4/22	Wk 6 5/5/22-5/11/22
Sullivan	McCullough/Ceres Solutions/Farmersburg	0	1	3	8		
Sullivan	McCullough/Ceres Solutions/Dugger		0	0	0		
Tippecanoe	Bower/Ceres Solutions/Lafayette	4	10	18*	40*		
Tippecanoe	Nagel/Ceres Solutions/W. Lafayette	7	26*	35*	21*		
Tippecanoe	Obermeyer/Purdue Entomology/ACRE	4	4	6	11		
Tippecanoe	Westerfeld/Bayer Research Farm/W. Lafayette	0	0	4	13		
Tipton	Campbell/Beck's Hybrids	1	0	5	6		
Vermillion	Lynch/Ceres Solutions/Clinton	0	0	1	0		
White	Foley/ConAgra/Brookston	0	2		0		
Whitley	Boyer/NEPAC/Schrader	0	9	31*	28*		
Whitley	Boyer/NEPAC/Kyler	0	7	7	14*		

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

Armyworm Pheromone Trap Report – 2022

(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	0	120	21							
Jennings/SEPAC Ag Center	0	0	10	2							
Knox/SWPAC Ag Center	0	5	58	24							
LaPorte/Pinney Ag Center	0	24	11	44							
Lawrence/Feldun Ag Center	4	31	31	163							
Randolph/Davis Ag Center	0	0	0	0							
Tippecanoe/Meigs	0	5	19	70							
Whitley/NEPAC Ag Center	0	0	15	17							

Wk 1 = 4/1/22-4/6/22; Wk 2 = 4/7/22-4/13/22; Wk 3 = 4/14/22-4/20/22; Wk 4 = 4/21/22-4/27/22; Wk 5 = 4/28/22-5/4/22; Wk 6 = 5/5/22-5/11/22; Wk 7 = 5/12/22-5/18/22; Wk 8 = 5/19/22 – 5/25/22; Wk 9 = 5/26/22-6/1/22; Wk 10 = 6/2/22-6/8/22; Wk 11 = 6/9/22-6/15/22

Soil Applied Herbicides And Rainfall For Activation

(Bill Johnson) & *(Marcelo Zimmer)*

Fieldwork has progressed slowly in the past couple of weeks due to frequent rain showers and cool soil temperatures. At this point, there is still uncertainty about how the weather will develop in the next couple of weeks. As we approach May, growers are ready to start planting as soon as conditions allow. Many of these acres will receive soil-applied, residual herbicides for control of germinating weed seedlings. Soil-applied preemergence herbicides require moisture for activation. What this really means is that we want the herbicide to be dissolved in the soil water (aka "solution") and moved down into the upper inch or two of the soil profile, so it can be taken up by the germinating weed seedling roots or shoots. When soil conditions are dry, herbicide molecules will remain closely associated with soil particles and are not able to move into weed seedlings via mass flow processes. As a result, weed control with soil-applied herbicides under dry conditions can be less than desirable.

We are asked quite often how much rainfall it takes to activate a soil-applied, residual herbicide. The answer depends on many factors, which include:

1) How water-soluble the herbicide is;
2) how sensitive the weed specie is to the specific active ingredient;
3) what stage is the weed seedling at when exposed to the herbicide;
4) did the weed seedling receive a high enough dose to overcome any natural herbicide tolerance or metabolism mechanisms;
5) how moist was the soil when the herbicide was applied.

As you can see, the answer to the question "how much moisture is required to activate my herbicide" requires consideration of several factors.

A quick review of several herbicide labels (but not all) shows the following edited comments with regards to precipitation and herbicide activation:

Single-Active Ingredient Products	Precipitation Required for Activation
Metolachlor (Dual)	0.5 inches on coarse soils, 1 inch on fine-textured within 2 days after application
Dimethenamid-P (Outlook)	Nothing about precipitation amounts mentioned.
Acetochlor (Harness/Degree)	0.25 to 0.75 inches within 7 days after application
Pyroxasulfone (Zidua)	0.5 inches before weed emergence
Flumioxazin (Valor)	When adequate moisture is not received after application, weed control may be improved by irrigation with at least 0.25-acre inch of water.
Sulfentrazone (Spartan)	If adequate moisture (0.5 to 1 inch) from rainfall or irrigation is not received within 7 to 10 days after application, a shallow incorporation may be needed to obtain desired weed control.
Atrazine (Aatrex)	Nothing about precipitation amounts mentioned.
Metribuzin (Tricor)	In areas of low rainfall, preemergence applications to dry soils should be followed with light irrigation of 0.25-acre inch of water.
Isoxaflutole (Balance)	Most effective in controlling weeds when adequate rainfall is received within 14 days after application.

Single-Active Ingredient Products	Precipitation Required for Activation
Acuron	Nothing about precipitation amounts mentioned.
Degree Xtra	0.25 to 0.75 inches within 7 days after application
Corvus	Most effective weed control when applied and subsequently moved into the soil by rainfall, sprinkler irrigation or mechanical tillage prior to weed emergence within 14 days after application.
Sonic	The amount of rainfall or irrigation required for activation following application depends on existing soil moisture, organic matter content and soil texture. If adequate moisture (0.5 to 1 inch) is not received within 7 to 10 days after the treatment with Sonic, a shallow cultivation may be needed to obtain desired weed control.
SureStart/TripleFlex	Precipitation or sprinkler irrigation of at least 0.25 inch is required to bring SureStart into contact with germinating seeds.
Verdict	Must be activated by at least 0.5 inch before weed seedling emergence.

As you can see, the answer varies a bit by herbicide product. As a rule of thumb for most soil-applied herbicides, we would like to see about 0.75 to 1 inch of precipitation within the first week. Also, we would like to see approximately 2 inches of precipitation spread out over the first two weeks after the herbicide was applied for optimal herbicide performance.

If 10-14 days have passed without rainfall following a soil residual application and weeds are starting to break, consider the following:

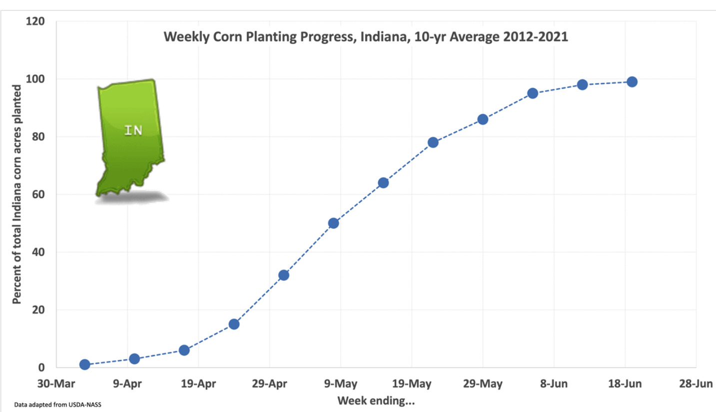
- Start planning for a post herbicide application.
- Use a rotary hoe to dislodge small seedlings and buy some time for a precipitation event to activate the herbicides.
- Some herbicides can "reach back" or "recharge" on small annual weeds when rainfall occurs, although depending on this may be a little like buying a lottery ticket. The HPPD (Group 27) herbicides (Accuron, Balance, Corvus, Lumax, Lexar, Instigate, Prequel, etc.) tend to have better "reach back" potential than some other herbicides, and escaped grass control is probably of greater concern. The Group 5 herbicides (Photosystem II inhibitors) like atrazine, simazine, and metribuzin will also control small emerged susceptible broadleaves via root uptake.

The Planting Date Conundrum For Corn

(Bob Nielsen)

- Early planting favors higher yields, but does not guarantee higher yields.
- Statewide averages for planting progress and yield are not strongly related.
- Planting date is but one of many yield influencing factors.

Conventional wisdom says that the prime planting "window" to maximize corn yields in much of Indiana opens about April 20 and closes about May 10. This "window" typically opens about one week later across the northern tier of Indiana counties (later warmup) and about one week earlier across the southern tier of Indiana counties (earlier warmup). Over the past 10 years, the pace of corn planting has typically accelerated beginning about April 20 and tapers off toward the end of May (accompanying popup image).



Weekly corn planting progress, Indiana, 10-yr Average 2012-2021.

Recent rains across Indiana, although not excessive, have delayed the start of the 2022 corn planting season. As of April 24, the USDA-NASS estimated that only 1% of the state's corn crop acreage was "in the ground" (about 3 weeks behind the 10-year average). Continued rainfall events this past week will keep most planters in the shed and the current short-term forecast for even more rain threatens to further delay planting around the state. The fearmongers and pessimists among us are already worrying about the consequences of a delayed planting season and the risk that imposes on the crop's yield potential in 2022.

But, hold on, let's think about this… How absolute are the negative consequences of late planted corn? How accurately does planting date predict statewide corn yield anyway? Does late planting in and of itself guarantee lower than normal yields? Good questions, but the effect of planting date on statewide average corn yield is simply not clearcut.

Analysis of USDA-NASS crop progress reports over the past 31 years (USDA-NASS, 2022) indicates there is **NOT** a strong relationship between planting date and **absolute** yield or even percent departure from trend yield on a statewide basis for Indiana. Figures 1 and 2 illustrate the relationships between percent departure from statewide trend yield and two measures of statewide planting progress; percent of total corn acres planted by April 30 (Fig. 1) or by May 15 (Fig. 2). Even though mathematical relationships (aka "trend lines") can be discerned, they only account for about 10-11% of the variability in trend yield departures from year to year (that's what the calculated R^2 values shown in the graphs tell us). Such a weak relationship reflects the fact that **a number of other factors, in addition to planting date, also affect yield in any given year.**

SIDENOTE: A recent article from colleagues at the Univ. of Nebraska (Elmore & Rees, 2019) documents the same absence of strong relationship between statewide corn planting progress and departures from trend yield in Nebraska.

Here's the Conundrum

Why is it that every corn agronomist worth their salt preaches about the importance of timely planting and yet the statewide statistical data suggest that planting date accounts for only 10% of the variability in statewide yields from year to year? Let's look more closely at this apparent conundrum.

It is true that **RELATIVE grain yield potential** of corn declines with delayed planting after about May 1 (Irwin, 2022; Licht & Clemens, 2021; Nafziger, 2014, 2017, 2019; Wiebold, 2019). Estimated yield loss per day with delayed planting varies from about 0.3% per day early in May to about 1% per day by the end of May. **RELATIVE grain yield potential** goes down with delayed planting because of a number of factors including a shorter growing season, greater insect & disease pressure, and higher risk of hot, dry conditions during pollination.

However, the good news is that planting date is only one of many yield influencing factors for corn. What is important to understand is that the **ABSOLUTE yield response to delayed planting is relative to the maximum possible yield in a given year**.

In other words, if all the other yield influencing factors work together to determine that the maximum possible yield this year for the optimum planting date is 220 bu/ac, then the consequence of a 10-day planting delay beyond April 30 (at 0.3% decrease per day) would be a yield potential of about 213 bu/ac (i.e., 220 bushel potential minus [10 days x 0.3%] due to delayed planting). However, if all the other yield influencing factors work together to determine that the maximum possible yield this year for the optimum planting date is only 150 bu/ac, then the consequence of a 10-day planting delay beyond May 1 (at 0.3% decrease per day) would be a yield potential of about 146 bu/ac (i.e., 150 bu/ac potential minus [10 days x 0.3%] due to delayed planting). Make sense?

Consequently, it is possible for early-planted corn in one year to yield more than, less than, or equal to later-planted corn in another year depending on the exact combination of yield influencing factors for each year. The accompanying Figure 3 illustrates this confusing concept. In that graph, delayed planting of corn in an otherwise high yielding year (**B**) may still be higher yielding than a crop planted on the optimum planting date in an otherwise lower yielding year (**C**). Farmers know this to be true because many have had June-planted crops in recent years yield better than any crop they have ever had............. because the remainder of the growing season following the delayed planting was extremely favorable for crop growth and development.

For example, the 2009 and 2012 Indiana corn crops represent late and early planting date years, respectively. About 94% of the state's corn crop was planted by May 15 in 2012, but only 20% of the crop was planted by May 15 of 2009 (Fig. 2). Yet, the earlier planted 2012 crop yielded 38.6% **BELOW** trend yield for that year and the later planted 2009 crop yielded 9.5% **ABOVE** trend yield. Why? There were other important differences in yield influencing factors between the years other than simply the planting dates.

Bottom Line

Let's not succumb quite yet to fearmongering triggered by the delayed start of planting the 2022 corn crop. We need only look back to the 2018 planting season for an example of a slow start to the planting season that was followed by a 2-week period in early May in which 60% of the state's corn acreage was planted. "Mudding in" a crop early to avoid planting late will almost always end up being an unwise decision.

When faced with prospects of delayed planting, one should certainly look for ways to expedite the planting process by eliminating unnecessary tillage trips or delaying some field operations (Nielsen, 2019; Thomison & Culman, 2019) so that you do not plant any later than absolutely necessary. One example of a field operation that can be delayed with little risk of yield loss is to forego pre-plant nitrogen fertilizer applications in favor of sidedressing the crop later. This choice is especially low risk if your planting operation includes 2×2 starter fertilizer at rates of 20 lbs/ac of nitrogen or greater.

Finally, since **delayed planting by itself is no guarantee of lower ABSOLUTE grain yield**, I see little reason to change any crop inputs because of delayed planting, other than possibly seeding rates. Significantly delayed planting generally coincides with warmer soil temperatures compared to early planting. Consequently, stand establishment may be more successful with delayed planting, resulting in established plant populations that are closer to actual seeding rates than the usual 90 to 95% success rate with earlier planting dates. So, you might consider slightly reducing your seeding rates if planting is delayed out towards late May or beyond.

Figures

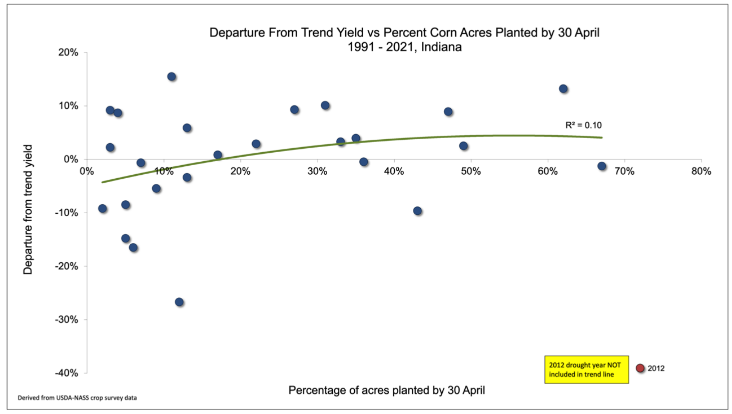


Fig. 1. Percent departure from statewide trend yield versus percent of corn acres planted by April 30 in Indiana, 1991 – 2021. Data derived from USDA-NASS crop survey data.

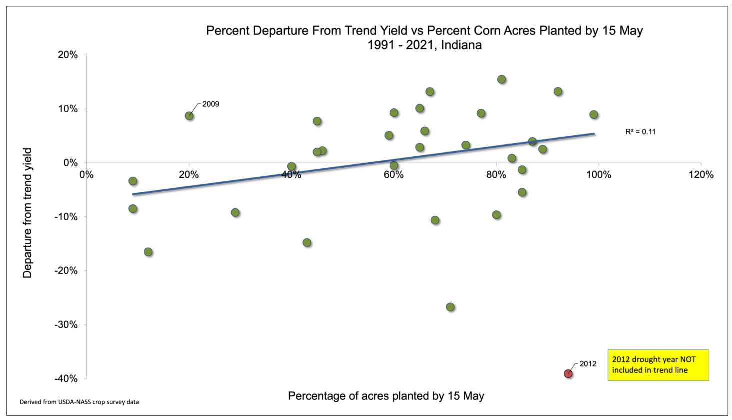


Fig. 2. Percent departure from statewide trend yield versus percent of corn acres planted by May 15 in Indiana, 1991 – 2021. Data derived from USDA-NASS crop survey data.

Fig. 3. The planting date conundrum relative to absolute yield potential: A delayed planted crop in one year (B) can yield better than a crop planted on the optimum date in another year (C).

Related Reading

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Take Time To Self-Evaluate Your Hay Production Management System

(Keith Johnson)

Managing forages for hay production requires much skill. Excellent hay producers understand that yield, quality and persistence are key for a perennial forage production system to be successful.

Making quality hay requires harvesting at the proper maturity and at the correct moisture.

The following table includes several statements that are essential for a successful hay business. Take time to self evaluate how good a job **you** have been doing with each statement given. Rankings “Strongly Disagree” or “Disagree” require some attention to have a topnotch hay production system. As you make plans for the 2022 hay harvest, make improvements where the ranking hasn’t made a “Strongly Agree” or “Agree” ranking.

If you have not developed a team of resource people that can help you with your questions about forage management, a good starting point is to contact your county’s Purdue Extension Agriculture and Natural Resources Educator and Natural Resources Conservation Service personnel. These individuals have a network within their own organizations and know local-regional agribusinesses and producers that will be able to help you with your questions.

Developing excellent hay management skills require much effort, but improving your knowledge and using it will improve profitability.

Hay Management Considerations – What are you doing right; what can be done better?

Statement	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
I soil test at least every third year and apply lime and fertilize based on the test results.					
I can produce hay profitably “on paper” with reasonable assumptions about yield, quality and input costs.					
I scout my fields for the presence of weeds, insects and diseases.					
I know the proper moisture levels to ted, rake and bale hay to retain top quality.					

Statement	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I utilize available technologies to reduce the amount of rain-damaged hay.					
I really try to harvest first cutting hay before the grass begins pollination.					
I protect high quality hay from weather damage.					
I have a marketing plan to sell hay.					
I harvest perennial forages for the last time six weeks before a killing freeze occurs.					
I use forage testing to determine what hay should be fed to different livestock types and how it is best supplemented.					

Indiana Farmer Participation Needed For Multi-State On-Farm Research Survey

(Dan Quinn)

In a collaborative effort with Kansas State University, The University of Nebraska-Lincoln, and The Ohio State University, Purdue University is looking for Indiana farmers to participate in a multi-state survey that examines farmer's views and approaches to on-farm research. In addition, this survey will also assess farmer motivation to participate in on-farm research and the importance of on-farm research to his/her operation.

Assessing farmer views and perceptions toward on-farm research is essential for improving and promoting field-scale research in the future. In addition, the information provided will help improve university extension and farmer engagement efforts moving forward. The short survey provided in the link below only takes 5-10 minutes to complete and your response are completely voluntary and anonymous. The survey needs to be **completed by May 23rd**. Your participation and responses are greatly appreciated.

Link to access the survey:
https://kstate.qualtrics.com/jfe/form/SV_71iwM5FE0zhSW10

For further questions please contact:

Dan Quinn, djquinn@purdue.edu, 765-494-5314

Participating members:

Carlos Pires, Ignacio Ciampitti, Charles Rice (Kansas State)
Fernanda Krupek, Gabriela Carmona (Nebraska-Lincoln)
Osler Ortez (Ohio State)
Dan Quinn (Purdue)

Economic Optimal Seed Rates Of Soybean

(Shaun Casteel) & (Richard Smith)

Soybean seed rate selection is based on a number of factors such as germination score, seed quality, variety, seed protection, planting equipment, and field conditions. Germination score of 90% is fairly standard, though I have seen a few seed lots below that mark and even some that have been pulled and replaced this season. Please be sure to check your seed tags!

Varieties have different growth habits and many companies suggest various seed rates based on vigorous or rank growth habit, shorter heights, less branches, etc. Other seed rate changes can be recommended based on a variety's disease protection or the lack thereof when a dense canopy of soybean plants can be prone to infection (e.g., white mold, Septoria brown spot, frogeye leaf spot). Another related factor depends on seed treatments used to protect soybean from seedling diseases like Pythium and/or Phytophthora. Seed rates can often be reduced with fungicide seed treatment is used that can protect young developing seedling rather than sacrificing seed and seedlings by planting more seeds. Insecticide seed treatment rarely provides return within Indiana, so a ~$10 to 15 seed treatment savings is possible.

The remaining factors of planting equipment and field conditions create sources of variation in seed rate recommendations. ***My standing AGRONOMIC recommendation has been to target 100 to 120 thousand PLANTS per acre regardless of row width, planting equipment, and field conditions.*** Target plant population will not change, but the seed rate will change primarily due to planting equipment. Higher seed rates with drills vs. planters. Seed rates should often be increased in tougher field conditions (e.g., cool and wet).

We have been conducting field-scale seed rate trials across Indiana since 2010 with drills and planters (a couple air-seeders in the mix) in no-till and tilled field conditions. Planting dates have ranged based on the growing season. We started evaluating two varieties in many of the fields since 2015 based on growth habit ("slender" vs. "bushy"), yield potential, and maturity (full vs. slightly shorter season). We have been able to use 58 of these trials from 2010 to 2021 to divide the data sets in multiple ways. Today, I will discuss the recommendations based on planting equipment and economics. Yes, economics.

Planting Equipment. The overall story has not changed. The drill still needs more seeds to attain the same plant stand compared to a 15-in planter. The agronomic optimal seed rate for the 15-in planter was just under 143,000 seeds/acre (90% germination); whereas, the drill (7.5-in and 15-in rows) was 173,000 seeds/acre (90% germination). Agronomic optimal plant stands were both ~100,000 plants/acre early in the season.

Economic Optimal Seed Rates. We really wanted to factor in seed costs and market price considering price range and volatility over the last 6 months. We used the agronomic yield response curves to create economic optimal seed rates (EOSR) based on a range of seed costs and market prices when using a planter vs. drill (Tables 1 and 2).

For instance, the **EOSR for 15-in planter** with seed costs of $60 per 140K unit and market price of $16 is 133,618 seed/acre. If your seed costs went up to $80 per 140K unit, then your EOSR decreases ~3000 seeds/acre to 130,693 seeds/acre (Table 1). Please note plant stands will be lower (obvious, but true). Our trials averaged ~70% establishment rate for planters, which includes the 90% germination score and emergence potential across the field conditions. Therefore, the last EOSR of 130,693 seeds/acre would have a stand near 91,500 plants/acre.

Table 1. Economic Optimal Seed Rates for PLANTER (15-in row) assuming 90% germination.

PLANTER (15-in)	Market Price ($/bu)				
Seed Cost ($/140K)	$10	$12	$14	$16	$18
$40	133,033	134,593	135,707	136,542	137,192
$50	130,693	132,643	134,036	135,080	135,892
$60	128,354	130,693	132,364	133,618	134,593
$70	126,014	128,744	130,693	132,156	133,293
$80	123,674	126,794	129,022	130,693	131,993
Δ per $10	(2,340)	(1,950)	(1,671)	(1,462)	(1,300)

- Agronomic optimal seed rate for planter (15-in)→ 142,766 seeds per acre
- Early plant stand for planter (15-in) → 100,930 plants per acre

As a point of comparison and adjustment based on planting equipment, the **EOSR for drill** with seed costs of $60 per 140K unit and market price of $16 is 159,237 seed/acre. If your seed costs went up to $80 per 140K unit, then your EOSR would decrease~4600 seeds/acre to 154,636 seeds/acre (Table 2). Our trials averaged ~57% establishment rate for drills, which includes the 90% germination score and emergence potential across the field conditions. Therefore, the last EOSR of 154,636 seeds/acre would have a stand near 88,150 plants/acre.

Table 2. Economic Optimal Seed Rates for DRILL (7.5- and 15-in rows) assuming 90% germination.

DRILL (7.5 and 15 in)	Market Price ($/bu)				
Seed Cost ($/140K)	$10	$12	$14	$16	$18
$40	158,317	160,770	162,523	163,837	164,859
$50	154,636	157,703	159,894	161,537	162,815
$60	150,956	154,636	157,265	159,237	160,770
$70	147,276	151,569	154,636	156,936	158,725
$80	143,595	148,502	152,007	154,636	156,681
Δ per $10	(3,680)	(3,067)	(2,629)	(2,300)	(2,045)

- Agronomic optimal seed rate for drill (7.5 and 15 in) → 173,190 seeds per acre
- Early plant stand for drill (7.5 and 15 in) → 98,723 plants per acre

All of the EOSR will be below the agronomic optimal seed rate since we are looking to optimize profits (i.e., balance of input costs, market price, and yield production). The EOSR will decrease as seed costs increase; whereas, the EOSR will increase as your market price increases.

Please use these tables to adjust your seed rates based on planting equipment, seed costs, and market price. You may need to increase your seed rates if your germination scores are below 90%, field conditions are cool and wet, heavy residue, or seed is not treated with fungicide.

Lots Of Wet Days, Not A Lot Of Rain

(Beth Hall)

It seems to be a big challenge these days to find two or more consecutive days without precipitation. What is interesting is the precipitation isn't always coming in great amounts, but enough to impact any outdoor plans. For example, will it be dry enough for enough days to justify dragging out all those patio cushions? When would be a good time to apply patio sealer if the label recommends 48 hours of dry conditions? Will be ground be dry enough this weekend to plan an outdoor social activity? While it seems it has been raining most every day, Indiana is starting to show signs of a precipitation deficit. Figure 1 shows the amount of precipitation received over the past 30 days represented as the percentage of the 30-year normal amount for that same period. Ignoring that green bullseye in Jackson County (likely an erroneous data value), most of the state has received less than the average amount. Eastern and central Indiana counties have only received 50% to 75% of the normal amount of precipitation. Interestingly, we are not seeing serious impacts yet from abnormally dry our even drought conditions primarily due to the cooler temperatures. Lower temperatures reduce the rate of evapotranspiration so what precipitation has fallen has been keep soil moisture levels near normal as well as surface streams and ground water supplies. However, as temperatures increase and vegetation begins to flourish, conditions may change so be aware and prepare in advance for potential moisture stress.

Average temperatures over the past 30 days have been around 2 degrees below normal, causing accumulated growing degree days to lag behind the climatological average for this time of year. Figures 2 and 3 show accumulations since April 1st along with the departure from the climatological departure. The 8-14-day outlooks (for May 5-11, 2022) are favoring cooler-than-normal temperatures with near-normal precipitation amounts. The climatological normal amount of precipitation for this period ranges from 0.75-1.5 inches with maximum daily temperatures ranging between 70°F to 80°F.

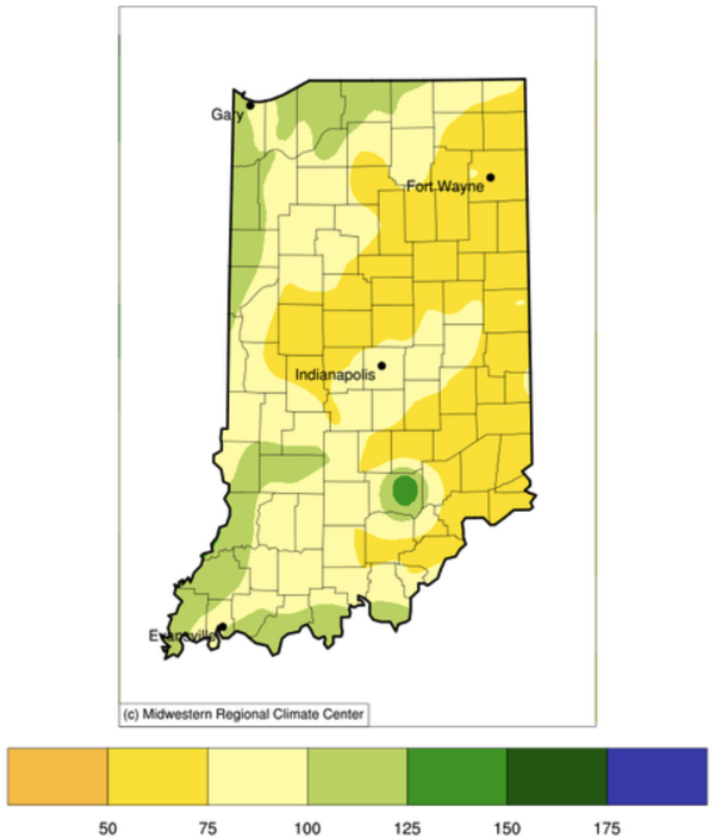

Figure 1. Total precipitation from May 30, 2022 through April 28, 2022 represented as a percentage of the 1991-2020 climate normal amount for the same period.

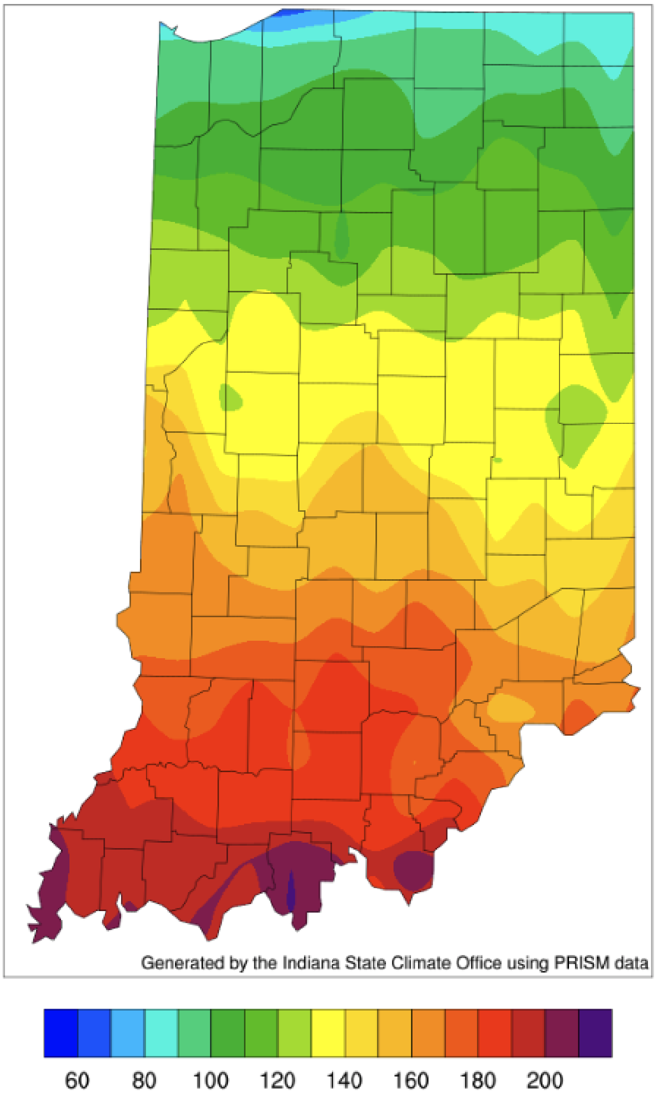

Figure 2. Modified growing degree day (50°F / 86°F) accumulation from April 1-27, 2022.

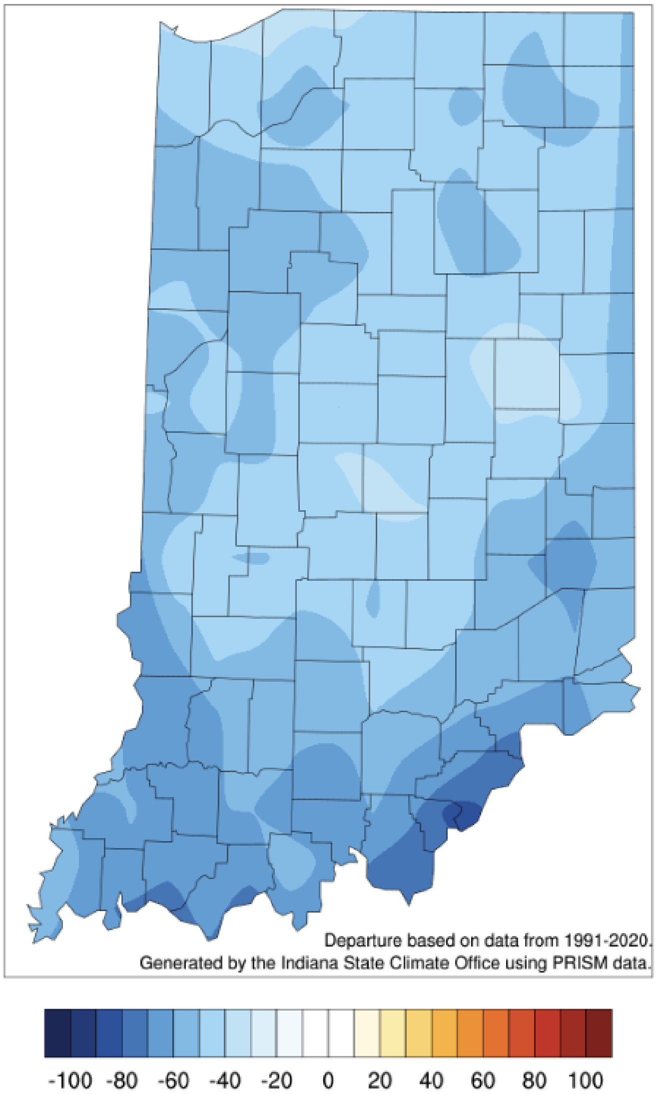

Figure 3. Modified growing degree day (50°F / 86°F) accumulation from April 1-27, 2022, represented as the departure from the 1991-2020 climatological average.

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Editor: Tammy Luck | Department of Entomology, Purdue University, 901 W. State St., West Lafayette, IN 47907