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Pest&Crop newsletter

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In This Issue

Moisture Stressed Soybean and Spider Mite Concerns

(John Obermeyer) & *(Christian Krupke)*

Some areas of Indiana remain very dry and concerns of spider mites moving into fields from parched field/road sides increase. The symptoms will almost always be noted first at field edges. Discerning the subtle yellowing of the foliage in stressed areas should be followed up with immediate scouting. Of course, many other factors can cause plants to yellow (nutrient deficiencies, soybean cyst nematode, disease, lack of moisture, compaction, herbicide damage, etc.), so you should confirm that mites are present. Delayed scouting, once plants are bronzed in color, gives spider mites time to colonize further into/throughout the field. Spider mite damage to plants is irreversible, even with ample rainfall – these leaves won't "green up" again.

If the problem is due to spider mites, a good understanding of the pest's biology, level of infestation, potential for damage, and management alternatives are needed to properly deal with the infestation. Along field edges of moisture stressed soybean, scout for spider mites and look for feeding damage. Shake discolored plants over a white piece of paper and watch for small, dark specks (1/60 inch in length) moving about. Do not confuse these with the lighter colored, elongated thrips which are at least twice as long. Often the edges of the field will be most heavily infested, as mites move from grasses and various broadleaf weeds (including clover) onto soybeans. Sample at least 5 different areas of the field and determine whether the spider mites are present or not by using the "shake" method.

It is important to understand the impact of weather upon spider mites already in fields:

Extended hot and dry conditions will:

1. encourage the movement of spider mites from drying field edges to soybean
2. favor rapid (explosive!) reproduction of spider mites
3. cause spider mites to increase their feeding
4. dramatically reduce fungal pathogens that normally keeping spider mites in check
5. create moisture stressed plants that provides a higher concentration of nutritious fluids ("protein broth")

The best "cure" for spider mite issues is moisture. A significant rainfall (1 inch or more) followed by high humidity will:

1. physically kill some spider mites by dislodging them from the plant
2. encourage the growth, development, and dissemination of beneficial fungal pathogens
3. recharge the plant's fluids, making them less to conducive to spider mites

For soybean fields scheduled for a fungicide application, should an insecticide, i.e. synthetic pyrethroid, be added to pick up the annoying Japanese beetles, grasshoppers, and various other foliage feeders? There is no reason to think it will be anything but a waste of time and money, and could actually cause problems.

Lurking in every soybean field are low numbers of spider mites. We rarely notice them when conditions remain "normal", as they are being fed upon by a range of predatory insects and spiders. However, treating fields with insecticide may tip the balance in the favor of potential pests. This is because natural enemies recover more slowly from broad-spectrum insecticides compared with mites and aphids, which have an extremely rapid generation time and are generally more difficult to kill with insecticides.

Dry conditions exacerbate crop damage from mites. One major reason for this is that fungal pathogens, that cause insect/mite diseases, do not flourish. Just as crop diseases (most of which are moisture-loving fungi) are more likely during wet/high humid conditions, so are insect diseases. An epizootic is quite impressive, as potentially damaging populations of billions of mites/aphids are quickly and thoroughly wiped out. Fungicides sprayed for crop diseases also suppress insect pathogens. This is one reason why high-value crops, e.g., fruits and vegetables, receiving prophylactic (calendar sprays) of fungicide and insecticide often have spider mite flare-ups.

This small, field-edge yellowing should prompt you to scout for spider mites!

Too late to scout, spider mites are spread throughout the field and sucking yield

https://extension.entm.purdue.edu/newsletters/pestandcrop/wp-content/uploads/sites/2/2022/07/TSSMshakeSampleMitesClose.mp4 This short video demonstrates spider mite sampling to confirm their presence.

Products for Spider Mite Control in Soybean

(John Obermeyer) & *(Christian Krupke)*

With EPA's recent revoking of chlorpyrifos (e.g., Lorsban, Tundra Supreme) tolerances in food/feed crops, we have lost an active ingredient that provided control of spider mites. The following products are labeled for spider mite control in soybean. Those products listing "suppression" of spider mites on the label aren't included. As you look at this list, you will see that our "tools" are very limited. We recommend always using full labeled rates of these products and applying them with high pressure nozzles and large quantities of carrier (10+ gallons/acre). Remember that the spider mites are mostly on the underside of the foliage, so lots of water and movement of leaves will be necessary to get good control.

Insecticides/Miticides Labelled for Spider Mite Control in Indiana

Soybean

Active Ingredient Product(s)	Pre-Harvest Interval (PHI)	Comments
abamectin ◦ Agri-Mek SC*	28	This product is primarily used in high-value fruit and vegetable crops, but is labeled for soybean. The cost may be high. Use in soybean has been very limited.
bifenthrin ◦ Brigade* ◦ Capture* ◦ Discipline* ◦ Sniper* ◦ Tundra* others	18	This synthetic pyrethroid is unique, in that is has good activity on spider mites and their eggs. What isn't known is how long it will control mites. Previously, bifenthrin was pre-mixed with chlorpyrifos (no longer legal to use) and the combination was effective.
dimethoate ◦ Dimate ◦ Dimethoate	21	This older chemistry is translocated through the foliage giving good control of spider mites, but isn't considered long lasting. Supplies will likely be limited, as uses are limited.
PRE-MIXES		
bifenthrin + zeta-cypermethrin ◦ Hero*	21	Bifenthrin is providing the mite control in this combination of synthetic pyrethroids. See comments above.
bifenthrin + imidacloprid ◦ Swagger* ◦ Tempest* others	18	Bifenthrin is providing the control in this pre-mix as well. Imidacloprid alone has little, to no, activity on mites.

* Restricted Use Product

2022 Western Bean Cutworm Pheromone Trap Report

(John Obermeyer)

		WBC Trapped						
County	Cooperator	Wk 1 6/16/22-6/22/22	Wk 2 6/23/22-6/29/22	Wk 3 6/30/22-7/6/22	Wk 4 7/7/22-7/13/22	Wk 5 7/14/22-7/20/22	Wk 6 7/21/22-7/27/22	Wk 7 7/28/22-8/3/22
Adams	Roe/Mercer Landmark, Decatur	0	0	0	0			
Allen	Anderson/Blue River Organics, Churubusco	0	0	0	0			
Allen	Gynn/Southwind Farms, Ft. Wayne	0	0	0	1			
Allen	Kneubuhler/G&K Concepts, Harlan	0	0	0	0			
Bartholomew	Bush/Pioneer Hybrids, Columbus	0	0	0	0			
Clay	Mace/Ceres Solutions, Brazil	0	0	0	0			
Clay	Fritz/Ceres Solutions, Clay City	0	0	0	0			
Clinton	Emanuel, Frankfort	0	0	0	0			
Daviess	Brackney/Daviess Co. CES, Montgomery	0	0	0				
Dubois	Eck/Dubois Co. CES, Jasper	0	0	0	0			
Elkhart	Kauffman/Crop Tech Inc., Millersburg	0	0	2	26			
Fayette	Schelle/Falmouth Farm Supply Inc., Falmouth	0	0	0	0			
Fountain	Mroczkiewicz/Syngenta, Attica	3	0	0	1			
Hamilton	Campbell/Beck's Hybrids	0	0	0	0			
Hancock	Gordon/Koppert Biologicals, Greenfield							
Hendricks	Nicholson/Nicholson Consulting, Danville	0	0	0	1			
Hendricks	Tucker/Bayer, Brownsburg	0	0					
Howard	Shanks/Clinton Co. CES, Kokomo	0	0	0				
Jasper	Overstreet/Jasper Co. CES, Wheatfield	0	0	2	21			
Jasper	Ritter/Dairyland Seeds, McCoysburg	1	1	3	35			
Jay	Boyer/Davis PAC, Powers	0	0	0	0			
Jay	Shrack/Ran-Del Co-Alliance, Parker City	0	0	0	0			
Jennings	Bauerle/SEPAC, Butlerville	1	0	0	0			
Knox	Clinkenbeard/Ceres Solutions, Edwardsport	0	0	0	0			
Knox	Edwards/Ceres Solutions, Fritchton	0	0	0	0			
Kosciusko	Jenkins/Ceres Solutions/Mentone	0	2	6	93			
Lake	Kleine/Rose Acre Farms, Cedar Lake	0	1	1	0			
Lake	Moyer/Dekalb Hybrids/Shelby	0	0	0	0			
Lake	Moyer/Dekalb Hybrids/Scheider	0	0	0	25			
LaPorte	Deutscher/Helena Agri, Hudson Lake	0	0	0	69			
LaPorte	Rocke/Agri-Mgmt. Solutions, Wanatah	0	1	18	108			
Marshall	Harrell/Harrell Ag Services, Plymouth	1	1	12	37			
Miami	Early/Pioneer Hybrids, Macy	0	1	15	79			
Montgomery	Delp/Nicholson Consulting, Waynetown	0	0	0	0			
Newton	Moyer/Dekalb Hybrids, Lake Village	1	1	7	46			
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	4	0	3			
Posey	Schmitz/Posey Co. CES, Blairsville							
Pulaski	Capouch/M&R Ag Services, Medaryville	0	0	1	16			
Pulaski	Leman/Ceres Solutions, Francesville	0	0	0	48			
Putnam	Nicholson/Nicholson Consulting, Greencastle	0	0	1	0			
Randolph	Boyer/DPAC, Farmland	0	0	0	0			
Rush	Schelle/Falmouth Farm Supply Inc., Carthage	1	0	0	0			
Scott	Tom Springstun/Scott Co. CES, Scottsburg	0	0	0	0			
Shelby	Fisher/Shelby County Coop, Shelbyville	0	0	0				
St. Joseph	Carbiener, Breman	0	1	0	21			
St. Joseph	Deutscher/Helena , New Carlisle	0	0	0	12			
Starke	Capouch Chaffins/M&R Ag Services, Monterey	0	0	8	19			
Starke	Capouch Chaffins/M&R Ag Services, San Pierre	0	0	9	27			
Sullivan	McCullough/Ceres Solutions, Farmersburg	0	0	0				
Sullivan	McCullough/Ceres Solutions, Dugger	0	0	0	0			
Tippecanoe	Bower/Ceres Solutions, Lafayette	0	2	5	18			
Tippecanoe	Nagel/Ceres Solutions, W. Lafayette	0	0		0			
Tippecanoe	Obermeyer/Purdue Entomology, ACRE	0	0	0	1			
Tippecanoe	Westerfeld/Bayer Research, W. Lafayette	0	0	0				
Tipton	Campbell/Beck's Hybrids	0	0	0	0			
Vigo	Lynch/Ceres Solutions, Clinton	0	0	0	0			
White	Foley/ConAgra, Brookston	0	0	0	0			
Whitley	Boyer/NEPAC/Schrader	0	11	0				
Whitley	Boyer/NEPAC/Kyler	5	5	1				

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

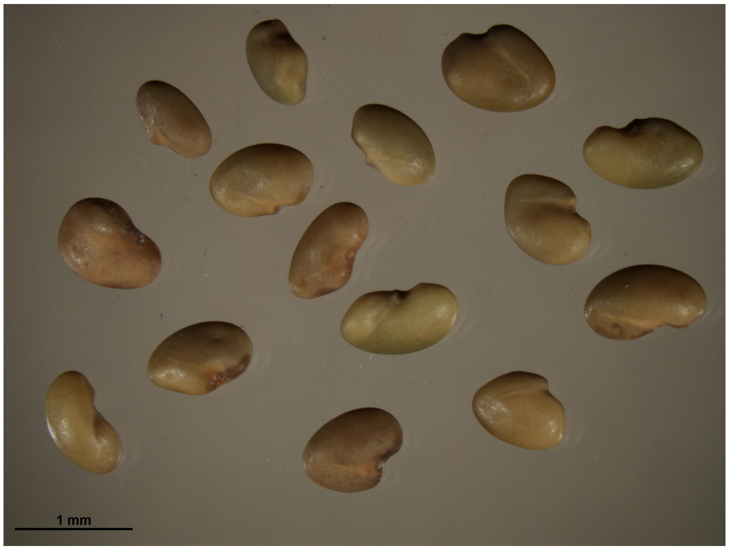
Communicate Seeding Date Carefully – Someone is Listening

(Keith Johnson)

I was asked to come to a field in early April many years ago by a young producer. The producer and the seedsman that sold the alfalfa to the producer met me at the field. The cause of concern was that there was an expectation of green alfalfa growing after breaking winter dormancy in Mid-March. Instead, what was seen at my height of 5’ 10” was light brown soil; not a trace of green from anything was seen. I dropped to my knees and got my eyes within 12 inches of the soil surface. What I saw was what had been an outstanding stand of alfalfa seedlings, at least 24 dead alfalfa seedlings per square foot, no more than 1-inch in height that were the same color of the soil. I asked the producer when he seeded the field. He replied, “October 7”. The “Best Management Practice” would have been to have the alfalfa seeded by late August. Timely alfalfa seeding is always important to getting an excellent stand, and when seeded so late does not have time to develop into a winter hardy plant. This caused me to reflect on how many times I had heard discussions about fall seeding alfalfa. If this novice alfalfa producer was part of one of these discussions, he did exactly what he was told or heard; he seeded on a beautiful fall day. This in-field experience resulted in me correcting anyone that talks about seeding alfalfa in the fall. The right time is to have the seeding task accomplished by mid-August in northern Indiana and very early September along the Ohio River Valley. The fall season doesn’t begin until September 21. Seedling development continues in the fall, but seeding and germination should happen in August and very early September.

The lesson from this event – Be specific when giving recommendations. Someone is listening!

P.S. for my beef cattle, sheep and goat friends – Spring calving, lambing and kidding is after March 21, not in February or early March!



For a successful stand, alfalfa is best sown in the early spring or August. Source: Purdue University Crop Diagnostic Training and Research Center

Isolated Heavy Rainfall, but Drying Continues

(Austin Pearson)

The June 2022 state average precipitation was 2.42 inches below the 1991-2020 normal, which ended up being the 14th driest on record. High heat and reduced precipitation led to the rapid intensification of abnormally dry and moderate drought conditions in the state. As of July 13, July precipitation had continued to be very isolated (Figure 1). Northeastern Indiana experienced rainfall totals ranging from 2-4 inches, which was 150-300 percent of the 1991-2020 normal (Figure 2). Reports of flash flooding at the Fort Wayne Children’s Zoo occurred on Tuesday, July 5. Heavy rainfall also fell in southwestern Indiana, where 2-4 inches was recorded. Parts of Sullivan, Greene, Davies, Martin and Lawrence counties received 3-4 inches of rain. As for everyone else, lighter precipitation totals (0.5-1.5 inches) were not enough to reduce drought stress. Much of central Indiana received less than 75 percent of the 1991-2020 normal precipitation and isolated locations received less than 25 percent of normal. The US Drought Monitor map released on July 7 reflects conditions through July 5, and therefore, excludes the most recent rainfall (Figure 3). Over 94 percent of the state was experiencing either abnormally dry (D0) or moderate drought (D1) conditions in this release. A new Drought Monitor map will be released on Thursday, July 14 at 8:00 am Eastern Daylight Time.

Eleven Indiana weather stations recorded over 100°F temperatures during the first week of. Patoka Lake, located in Dubois County, recorded a maximum temperature of 104°F on July 6. On July 7, the oppressive temperatures retreated south, leaving behind more seasonable conditions in the northern part of the state. As of July 13, month-to-date temperatures still averaged 1-3°F above normal for much of central and southern Indiana. Isolated locations in central and southern Indiana were in excess of 3°F above normal. Modified Growing Degree Day (MGDD) accumulations since April 15 (Figure 4) were above the 1991-2020 normal, which was directly tied to the above normal temperatures. The highest departures were observed in central Indiana, where many locations were over 100 MGDDs ahead of normal (Figure 5).

Limited rain chances are in the forecast through the next week and appear to be very isolated in nature. The Climate Prediction Center’s 6-10-day and 8-14-day forecasts are in agreement with elevated chances of above normal temperatures and below normal precipitation. Continued drought stress is expected and Indiana will likely see a continued deterioration of conditions. The Indiana State Climate Office recently added drought resources to their website, which include a National Weather Service Drought Dashboard, Midwestern Regional Climate Center Midwest Climate Watch, the National Integrated Drought Information System resource page for Indiana, the U.S. Drought Monitor, Purdue Extension’s ‘The Kernel’, and the IN-PREPared drought page. Should you have any questions or input on local conditions, please email the Indiana State Climate Office (in-sco@purdue.edu).

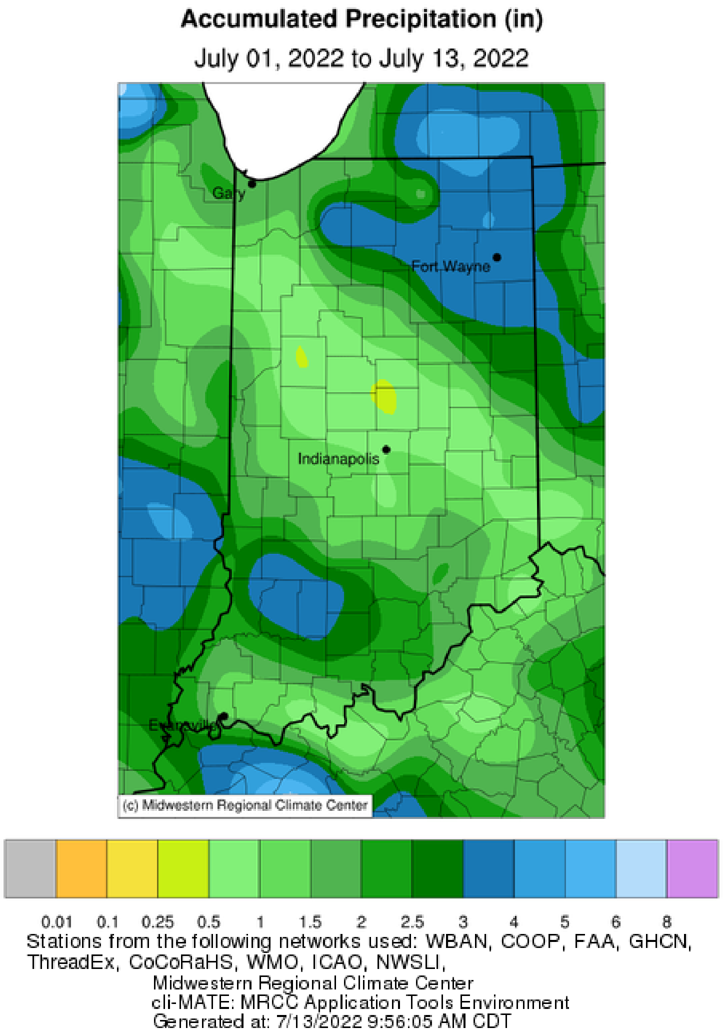


Figure 1. Accumulated precipitation (inches) from July 1-13, 2022.

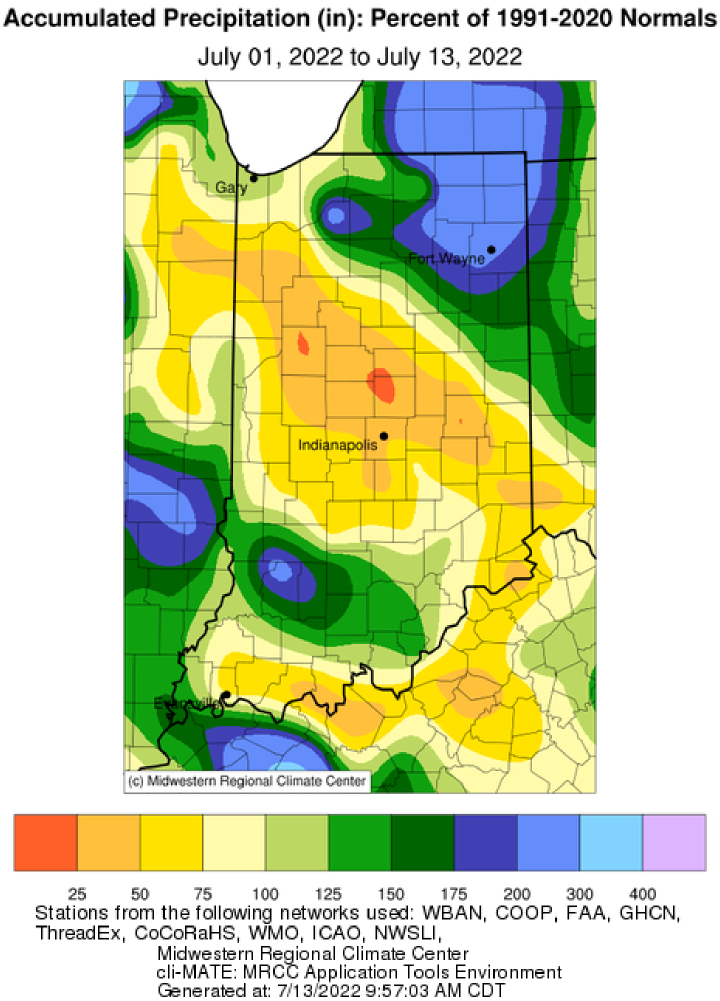
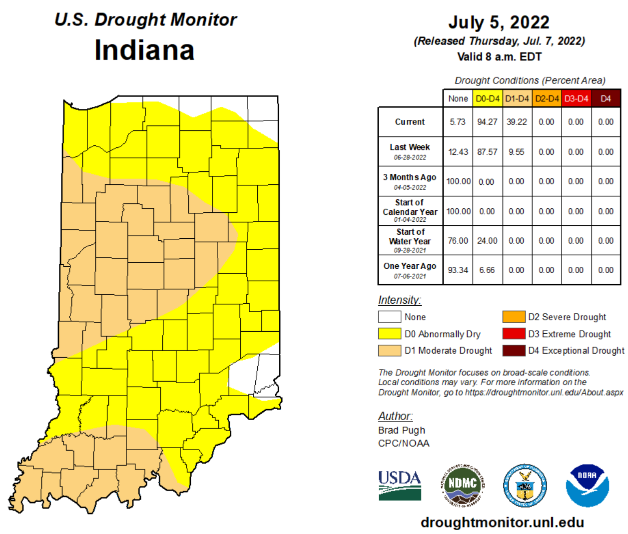


Figure 2. Accumulated precipitation from July 1-13, 2022, represented as the percentage of what normally fell during that period from 1991-2020.



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	5.73	94.27	39.22	0.00	0.00	0.00
Last Week 06-28-2022	12.43	87.57	9.55	0.00	0.00	0.00
3 Months Ago 04-05-2022	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-04-2022	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year 09-28-2021	76.00	24.00	0.00	0.00	0.00	0.00
One Year Ago 07-06-2021	93.34	6.66	0.00	0.00	0.00	0.00

Figure 3. Indiana US Drought Monitor released July 7, 2022.

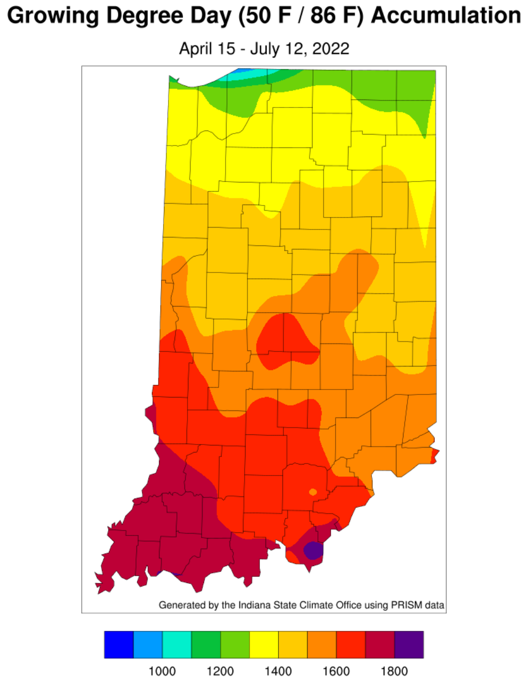


Figure 4. Modified Growing Degree Day (MGDD) (50◦F/86◦F) accumulation from April 15-July 12, 2022.

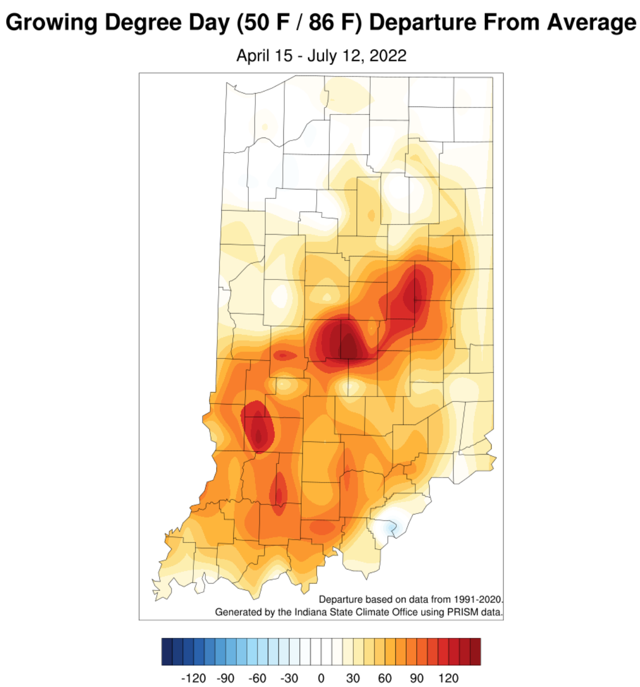


Figure 5. Modified Growing Degree Day (MGDD) (50◦F/86◦F) accumulation from April 15-July 12, 2022, represented as the departure from the 1991-2020 climatological average.

Farming For A Better Climate: Putting It All Together

(Melissa Widhalm), (Hans Schmitz) & (Austin Pearson)

Farming for a Better Climate

The Farming for a Better Climate series explored a variety of climate-smart agricultural practices that aim to maintain, or even increase, farm profitability while also slowing climate change. Topics focused on managing the soil's carbon, soil conservation strategies, fertilizer stewardship, livestock and manure management, carbon markets, and energy use. Let's review.

As we manage the soil, we also manage the climate. That's because the soil contains most or all of the soil's carbon – carbon that would otherwise be in the atmosphere trapping heat. Managing soil organic matter (SOM) also builds the soil's resiliency to weather and climate extremes, like droughts and heavy rainfall, by increasing moisture-holding capacity. By implementing conservation practices, you can improve soil health, reduce soil erosion and nitrogen loss, and increase yields all while generating economic returns and helping the climate.

According to the United States Environmental Protection Agency, the majority of on-farm greenhouse gas emissions come from soil management. Adopting the 4R's of Nutrient Management (Right Source, Right Rate, Right Time, and Right Place) can help optimize nutrient use and reduce negative environmental impacts. The Tri-State Fertilizer Recommendations for Corn, Soybeans, Wheat, and Alfalfa and the Fertilizer Institute's Nutrient Stewardship are excellent resources for getting started with the 4R's.

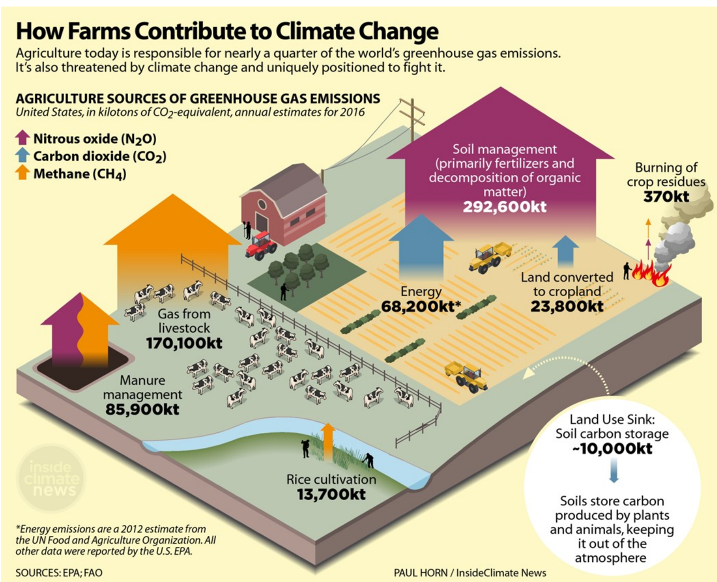
Reducing methane emissions in livestock production is of high interest. Researchers are exploring feed additives to reduce the amount of methane produced in a cow's digestive tract with limited success. The tricky part is figuring out ways to decrease the methane output without killing important microbes in rumen. The most promising additives appear to be lemongrass, peppermint, garlic, and seaweed, but none are a silver-bullet additive solution at this point.

Manure management is another focal point for reducing methane. Generally, animal manure is placed in pits or lagoons, composted, or hauled off-site and spread onto agricultural fields. Anaerobic digesters on confined feeding lots are an expensive, but potentially lucrative, option for controlling animal waste. The end product, biogas, can be converted to natural gas and reused for fuel. Lagoon cover digesters or lagoon additives can also reduce emissions.

Some farmers are starting to venture into "carbon farming." Companies are paying farmers to store additional carbon in their soil through conservation practices such as no-till and cover cropping, which in return will help reduce greenhouse gas emissions. Economists at Purdue University recently wrote an article titled "Opportunities and Challenges Associated with Carbon Farming for U.S. Row-Crop Producers" that helps explain current carbon market options and requirements.

Reducing the amount of energy being used, using energy more efficiently, and incorporating energy from renewable sources are ways that farmers can lower their on-farm expenses while also helping the planet. The Extension Foundation has created a comprehensive suite of online fact sheets, case studies, decision tools, and worksheets to address farm energy use, conservation, and efficiency.

There are many paths to farming for a better climate, and farmers are already doing some of these. We hope you found this series interesting and informative. Purdue Extension, the Indiana State Climate Office, and the Purdue Climate Change Research Center appreciate you following along and we hope that you continue moving forward with farming for a better climate. You may review the suite of articles at the Indiana State Climate Office's Farming for a Better Climate website.



Farms in the US release three main heat-trapping gases: nitrous oxide, methane, and carbon dioxide. The arrows in this graphic show the agricultural activities that release each of these gases. The width of each arrow shows how much each practice contributes to climate change. The largest contribution comes from wet, fertilized soils, which release nitrous oxide. Most of these emissions happen in the spring, before germination or when plants are still small. The second largest source is methane belched up by livestock. This graphic originally appeared in Why Farmers Are Ideally Positioned to Fight Climate Change published by Inside Climate News (8/24/2018).

Geothermal energy can be used to heat and cool buildings and homes using heat pumps that take advantage of stable ground temperatures deep in the earth. These systems are notably more expensive than natural gas and/or propane systems for regulating building temperatures, but the energy efficiency is much higher. Biomass energy involves plant and animal materials that either pull oils and sugars from plants to fuel vehicles (biofuels) or the burning of biomass (biopower). Biodigesters employ microorganisms to decompose biomass (most commonly livestock manure) and produce biogas, which can generate cleaner fuel for engines, electricity production, air and water heating, and refrigeration. Additional renewable energy resources can be found on the Extension Foundation's Farm Energy resource page.

Farming for a Better Climate is written in collaboration by the Purdue Extension, the Indiana State Climate Office, and the Purdue Climate Change Research Center. If you have questions about this series, please contact in-sco@purdue.edu.

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