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Pest & Crop Newsletter

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PURDUE UNIVERSITY | Extension - Entomology

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In This Issue

Armyworm Pheromone Trap Report – 2024

(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	8	41	101	81	18	5				
Jennings/SEPAC Ag Center	1	8	58	137	60	18	4				
Knox/SWPAC Ag Center	0	0	41	31	13	8	11				
LaPorte/Pinney Ag Center	0	44	51	65	33	14	35				
Lawrence/Feldun Ag Center	4	125	248	103	69	86	46				
Randolph/DPAC Ag Center	0	0	25	90	84	0	0				
Tippecanoe/ACRE	0	4	37	27	68	30	8				
Whitley/NEPAC Ag Center	0	0	62	179	381	507	76				

Wk 1 = 4/1-4/3/24; Wk 2 = 4/4-4/10/24; Wk 3 = 4/11-4/17/24; Wk 4 = 4/18-4/24/24; Wk 5 = 4/25-5/1/24; Wk 6 = 5/2-5/8/24; Wk 7 = 5/9-5/15/24; Wk 8 = 5/16-5/22/24; Wk 9 = 5/23-5/29/24; Wk 10 = 5/30-6/5/24; Wk 11 = 6/6-6/12/24

Evaluation Of New Technology For Foliar Disease Management In Indiana Soybean And Corn

(Darcy Telenko)

Aerial drone application technology has recently become available and may address limitations by providing greater agility to monitor and apply under conditions where obstacles and poor field conditions limit current pesticide application equipment. As aerial drones are more readily available, there is a great opportunity to develop research-based best practices and training for this new technology. In addition, changes in climate continue to affect the survival, distribution and aggressiveness of soybean pathogens. The goal of this research is to determine the feasibility of fungicide application via drones as sustainable disease management tool.

Check out a summary from our 2023 trials here

DJI T30 UAS with the payload capacity of 7.9 gallons. Photo Credit: M. Mizuno, Purdue University.

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 agronomic 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). For mostly weather-related reasons, actual corn planting throughout Indiana historically stretches from late April to late May or early June. In fact, over the past 20 years, half of Indiana's corn crop on average has been planted after mid-May (Fig. 1).

The 2024 corn planting season in Indiana to date has been slower than hoped for due to frequent rainfall and wet soils. For the week ending May 12th, USDA-NASS (2024) estimated that 36% of Indiana's corn crop had been planted. Considering the running 20-year average for this date is 46% planted, some are concerned that yield potential will begin to decrease significantly.

When analyzing statewide yield data relative to statewide planting progress, defining "late planting" can be a challenge. Since half of Indiana's corn crop, on average, is typically planted after May 15th (Fig. 1), I arbitrarily selected that date as a reference point to characterize "early" and "late" planting seasons. Years where a higher percentage of corn was planted after mid-May are considered "late planting" seasons and years where a lower percentage of corn was planted after May 15th are considered "early planting" seasons.

Then, I evaluated the relationship between percent departure from trend yield and percent of corn acres planted AFTER May 15th for Indiana over the past 30 years. Low yielding years are represented by negative departures from trend and higher yielding years are represented by positive departures from trend.

The data show there is indeed a "tendency" for lower yields statewide as more and more acres are planted after May 15th, i.e., a negative linear regression (Fig. 2). However, notice the negative relationship is not perfect. There were three late-planted years where 76 to 89% of the state's corn crop was planted AFTER May 15th but statewide average yields ended up 4.5 to 8% ABOVE trend (2009, 2013, 2022). There were also two earlier-planted years where only 31 to 38% of the crop was planted AFTER May 15th but statewide average yields ended up 6 to 10% BELOW trend (1997, 1999).

In fact, the planting date "effect" only describes about 13% of the overall year to year variability in yield over the past 30 years (calculated R^2 value = 0.13). Elmore & Rees (2019) documented the same absence of a strong relationship between statewide corn planting progress and departures from trend yield in Nebraska. 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: Scott Irwin, Univ. Illinois Ag Economist, has published several articles wherein he discussed the impact of late planting from the perspective of the U.S. corn crop (Irwin; 2022, 2023, 2024). In his multivariate regression analysis involving yield and weather data collected from 10 major corn producing states, he defined May 20th as the planting date after which substantial yield losses occur for corn, based on agronomic planting date trials. His analyses concluded that "late planting" was the third most important weather-related variable influencing average U.S. corn yields, behind July rainfall and temperature. Remember, however, the effects of summer rainfall and temperature on the corn crop are not independent of planting date because crop growth stage influences the effects of extreme weather.

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 13% 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 (Lauer, 2022; Licht & Clemens, 2021; Nafziger, 2014, 2017, 2019; Wiebold, 2022). Estimated yield loss per day with delayed planting varies from about 0.3% per day early in May to about 1% per day beginning about May 15. **RELATIVE grain yield potential** decreases 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, 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 depends on the yield potential for any given year**.

In other words, if all the other yield influencing factors work together to determine that the maximum possible yield this year for an optimum planting date was 190 bu/ac, then the consequence of a 30-day planting delay beyond May 1 might be a yield potential of about 154 bu/ac. However, if all the other yield influencing factors work together to determine that the maximum possible yield this year for an optimum planting date was 240 bu/ac, then the consequence of a 30-day planting delay beyond May 1 might be a yield potential of about 194 bu/ac (i.e., higher yield than the maximum yield potential in a challenging year). 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 the confusing concept of the previous paragraph. In that graph, delayed planting of corn in an otherwise high yielding year (**A**) may still be higher yielding than an earlier planted crop in an otherwise lower yielding year (**B**). 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.

Another 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 as of May 15 in 2012, but only 20% of the crop was planted as of May 15 of 2009. 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 planting progress of 2024. 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.

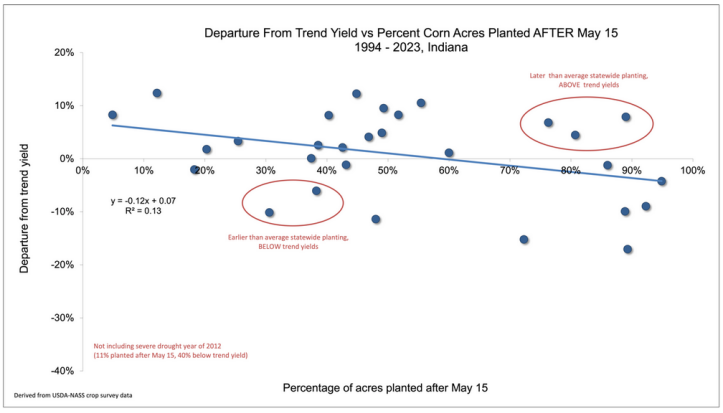

Fig. 1. Average weekly Corn Planting Progress in Indiana for the past 20 years. Data derived from USDA-NASS crop survey data.

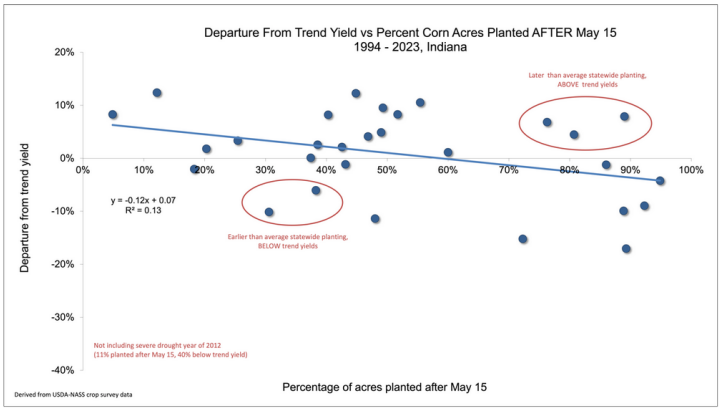

Fig. 2. Percent departure from statewide trend yield versus percent of corn acres planted AFTER May 15 in Indiana, 1994 – 2023. Data derived from USDA-NASS crop survey data.

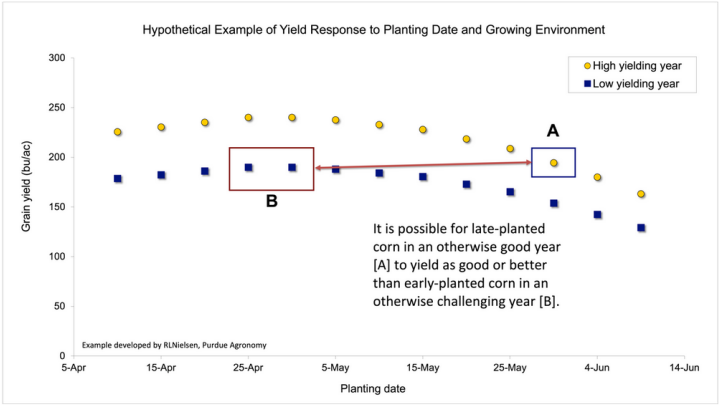

Fig. 3. The planting date conundrum relative to absolute yield potential: A late planted crop in an otherwise good crop year (A) can yield better than an early planted crop planted in an otherwise challenging crop year (B).

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Is Your Hay Too Hot?

(Keith Johnson)

It is that time of year when much cool-season grass and legume hay is being made in Indiana. Remember 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 and possible mycotoxins, 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, Former Purdue ANR Educator-Sullivan County*)

It is quite normal for a temperature rise to occur after hay is packaged, but anything greater than 125 degrees F should be 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 the hay was smoldering.
(*Photo Credit: Keith Johnson*)

Temperature and moisture 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 in storage 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.

Critical temperature and action steps for hay in storage.	
125°F Or Lower	**Action Steps**
125°F	**No action needed.**
150°F	**Entering the danger zone.** Check temperature twice daily. If possible, disassemble stacked hay to allow more 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.
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"!

Warm Temperatures And Rain Continues

(Austin Pearson)

Allergy season is in full swing. At least, it is for me. Runny nose, itchy eyes, and consistent drainage that I have to clear in the shower every morning. We love spring, right?? That's enough complaining for now.

Indiana's April 2024 average temperature was 55.1°F (3°F above normal), which was good enough for 14th warmest on record since 1895. April ended with the 5th most precipitation on record for Aprils dating back to 1895 with 6.63 inches of precipitation. This was 2.24 inches above normal or 151 percent of normal. The wettest Indiana April on record occurred in 2011 when the state observed 9.61 inches of precipitation. This April's rain helped chew away at precipitation deficits, but led to limited planting windows across the state.

Shifting attention to the last 30 days (April 16-May 14), temperatures have run 2-6°F above the 1991-2020 climatological normal. In fact, Indiana's statewide average temperature was 61.1°F, 4.4°F above normal for this period (Figure 1). The Evansville Regional Airport observed the highest average temperature in the state (66.4°F), which was 4.3°F above normal for the period. As a result of the above-normal temperatures, growing degree days (GDDs) continued to run ahead of schedule (Figure 2). Statewide, GDDs have accumulated between 240 and 640 units, which was 50 to 150 GDDs above normal.

Climate Division Data by State between Two Dates
From Midwestern Regional Climate Center

Indiana
4/16/2024 to 5/14/2024

	Temperature			Precipitation			
cd	temp	norm	dev	prcp	norm	dev	percent
1	58.4	55.1	3.3	4.76	3.35	1.42	142
2	58.2	54.6	3.6	4.35	3.16	1.19	137
3	57.9	54.2	3.8	4.32	2.98	1.34	145
4	61.0	56.9	4.1	3.81	3.78	0.03	101
5	60.8	56.2	4.6	3.29	3.79	-0.50	87
6	60.3	55.3	5.0	2.84	3.60	-0.76	79
7	64.9	59.7	5.2	5.18	4.62	0.55	112
8	64.4	59.0	5.4	4.70	4.53	0.17	104
9	62.9	58.0	4.9	4.32	4.25	0.07	102
State	61.1	56.6	4.4	4.20	3.81	0.39	110

Midwestern Regional Climate Center
MRCC Applied Climate System
Generated at:
Wed May 15 10:46:24 EDT 2024

Figure 1: Temperature and precipitation data for April 16 to May 14, 2024 for Indiana and representative climate divisions (cd). Temperatures are represented as average mean temperature (temp), 1991-2020 normal mean temperature, and mean temperature deviation from normal (dev). Precipitation is represented as the average observed total, 1991-2020 normal precipitation, precipitation deviation from normal, and precipitation represented as the percent of the 1991-2020 climatological normal.

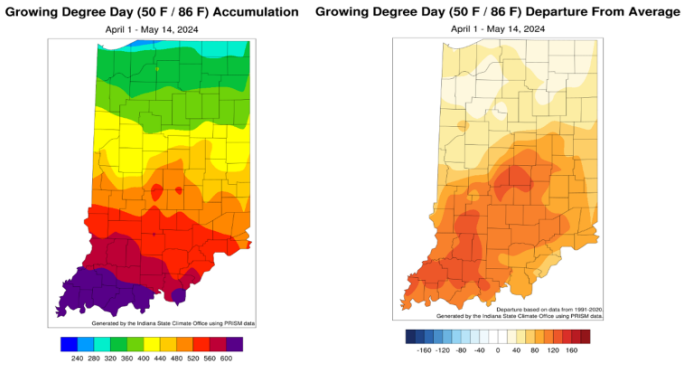

Figure 2: (Left) GDD accumulations from April 1-May 14, 2024. (Right) GDD accumulations from April 1-May 14, 2024, represented as the departure from the climatological average

Precipitation totals over this period ranged from 1.82 inches in New Castle (Henry County) to 10.18 inches at the Evansville Regional Airport (Vanderburgh County). From April 16 to May 14, the Evansville Regional Airport recorded at least a trace of precipitation on 16 days and averaged roughly 0.35 inches per day. The April 14th precipitation observation yielded 3.42" of rain. Despite the limited planting windows, corn and soybeans planted progress tracked with the five-year average.

As of April 12, 36 percent of corn and 34 percent of soybeans have been planted. Today's equipment and technology allows farmers to plant crops faster than ever!

Through May 22, the heaviest rain totals (up to 2.5") are expected in southern Indiana, whereas northern Indiana could see up to an inch of rain (Figure 3). The Climate Prediction Center expects above-normal temperatures and precipitation from May 20-24, with near-normal temperatures returning toward the end of the month. Elevated chances of above-normal temperatures continue through the end of the month.

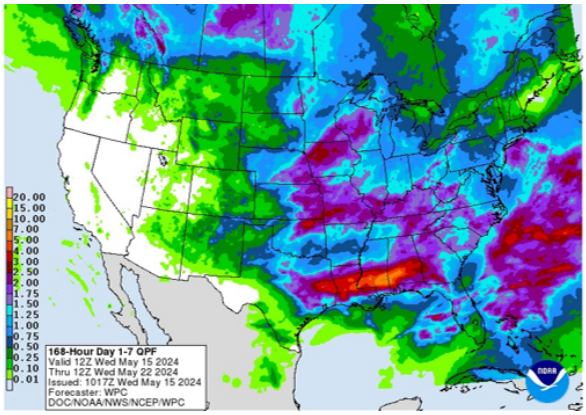

Figure 3: Weather Prediction Center's Day 1-7 Quantitative Precipitation Forecast valid from May 15 to May 22, 2024.

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