In This Issue

Should Insecticide Be Included With Burn-Down Herbicides This Spring?

(John Obermeyer)

Moth flights for both black cutworm and armyworm have been impressive this spring. Unworked/untreated fields are plentiful, and so is the plant life, meaning that there has been no shortage of egg-laying opportunities for these pests. Once soils dry, there will be no luxury of time to prevent a green-bridge, that is to starve the small larvae before they switch from feeding on the dying weeds/cover crops to the emerging crop. So, should one be tempted to be proactive and add some "cheap" insecticide in with the burn-down herbicides. A few factors to consider:

First, seed-applied insecticides and many varieties of Bt-traited corn offer some suppression of black cutworm. The systemic activity of the seed-applied insecticide, and/or the protein production of the Bt-corn are optimal when the corn seedling is actively growing, not so much when corn is stressed. Their performance against larger larvae, >0.5", is greatly reduced, meaning the later we plant, the larger the pests will be. Though these technologies have weaknesses, in a worst-case scenario, they should allow time to follow-up with scouting trips to determine the extent of damage and rescue treatments if necessary.

Attractive field to both pest AND beneficial insects.

Second, understand that foliar insecticides have their limitations, specifically when subjected to sunlight, rainfall, heat, and dust. Claims of multiple weeks of control with foliar insecticides in spring conditions are simply unfounded; 7-10 days of control is the most optimistic measure. Remember that these are contact insecticides, and as soon as they hit the soil, breakdown begins.

Finally, these "insurance" insecticides may cause catastrophic losses to beneficial organisms where applied. There is plethora of arthropods in every field, including the decomposers and natural enemies. Springtails and millipedes are among many that are commonly found in agronomic fields, they along with earthworms and microscopic organisms break down crop residues. Natural enemies, e.g., ground beetles, spiders, etc., work in our favor by feasting on cutworms/armyworms/slugs and their eggs. Pollinators of all shapes and sizes are present in flowering fields, whether it be weeds or cover crops. It is simply amazing to sit among these flowering plants and behold the many small bees, flies, moths, and butterflies, not to mention honeybees working. Unfortunately, all these beneficial organisms are negatively impacted should they come in contact with insecticide.

Solitary bee working yellow rocket (mustard) flowers.

Millipedes, i.e., decomposers, killed by foliar insecticide.

We can manage black cutworm and armyworm effectively and have done so in the past. Timely scouting and rescue foliar insecticides, when necessary, are the tried and true approach to controlling these pests. Happy scouting!

2019 Black Cutworm Pheromone Trap Report

(John Obermeyer)

County	Cooperator	BCW Trapped Wk 1 3/28/19-4/3/19	Wk 2 4/4/19-4/10/19	Wk 3 4/11/19-4/17/19	Wk 4 4/18/19-4/24/19	Wk 5 4/25/19-5/1/19	Wk 6 5/2/19-5/8/19	Wk 7 5/8/19-5/15/19
Adams	Roe/Mercer Landmark	0	7	20*	41*	27*	27*	
Allen	Anderson/Syngenta							
Allen	Gynn/Southwind Farms	0	0	14*	0	5	13	
Allen	Kneubuhler/G&K Concepts		1	65*	41*	9	14	
Bartholomew	Bush/Pioneer Hybrids		0	2	2	2	1	
Boone	Emanuel/Boone County CES/Lebanon	0	2	13	5	9	4	
Clay	Bower/Ceres Solutions/Brazil		6	11	11	1	0	
Clay	Bower/Ceres Solutions/Clay City		1	2	5	4	1	
Clinton	Emanuel/Boone Co. CES	1	6	20*	9	21*	26*	
Clinton	Foster/Rossville		3	9	8	10		
DeKalb	Hoffman/ATA Solutions			0	1			
Dubois	Eck/Dubois Co. CES	4	14	23	19*	10	8	
Fayette	Schelle/Falmouth Farm Supply Inc.	1	11	24*	3	2	1	
Fountain	Mroczkiewicz/Syngenta	0	16*	24*	22*	36*	15	
Fulton	Jenkins/Ceres Solutions/Talma		0	3	5	7	2	
Fulton	Ranstead/Ceres Solutions	0	0	0	0	3	4	
Hamilton	Campbell/Beck's Hybrids	0	4	20*	8	36*	24	
Hendricks	Nicholson/Nicholson Consulting	0	1	8	8	5	12*	
Hendricks	Tucker/Bayer				0	12	4	
Howard	Shanks/Clinton Co. CES		0	0	0	0	1	
Jasper	Overstreet/Jasper Co. CES	0	0	7	2	2	8	
Jasper	Ritter/Brodbeck Seeds		0	12	11	21	19	
Jay	Boyer/Davis PAC	2	24	52*	35	29*	38*	
Jay	Shrack/Ran-Del Agri Services	0	6	55*	32*	13	23	
Jay	Temple/Jay Co. CES/Redkey	0	0	4	0	3	3	
Jay	Temple/Jay Co. CES/Pennville	0	1	48*	1	6	10	
Jennings	Bauerle/SEPAC	1	5	8	5	11	10	
Knox	Bower/Ceres Solutions/Freelandville		0		0	0	0	
Knox	Bower/Ceres Solutions/Vincennes							
Lake	Kleine			7	7	15	9	
Lake	Moyer/Dekalb Hybrids/Shelby	0	3	14	4	8	7	
Lake	Moyer/Dekalb Hybrids/Scheider	0	2	6	0	7	9	
LaPorte	Rocke/Agri-Mgmt. Solutions	0	0	13	0	0	7	
Marshall	Barry				0	0	0	
Marshall	Harrell/Harrell Ag Services		2	0	0	0	3	
Miami	Early/Pioneer Hybrids	0	0	2	3	5	2	
Montgomery	Delp/Nicholson Consulting		23*	23*	7	17	36*	
Newton	Moyer/Dekalb Hybrids/Lake Village	0	0	2	2	1	2	
Porter	Tragesser/PPAC	0	0	7	4	8	9	
Posey	Schmitz/Posey Co. CES	0	1		3	4	0	
Pulaski	Capouch/M&R Ag Services		0		28	18*	38*	
Pulaski	Leman/Ceres Solutions			32*	24	18		
Putnam	Nicholson/Nicholson Consulting		11*	8	2	12		
Randolph	Boyer/DPAC	0	2	6	14	21	12	
Rush	Schelle/Falmouth Farm Supply Inc.	0	0	1	0	1	1	
Shelby	Fisher/Shelby County Co-op		3	2	7	2		
Shelby	Simpson/Simpson Farms	1	21*	49*	39*	30*	34*	
Stark	Capouch/M&R Ag Services		0					
St. Joseph	Carbiener		0	3	4	7	13	
St. Joseph	Deutscher/Helena Agri-Enterprises	0	0	5	3	8	25	
Sullivan	Bower/Ceres Solutions/New Lebanon		12	6	8	7	8	
Sullivan	Bower/Ceres Solutions/Sullivan		0	16*	26*	20*	22*	
Sullivan	Bower/Ceres Solutions/Farmersburg		2	6	14*	14*	11	
Tippecanoe	Bower/Ceres Solutions	0	9	0	9	7	9	
Tippecanoe	Nagel/Ceres Solutions	0	5	20*	34*	26*	35*	
Tippecanoe	Obermeyer/Purdue Entomology	0	0	0	4	3	6	
Tippecanoe	Westerfeld/Monsanto Research Farm	0	7	18	18	7	9	
Tipton	Campbell/Beck's Hybrids	0	25*	54*	0	0	38*	
Vermillion	Bower/Ceres Solutions/Clinton		0	0	0	0	0	
Wabash	Enyeart/Ceres Solutions		0	8	13	12	19	
White	Foley/ConAgra	0	0	2	5	0	1	
Whitley	Richards/NEPAC/Schrader		10	73*	36*	20*	27	
Whitley	Richards/NEPAC/Kyler		4	41*	19*	6	8	

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

Armyworm Pheromone Trap Report – 2019

(John Obermeyer)

County/Cooperator	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10
Dubois/SIPAC Ag Center	5	24	91	74	8					
Jennings/SEPAC Ag Center	0	2	9	11	6					
Knox/SWPAC Ag Center	105	34	78	200	185					
LaPorte/Pinney Ag Center	0	127	312	52	51					
Lawrence/Feldun Ag Center	148	60	124	327	376					
Randolph/Davis Ag Center	0	193	183	420	446					
Tippecanoe/Meigs	8	5	127	120	361					
Whitley/NEPAC Ag Center	4	191	384	392	1222					

Wk 1 = 4/4/19-4/10/19; Wk 2 = 4/11/19-4/17/19; Wk 3 = 4/18/19-4/24/19; Wk 4 = 4/25/19-5/1/19; Wk 5 = 5/2/19-5/8/19; Wk 6 = 5/9/19-5/15/19; Wk 7 = 5/16/19-5/22/19; Wk 8 = 5/23/19 – 5/29/19; Wk 9 = 5/30/19-6/5/19; Wk 10 = 6/6/19-6/12/19

Fusarium Head Blight Update in Wheat

(Darcy Telenko)

I have heard that wheat is starting to flower in parts of southern

Indiana, and the Fusarium risk forecast is still red for most of the state indicating a high-risk potential for infection. Recent weather conditions will only continue to promote the high risk. (Fig. 1 Fusarium Risk Assessment Tool)

During flowering, moderate temperatures of 56 to 86° F and high relative humidity favor head scab (Fusarium head blight). The best time to make a fungicide application is when 50% of heads are starting to flower – watch for anthers (flowers) emerging from the wheat heads to make this determination. The best control, with all fungicides, will occur when applications are made at this time. Caramba and Prosaro (FRAC group 3) or Miravis Ace (FRAC group 3 + 7) give good control of scab as well as most leaf and head diseases. These products will help reduce the disease severity and associated mycotoxin level (DON or vomitoxin). It will generally take 2.5 to 3 weeks for symptoms of Fusarium head blight to appear after initial infection.

For more details see last week's article in Pest & Crop, and fungicide efficacy for wheat diseases in CPN publication Small Grain Disease Management.

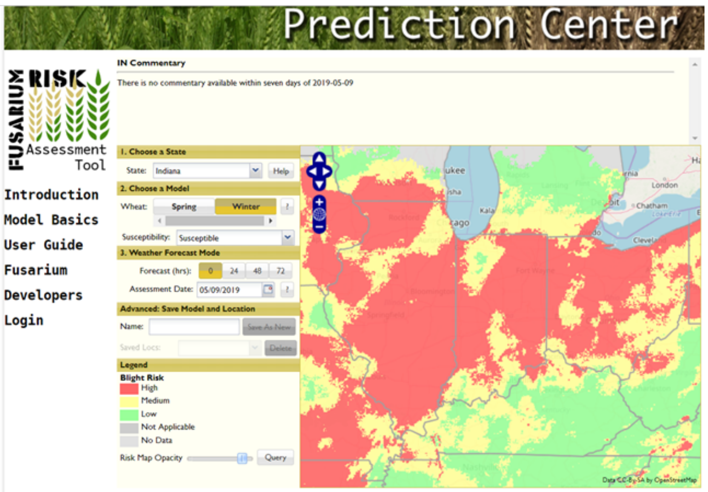

Figure 1. Fusarium head blight risk for Indiana for 9 May 2019. http://www.wheatscab.psu.edu/

Late Burndowns and Cleanup of Failed Burndowns

(Bill Johnson) & *(Marcelo Zimmer)*

There are many no-till fields across Indiana that have either not been burned down or those that will need to be sprayed again because of wet weather and planting delays. The wet weather this spring has kept sprayers out of the field and allowed winter annuals to continue to grow and the majority to go into reproductive growth (Figures 1 and 2). Those fields that did receive a burndown may need to be scouted and readdressed as many of the burndowns were applied under cool weather conditions, thus the herbicides were not effective in killing all the vegetation.

Figure 1. Mixed patch of marestail (horseweed), henbit, and purple deadnettle in the spring at burndown.

Figure 2. Cressleaf groundsel, a winter annual weed, reaching reproductive growth in the spring.

Farmers will need to have a plan as we approach any possible dry spell in which sprayers will be able to get back into the fields to make late burndowns. Winter annuals that are in reproductive stages and larger in growth are tougher to control and will require an increased rate of glyphosate for effective control. Rates of 1.25 to 1.5 lb ae glyphosate (35-42 fl oz Roundup Powermax) will be needed to effectively control winter annuals in fields that have yet to receive any burndown applications.

It is also recommended that farmers include 2,4-D (for Enlist soybean or corn), dicamba (for Xtend soybean and corn) and/or a saflufenacil product (Sharpen, Optill, Optill PRO, or Verdict) into the tank to improve control of the larger broadleaf weeds. Farmers may be inclined to remove these products from the tank due to plant back restrictions in a time when our planting season has become more compressed. Purdue weed scientists encourage farmers to NOT remove these products in order to achieve an improved burndown and assure that the field is clean at planting. We always discourage planting into dirty/weedy fields as herbicide options become much more limited once the crop emerges.

There will also be fields that need a second burndown application to clean up weeds that were not controlled by a previous burndown. In these fields, remember that plants need to be actively growing to achieve an effective cleanup burndown with a glyphosate based program. Farmers need to make sure surviving weeds have begun to regrow before the second burndown application is done to improve herbicide efficacy. Similar to what was mentioned above we encourage the use of at least 1.25 lb ae glyphosate and the inclusion of 2,4-D and/or Sharpen in the tank mix to improve burndown control.

Paraquat based burndown programs will be less effective for late spring burndowns if weeds are large, because effective spray coverage can be very difficult to achieve. If the wet weather prevented planting of a field that had been sprayed effectively in April, a paraquat based program can be effective on small, summer annual weeds. We would still encourage the use of metribuzin (soybean), atrazine (corn), saflufenacil (corn or beans) or 2,4-D or dicamba with paraquat to broaden the spectrum of activity if you are going after small, summer annual weeds. Although if farmers do choose to use a paraquat based program, they need to make sure to have a spray volume of at least 15 to 20 gal/A and apply with fine to medium droplets to achieve appropriate herbicide coverage.

Finally, we will address burndown of cover crops. Cover crop growth is proceeding at a rapid pace (i.e. they are gettin' big!). As discussed earlier, use higher rates of glyphosate, add sharpen if needed (don't' mix with ATS to avoid antagonizing grass control), and consider adding residual herbicides. We almost always recommend adding a residual herbicide to a burndown mix when we are this close to planting. However, due to weather conditions this year, we must be careful about adding residual herbicides for a couple of reasons: 1) If the residual herbicide is sprayed onto large amounts of biomass, the residual may never hit the ground to do its job. 2) Residual herbicides sprayed under less than ideal weather conditions can antagonize glyphosate and reduce control of grasses (like wheat, cereal rye, annual ryegrass). This occasionally happens when herbicides such as flumioxazin, metribuzin, sulfentrazone, or atrazine are mixed with glyphosate (Figure 3). To avoid problems, increase the rate of glyphosate or spray the products separately. 3) 2,4-D or dicamba could be added if there are broadleaf species in the mix and you were planting the right soybean genetics (dicamba-Xtend or 2,4-D-Enlist) or planting corn.

Figure 3. Antagonism of atrazine with glyphosate (left) versus glyphosate alone (right) for cereal rye burndown (*Photo Credit: Wyatt Petersen*).

New Extension Publication on Differentiating 2,4-D and Dicamba Injury on Soybeans

(Bill Johnson) & *(Marcelo Zimmer)*

Adoption of Xtend soybeans is expected to reach 70-80% of the soybean acres in the U.S. in 2019. The approval of Enlist E3 soybean imports by China and the Philippines earlier this year has allowed for full commercialization in the U.S. and provided farmers with another auxin herbicide (2,4-D choline) in their soybean weed management programs. The approval of these technologies allows farmers to spray dicamba or 2,4-D herbicides postemergence for management of glyphosate resistant weeds such as horseweed, giant ragweed, waterhemp, and Palmer amaranth. However, the use of Xtend technology resulted in an increased number of herbicide off-target movement complaints across the Midwest from farmers growing non-dicamba tolerant crops. Differentiating between 2,4-D and dicamba symptomology will become increasingly important for farmers and ag professionals as they evaluate complaints of off-target movement of these two herbicides. The purpose of this publication is to provide some guidance on how to accomplish this diagnosis.

Although it is not the objective of this publication to discuss potential yield reduction from off-target movement of these herbicides, it is important to understand that soybeans are more sensitive to dicamba than 2,4-D. Therefore, it will require higher doses of 2,4-D to cause the same levels of injury caused by off-target movement of dicamba. Differences in soybean injury levels and yield reduction in response to 2,4-D and dicamba exposure from a multi-state study are described in Table 2. Keep in mind that the level of injury and yield reduction in response to these herbicides will vary depending on time of exposure and the environmental conditions after exposure. Therefore, it is difficult to accurately predict soybean yield reduction from visual injury ratings.

In conclusion, differentiating 2,4-D and dicamba symptomology is challenging, however, subtle differences do exist and are key for accurate herbicide injury diagnostics.

Link to the publication – https://ag.purdue.edu/btny/weedscience/Documents/WS-56.pdf

Hybrid Maturity Decisions for Delayed Planting

(Bob Nielson)

Delayed planting seasons create a lot of frustrations for everyone involved with planting crops. One of the agronomic questions that comes up when planting is seriously delayed is whether farmers should consider switching from their normal full-season maturity hybrids to shorter-maturity hybrids. The question is based, of course, on the perceived risk of the crop not reaching physiological maturity before a killing fall freeze and the yield losses that could result. A related, and economic, concern with delayed planting of normal full-maturity hybrids is the risk of high grain moisture contents at harvest and the resulting costs incurred by artificial drying of the grain or price discounts by buyers.

Bottom Line

Delayed planting certainly reduces the growing season for corn, both in terms of calendar days but more importantly in terms of available GDDs for the plants to safely mature before a fall frost or killing freeze. The good news is because hybrids appear to decrease their GDD needs with delayed planting, one can plant adapted, full-season hybrid maturities later than otherwise expected. However, by about the last week of May, some growers in the central and, especially, northern parts of Indiana need to consider switching to earlier-maturity hybrids to minimize the risk of not maturing safely prior to a killing fall freeze. The steps outlined in this article will help growers and consultants determine "safe" hybrid maturities for late planting.

The traditional "days to maturity" rating system for hybrids (Nielsen, 2012) does not literally refer to calendar time and so is not helpful in making decisions about switching to early-maturity hybrids with delayed planting. How fast a corn plant develops (i.e., moves through growth stages) is very dependent on temperature (warm = fast, cool = slow). The accumulation of heat on a daily basis can be quantified on the basis of calculated Growing Degree Days or GDDs (Nielsen, 2017) and the relative maturity of a hybrid can be more reliably characterized by how many GDDs it requires from planting to physiological maturity (kernel black layer).

NOTE: Most seed companies publish "GDDs to Black Layer" ratings for the hybrids in their lineup, but sometimes do not clearly state whether the GDD values are "from planting" or "from emergence". The discussion and guidelines provided in this article assume "GDDs from planting". If your seed company rates their hybrids "from emergence", you need to add about 115 GDDs to the hybrid's rating to account for the GDDs required from planting to emergence.

Interestingly, it appears that **hybrids mature in fewer GDDs than predicted when planted "late".** Based on research we conducted some years ago (Nielsen et al., 2002), hybrids planted later than about May 1 mature approximately 6.8 fewer GDDs for every day of delay beyond May 1, through at least the 2nd week of June (the latest planting dates we evaluated in the research). For example, a hybrid rated at 2700 GDDs from planting to physiological maturity (kernel black layer) and planted on May 31 reaches physiological maturity in less than 2500 GDDs after planting (e.g., 2700 – (30 days x 6.8)).

The following simple calculator can be used to quickly estimate the adjusted GDD requirements of a hybrid in response to delayed planting. With that estimate in hand, you can then compare that value with an estimate of the GDDs available between the date you expect to plant and the end of the season using long-term climate data tools like the **Corn GDD Tool** described in the following paragraphs.


Adjustment to Hybrid GDD Requirement in Response to Late Planting

Original hybrid GDD rating (GDD from planting to black layer):

e.g., 2700

Expected planting date (number of days after May 1; e.g., May 31 = 30 days after May 1)

e.g., 30

Calculate

Approximate hybrid GDD requirement with delayed planting:

Disclaimer: Recognize that hybrids undoubtedly vary in their GDD response to delayed planting. Also recognize that hybrid GDD response to delayed planting in other parts of the country may differ from what we have documented in the eastern Corn Belt.

Adjustment to Hybrid GDD Requirement in Response to Late Planting.

Use the U2U Corn GDD Tool to Identify "Safe" Hybrid Maturities for Late Planting

The USDA-funded **Useful to Usable (U2U)** multi-state research and Extension project developed a GDD decision support tool that is now hosted by the Midwestern Regional Climate Center at http://mrcc.isws.illinois.edu/U2U/gdd. The **Corn GDD Tool** estimates county-level GDD accumulations and corn development dates based on current and historical GDD data plus user-selected start dates, relative hybrid maturity ratings, GDDs to blacklayer, and freeze temperature threshold values. The estimates are displayed graphically and in tabular form, plus the results can be downloaded in a Comma Separated Value (.csv) formatted file for you to work with in your own spreadsheet program. The GDD Tool is currently available for the states of North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, Ohio, Kentucky, and Tennessee.

The choice of the date to represent the "end of the season" can be straight-forward or one of those "eyes of the beholder" decisions. If the main concern is to identify a "safe" hybrid maturity that will reach physiological maturity before a typical fall freeze date, then the steps described in this article are appropriate for you to follow. Some growers may opt to select an "end of season" date earlier than the historical first fall freeze date to ensure that physiological maturity will occur earlier during a time period that may allow for some grain drydown in the field and thus minimize their expenses of drying the grain artificially.

Corny Trivia: Frost often develops on exposed leaf surfaces at temperatures of 32F or slightly higher and can cause significant leaf injury or death, but the corn plant usually remains alive and capable of remobilizing non-structural carbohydrates from the stalk tissues to the immature grain. A temperature of 28F for several hours is considered lethal for corn plants.

Figure 1 shows a screen capture from the **Corn GDD Tool** in which I selected "Tippecanoe Co., IN", a start date (aka planting date) of May 31, a relative hybrid maturity rating of 112 "days", and a freeze temperature threshold of 28F. The tool displays default values for GDDs to silking and black layer, but these can modified by the user. The graph depicts the estimates of silking and black layer dates for the 112-day hybrid planted on May 31, as well as the range of the estimates. When you are viewing the actual graph on the Web site, estimates of GDD accumulations at specific dates "pop up" when you hover your computer mouse over parts of the line graph.

Heed the following Advice!

The U2U GDD Tool does not currently account for the previously described phenomenon wherein corn hybrids typically mature in fewer GDDs than expected when planted later than May 1. In other words, the GDD Tool assumes the same GDDs to black layer for a given hybrid maturity whether planted April 20 or May 31. Consequently, you can be led astray by the Tool if you do not modify the "Black Layer GDDs" value in the Tool's input area. For example, the screen capture displayed in Fig. 1 for a 112-day hybrid with a default GDD rating of 2691 planted in Tippecanoe Co. on May 31 indicates the hybrid would mature on or about October 23 by which the estimated GDD accumulation from planting exceeded 2691. If, however, you manually change the expected "Black Layer GDD" value from 2691 to a more realistic 2487 GDDs (estimated using the calculator above), the GDD Tool then estimates the hybrid would safely mature by about September 30, well ahead of the usual killing fall freeze date (Fig. 2).

Final Considerations

- Availability of early-maturity hybrids with good yield potential, disease resistance (especially Gray leaf spot), and overall tolerance to stress may vary depending on seed company and location. Do not forget these important genetic characteristics when deciding whether to switch to earlier maturity hybrids in late planting situations.
- Some research suggests that yield decreases due to late planting are greater for full-season hybrids than for short-season hybrids (e.g., Jeschke and Paszkiewicz), whereas recently published research from Iowa documented very few differences among hybrid maturities in their relative rates of yield loss to delayed planting (Baum et al., 2019). This inconsistency for relative yield loss to delayed planting suggests growers should focus on whether particular hybrid maturities are expected to mature safely when planted late AND/OR whether expected differences in grain moisture content at harvest merit the decision to switch to earlier maturity hybrids in late planting situations.
- Most research indicates that optimum plant populations do not change as planting is delayed (Nielsen, 2019a).

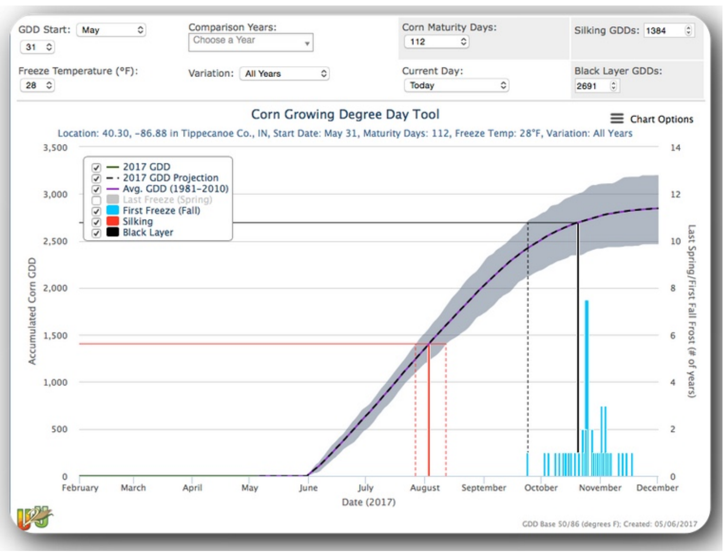

Fig. 1. Screen capture of U2U GDD Tool graphical display of historical and estimated future GDD accumulations and predicted corn development stages for a 112-day hybrid planted May 31 in Tippecanoe County, IN.

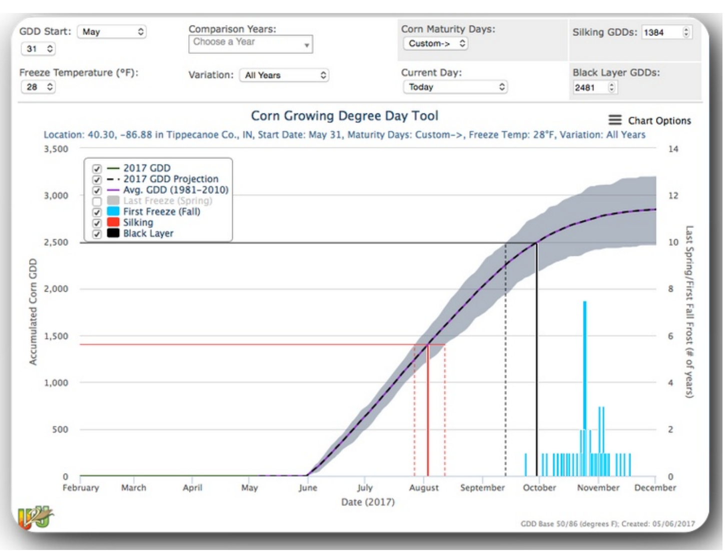

Fig. 2. Screen capture of U2U GDD Tool graphical display of historical and estimated future GDD accumulations and predicted corn development stages for a 112-day hybrid planted May 31 in Tippecanoe County, IN, BUT WITH ITS GDD MATURITY REQUIREMENTS ADJUSTED FOR LATE PLANTING.

Related reading

Baum, M. E., S. V. Archontoulis, and M. A. Licht. 2019. Planting Date, Hybrid Maturity, and Weather Effects on Maize Yield and Crop Stage. Agron. J. 111:303-313. doi:10.2134/agronj2018.04.0297

Jeschke, Mark and Steve Paszkiewicz. Hybrid Maturity Switches Based on Long-Term Research. Pioneer (Corteva agriscience, an Agriculture Division of DowDuPont). https://www.pioneer.com/home/site/us/agronomy/library/corn-hybrid-maturity-switches [URL accessed May 2019]

National Climatic Data Center. 2015. 1981-2010 US Climate Normals. https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/climate-normals/1981-2010-normals-data [URL accessed May 2019]

Nielsen, R.L. (Bob). 2012. Interpreting Corn Hybrid Maturity Ratings. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/HybridMaturity.html [URL accessed May 2019].

Nielsen, R.L. (Bob). 2017. Heat Unit Concepts Related to Corn Development. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/HeatUnits.html [URL accessed May 2019].

Nielsen, R.L. (Bob). 2018. Grain Fill Stages in Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/GrainFill.html [URL accessed May 2019].

Nielsen, R.L. (Bob). 2019a. Optimum Plant Populations for Delayed Planting of Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/CornPltPopPltDate.html [URL accessed May 2019].

Nielsen, R.L. (Bob). 2019b. The Planting Date Conundrum for Corn. Corny News Network, Purdue Univ. http://www.kingcorn.org/news/timeless/PltDateCornYld.html [URL accessed May 2019].

Nielsen, Robert L., Peter R. Thomison, Gregory A. Brown, Anthony L. Halter, Jason Wells, and Kirby L. Wuethrich. 2002. Delayed Planting Effects on Flowering and Grain Maturation of Dent Corn. Agron. J. 94:549-558.

Soil Compaction: The “Gift” That Keeps on Giving

(Bob Nielson)

Soils in Indiana have been too wet for field work almost since last fall. What I mean by “too wet” is so wet that the soils would not even support the weight of the field equipment without creating ruts or the equipment literally getting stuck.

The short term weather forecasts hint that some drying may finally occur over the next couple of weeks. If or when that happens, the pent up energy from delayed spring field activities will explode and there will be a “tsunami wave” of tillage, herbicide application, fertilizer application, and, of course, planting activities, some of which will occur on soils that are technically not yet “fit” for field work. The consequence of working or planting soils that are “a bit on the wet side” is that such field activities can create varying intensities and depths of soil compaction.

The problem with soil compaction is that, at the time we create it with our field operations, we are not totally aware it is happening. Oh sure, the thought might cross our minds that the soil is “a bit on the wet side”, but the reality of a late planting calendar often overwhelms common sense. And, after all, the rest of the growing season may turn out so perfect that there will be minimal effects of soil compaction on the crops……. Which often turns out to wishful thinking.

The potential consequences of soil compaction can haunt a crop the entire growing season and result in serious yield losses by the end of the season due to:

- Planter furrow compaction that impedes emergence and initial root development of young seedlings, sometimes resulting in erratic or lower than desired plant populations.
- Shallow tillage compaction that impedes the downward development of the young root system, thus restricting the root system to shallow depths and increasing the vulnerability of the corn plant to excessively dry conditions throughout the season.
- Tillage or tire compaction that restricts soil drainage, causing lengthier periods of saturated soils following excessive rains that can quickly deteriorate or kill crop root systems.
- Lengthier periods of saturated soils due to soil compaction also increase the risk of denitrification and loss of soil nitrate, resulting in potentially serious N deficiency in the corn crop.

The references that follow are excellent backgrounder pieces about soil compaction, how to avoid it, and what to do about it once you’ve created it.

Related reading

DeJong-Hughes, Jody. 2018 (reviewed). Soil Compaction. Univ of Minnesota Extension. https://extension.umn.edu/soil-management-and-health/soil-compaction [URL accessed May 2019]

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Al-Kaisi, Mahdi. 2019. Spring Planting and Wet Soil Management. Iowa State Univ Extension. https://crops.extension.iastate.edu/cropnews/2019/03/spring-planting-and-wet-soil-management [URL accessed May 2019]

Indiana Climate and Weather Report – 5/9/2019

(Beth Hall)

The biggest topic seems to be how wet it is and how much more rain Indiana can expect. So far, May has experienced near-normal precipitation throughout the central part of the state with 0.5”-2” in southern and northern regions (Figure 1). Combining this with April’s precipitation, however, means the soil moisture is still 60mm to over 80mm above average (Figure 2), causing saturated soils and the propensity for flooding anytime precipitation occurs. Speaking of which, 0.25”-1.5” of additional precipitation is expected over the next 7 days with the lower amounts favoring the northwestern part of the state. Could there be drying beyond that? The climate outlook for May 16-22 is indicating slight probabilities for below-normal precipitation in the northern counties, but the rest of the state is statistically uncertain to predict above- or below-normal precipitation with confidence. However, keep in mind that normal precipitation (based upon 1981-2010 data) during that time period is still 1”-1.5”.

Modified growing degree-days (MGDDs) since April 1 have accumulated to 150-400 (from north to south) across the state, which is within 40 units of the climatological average. Northern Indiana is most behind in MGDDs with a departure of -40 to -60 units. The climate outlook for May has significant probabilities of above normal temperatures so hopefully on days when it is not raining, skies will clear enough to allow more rapid MGDD accumulation.

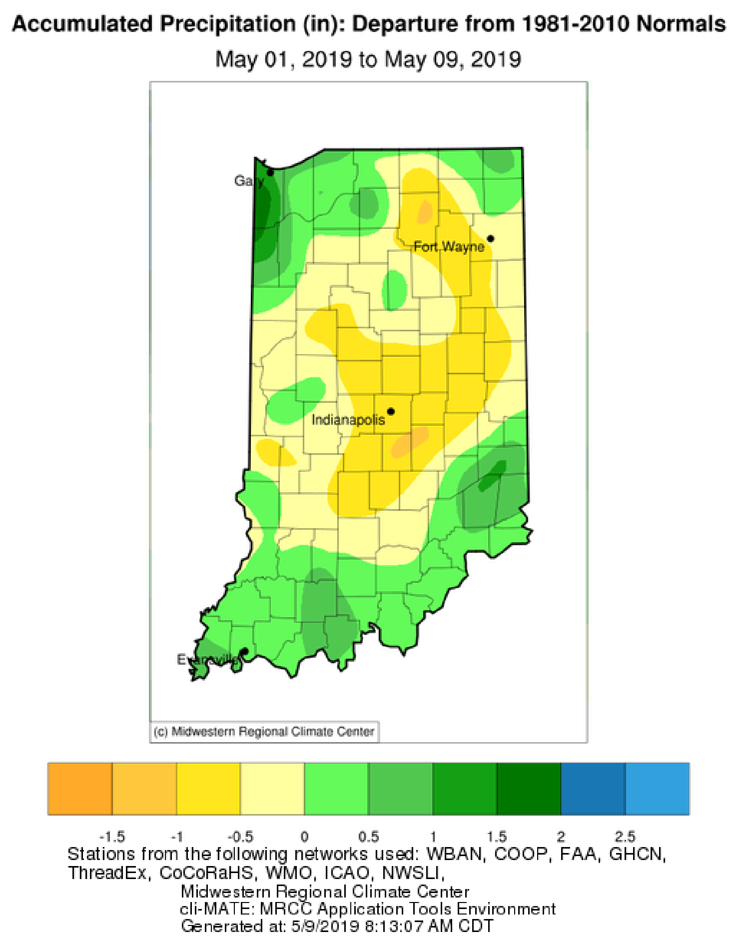

Figure 1. Accumulated precipitation departure (inches) for May 2019 compared to 1981-2010 normals.

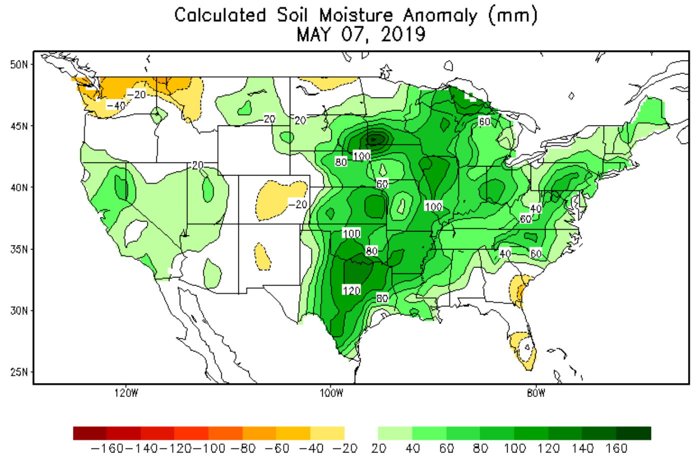

Figure 2. Soil moisture anomaly (in millimeters) for 7 May 2019. Source: NOAA Climate Prediction Center.

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