

Pest & Crop newsletter

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Herbicide Shortage – How To Plan Termination Of Multispecies Cover Crop Mixtures For The 2022 Growing Season

(Bill Johnson), (Marcelo Zimmer) & (Bryan Young)

In last week's article we discussed the herbicide shortage for the 2022 growing season and outlined a couple of scenarios where we can switch to alternative herbicides to accomplish the same weed control objectives. In this article, I want to discuss some options for fields that have a mixture of cover crop species growing in them and how to effectively terminate the cover crops before corn or soybean production.

Corn – Multispecies mixture of cover crops that contains cereal rye, (although some may use annual ryegrass rather than cereal rye) and other species which include legumes and brassicas that need to be terminated prior to corn planting.

We have to design a program to 1) control the winter annual cover crops and early spring summer annual weeds that have emerged, and 2) factor in the fairly long list of residual premixes that might have some combination of atrazine, isoxaflutole, mesotrione, rimsulfuron or thienencarbazone, metribuzin, or saflufenacil in them. All these herbicides have some foliar activity on some cover crop species and fit into this burndown/termination scenario. Isoxaflutole, rimsulfuron, and thienencarbazone have foliar and residual activity on grasses and will control a few selected broadleaf cover crops and weeds. Metribuzin, saflufenacil, and mesotrione have foliar and residual activity on the legumes and brassica cover crops, a key no-till weed, horseweed (aka marestail), and can also help with waterhemp and Palmer amaranth control. A group 15 herbicide (metolachlor, dimethenamid, pyroxasulfone, acetochlor) is also needed to form the backbone of the soil residual grass and small seeded broadleaf weed control program for the season.

The key challenge with this system is how to control large cereal rye or annual ryegrass if glyphosate is in short supply? One possibility is to terminate the grasses early (March), while the grass cover crops are small (6 inches tall or less) with clethodim, a reduced rate of glyphosate or paraquat added to a broadspectrum residual herbicide that contains

isoxaflutole, rimsulfuron or thienencarbazone. Except for clethodim applied by itself, the rest of the treatments mentioned can suppress or control many of the other cover crop species in the mixture. Keep in mind that the activity of clethodim will be slow in cool weather conditions and will require a preplant interval before planting corn. If you choose to go this route (early termination) with your cover crop termination program, you will need to determine the overall value of limiting additional biomass production of the other species with this decision. Regardless of your decision, if glyphosate is carrying the load for terminating the grass, add saflufenacil or a saflufenacil containing herbicide to speed up the activity of glyphosate on the grass species. If you use paraquat, add atrazine or an atrazine containing premix to the application to improve grass control.

If you wait to terminate cover crops closer to planting (mid-April through mid-May), you will need a full rate of glyphosate to terminate the grasses, paraquat won't be effective on the larger grasses, and the clethodim preplant interval might be too constraining to be a viable option. If we are in a warm, sunny weather pattern, glufosinate could be substituted for glyphosate, but be prepared to do a follow up treatment if complete control is not achieved. If glufosinate is used, the best management strategy will be to apply it with something that has grass activity such as an isoxaflutole, rimsulfuron, or thienencarbazone containing premix to help with grass control.

For weeds that break through the cover crops and termination/residual treatment, use glufosinate + dicamba on Liberty Link corn or glyphosate + dicamba on Roundup Ready corn and add a 1/3 to 1/2 label rate of the atrazine premix product that contains a group 15 herbicide to lengthen the window of residual weed control in the crop. You can also use Revulin Q, Realm Q, Armezon, Armezon PRO, Impact or Laudis for postemergence grass control if glyphosate or glufosinate is not available or the corn is non-GMO corn.

Soybean – Multispecies mixture of cover crops such as cereal rye, (and to a lesser extent annual rye) and other species which include legumes and brassicas to be terminated prior to soybean planting.

In this field, broadleaf cover crops and possibly horseweed are the main target with the burndown treatment. Start off by determining which soybean trait will be planted. If it is non-GMO or straight Roundup Ready or Liberty Link, remember that there will be a preplant interval for 2,4-D or dicamba applications, and for these traits, the 2,4-D interval is shorter. A mixture of 2,4-D + saflufenacil or metribuzin for legumes and brassicas will be the backbone of the burndown program.

Generally, 2,4-D is a bit weaker than dicamba on some of the legume cover crop species, but the addition of metribuzin or saflufenacil will help to increase overall efficacy. Considering the soybean traits chosen here, adding 2,4-D to premixes that contain saflufenacil (Verdict, Zidua Pro) or metribuzin (Authority MTZ, Canopy Blend, Intimidator, Kyber, Matador, Boundary/Moccasin MTZ, Trivence, or Panther Pro) makes the

most sense and would require a 7 to 30 day preplant interval depending on the 2,4-D formulation and rate used. If you planted Enlist soybeans, you would use the same strategy, but no preplant interval is required if you use the 2,4-D choline (Enlist One) product from Corteva. If you plant Xtend or XtendFlex soybeans, simply replace 2,4-D with an approved dicamba product (Engenia, Xtendimax, or Tavium) and no preplant interval is required for that trait.

As mentioned in the corn example, the key challenge with this system is how to control large cereal rye or annual ryegrass if glyphosate is in short supply? One possibility is to terminate the grasses early (march), while the grass cover crops are small (6 inches tall or less) with clethodim, or a reduced rate of glyphosate or paraquat added to a broadspectrum residual herbicide. Remember that the glyphosate- or paraquat-based treatments can suppress or control many of the other cover crop species in the mixture. If you choose to go this route with your cover crop termination program, you will need to determine the overall value of limiting additional biomass production of the other species with this decision. Regardless of your decision, if glyphosate is carrying the load for terminating the grass, add saflufenacil or a saflufenacil containing herbicide to speed up the activity of glyphosate on the grass species. If you use paraquat, add metribuzin or a metribuzin containing premix to the application to help paraquat on the grasses. Clethodim can be used for emerged grasses, but activity will be slower in cool weather conditions and can also be antagonized by other components of the mixture (2,4-D, dicamba, acetochlor). Rimsulfuron can be used 30 days or more before planting soybean and may help with winter annual grasses, providing some residual control of summer annual grasses as well. Use of rimsulfuron would be best suited to STS or Bolt soybeans since they will be more tolerant to rimsulfuron.

The postemergence weed control program will be based on the soybean trait planted and the weeds that break through the residual herbicide. Adding a group #15 residual herbicide (metolachlor, dimethenamid, pyroxasulfone, acetochlor) to the postemergence application will be the backbone of your small seeded broadleaf and grass control program, and reduce the need for a second postemergence application later in the growing season.

Non-Chemical Methods of Cover Crop Termination

Roller Crimping – We know there are a few folks out there that have had good success with roller crimping as part of their termination program. We have experience with roller crimping cereal rye and balansa clover, but less experience with other cover crop species. The key to making the roller crimper work is to hit the weeds at a time when they are less likely to stand back up after being hit with the crimper. For cereal rye, this stage of growth is anthesis, which means the cereal rye is fairly large and the biomass production on the field is substantial. For those that have not used roller crimping previously, you will need to do your homework about the impact of very high biomass production on corn and soybean stand establishment and yield, and decide on whether waiting that long to terminate with the roller crimper fits your production goals.

Mowing – Mowing is pretty straight forward and allows some flexibility in timing. The obvious considerations here are timing and frequency (mowing can be done more than once before planted if needed), mowing height, the time and labor needed to complete the operation, and dealing with biomass accumulation in streaks. Most farmers have some experience with mowing and corn stalk shredding, so there really isn't a lot that needs to be written in this article about the process.

These are just a few examples of some different scenarios to consider

when building a weed control program. Keep in mind that the concern isn't just the limited supply of glyphosate and glufosinate, but the increase in cost, especially glyphosate which may be 4X the cost just a few years ago, which makes other herbicide options much more feasible that you didn't consider previously. We will add other examples to this discussion as we write our future newsletter articles through the winter months. We will also be covering this topic in our winter county meetings as well.

Other Tips:

- Target using “regular” rates of glyphosate to stretch supply. Instead of using 32 or 44 oz/acre of a Roundup brand product, consider using the standard rate on the label such as 22 oz/acre for Roundup PowerMax (Note – Roundup PowerMax3 will be launched in 2022 and the standard rate is 20 oz/acre; equivalent to 22 oz/acre of the old R. PowerMax formulation).
- Identify glyphosate or glufosinate premixes that may be in greater supply or at lower relative costs compared to solo glyphosate and glufosinate products.
- Failure is not an option for herbicide applications. Make sure you optimize your herbicide applications using the best methods (GPA, spray nozzles, etc.), adjuvants, and minimal weed size for foliar applications.
- Substitute alternative corn post herbicides that control grasses and broadleaves, if they don't include a residual group 15 herbicide, add one to the postemergence mixture.
- Cultivate if needed and/or possible.
- Hand weed escapes prior to the weeds setting seed.

Fall-applied Anhydrous Ammonia Best Practices

(Jim Camberato)

To minimize the loss of nitrogen (N) from fall-applied anhydrous ammonia (AA), seal the application slot, avoid applications on poorly-drained or excessively well-drained soils, wait till soil temperatures approach freezing, and use a nitrification inhibitor¹.

First things first, get a good seal on the application slot to avoid direct loss of ammonia to the air. This can be difficult when soils are either sopping wet or bone dry. If you can smell ammonia, N is being lost – this is especially troubling if you can still smell ammonia several days after application.



Ammonia that is trapped in the soil after application can be lost later by two mechanisms. On poorly-drained fields (heavy textured and wet) nitrate-N produced from ammonia can be lost to the air when soils are saturated. On excessively well-drained fields (sandy soils with low water holding capacity) the ammonium-N and nitrate-N produced from ammonia can be leached with excess rainfall below the rootzone. Fields with optimum drainage result in lower N loss than those that are poorly- or excessively well-drained. Nitrogen losses can occur throughout winter but the greatest losses occur in spring when soils warm up and are ponded and/or the tile drains are flowing.

Delaying AA application until soils become cold is important because soil microorganisms convert ammonia to nitrate-N much more slowly as temperatures approach 32°F, where conversion of ammonia to nitrate-N stops. The less nitrate-N produced the lower the chance of N loss. The standard advice is to wait till soils at a 4-inch depth are consistently below 50°F and soil temperatures are expected to continue dropping to freezing. In the northern half of Indiana this could occur anywhere from the last couple weeks of October to the first weeks of December. Fall application of AA south of Interstate 70 is discouraged because of warm and fluctuating soil temperatures throughout winter.

A nitrification inhibitor is a substance that slows the activity of microorganisms that convert ammonia to nitrate-N, thus reducing the loss of N from fall-applied AA. Consider using a nitrification inhibitor¹ if you fall-apply AA.

Lastly, in addition to implementing agronomic best practices remember those practices necessary to keep everyone safe when handling, transporting, and applying anhydrous ammonia².

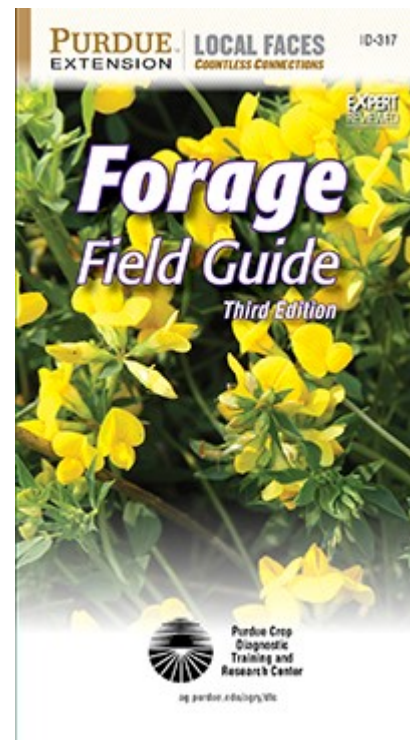
¹Nitrogen Extenders and Additives for Field Crops. 2017. D.W. Franzen and NCERA-103 Committee, North Dakota State University SP1581 (Revised).

²Anhydrous Ammonia – Understanding, Avoiding and Mediating Inherent Risks. 2021. F. Whitford and others. Purdue University Extension PPP-140.

Forage Management Necessities For Improved Yield, Quality, And Persistence

(Keith Johnson)

What have been your challenges with forage production and utilization in 2021? Are there some tools that would have improved the yield, quality, and persistence of your forages? The holiday season is coming soon when gifts are often given. Maybe one of these tools would be an excellent gift to your business or someone that produces and utilizes forages.



The Purdue Forage Field Guide has forage production, harvest and utilization information that can be helpful in improving the forage-livestock enterprise. Ordering information and cost can be found at [Forage Field Guide, third edition](#). (Photo Credit: Keith Johnson)

Resource information – The *Purdue Forage Field Guide* and subscriptions to forage magazines have great value if information learned is utilized in the forage business.

Calendar – Having a computer-based calendar or a desk calendar with room for taking notes on each day has value. Observations, tasks accomplished, and weather notes can prove to be valuable.

Soil probe – A heavy-duty soil probe for collecting soil samples is preferred to a spade or shovel. Avoid nutrient deficiencies and excess fertilization by sending soil samples to a soil testing laboratory and following through with needed recommendations.

Weed Control Guide – Purdue University, Ohio State University, and the University of Illinois have an outstanding publication provides that provides herbicide options for problematic weeds in common agronomic crops, including alfalfa and grass pastures. [2021 Weed Control Guide for Ohio, Indiana, and Illinois – OSU Extension Publications](#)

Sweep net – Do you have harmful or beneficial insects? The sweep net is an excellent way to determine whether one should be concerned about an insect pest, especially potato leafhopper in alfalfa.

Moisture tester – Ever made moldy hay? Worse yet, have you ever had a hay storage structure burn from hot hay? Using a moisture tester to determine if hay is at the correct moisture for packaging can minimize these concerns.

Thermometer – Testing hay temperature when in storage for several weeks will determine whether there is a possible hay fire risk.

Hay probe – Sampling hay properly for nutritional value requires a hay probe. A ration for livestock can be developed when forage quality results and information about the livestock being fed is given to a trained livestock nutritionist. Visit the website www.foragetesting.org for details about forage testing.

Penn State particle separator – Do you make chopped silage? If so, percentage values of particle size attained by using the Penn State

particle separator will help adjust knife gap on the forage harvester so improved packing, reduced silage sorting, and less acidosis occurs.

Purdue Plant and Pest Diagnostic Lab – Are you troubled with problems in a field that need the help of a diagnostician or specialist? Information about sample submission can be found at [Plant and Pest Diagnostic Laboratory \(purdue.edu\)](https://www.purdue.edu/plantandpest/). Gift your business if expert help is needed.

Unmanned Aerial Vehicle – After having access to the above items, becoming licensed to fly an unmanned aerial vehicle, or seeking help from a trained operator, can prove helpful in identifying problems with forages, and day-to-day livestock management, too.

Indiana Forage Council and livestock association memberships – Networking with people of like interest and supporting the activities of an industry has value. Indiana Forage Council membership information is at www.indianaforage.org.

There are many items that are helpful in improving your forage farming business. I would suggest that they are necessities.

Warm And Dry For Next Several Months

(Beth Hall)

The last several weeks have certainly been warmer than normal. Figure 1 illustrates just how warm with some parts of Indiana almost 9°F above normal over the past 30 days. That is quite incredible, however not many records were broken over this period. Climate outlooks for the next several weeks are indicating that above-normal temperatures are likely to continue. How will this impact the timing of the first hard freeze? Figure 2 shows the median date of the first hard freeze based upon data from 1981 through 2010. For Indiana, the end of October is when the first hard freeze typically has occurred. However, the last 10 years have been indicating an increasing warming trend. Combine that with the climate outlooks favoring continued warmer-than-normal temperatures, this year's first hard freeze may be later than normal.

Average Temperature (°F): Departure from 1991-2020 Normals September 13, 2021 to October 12, 2021

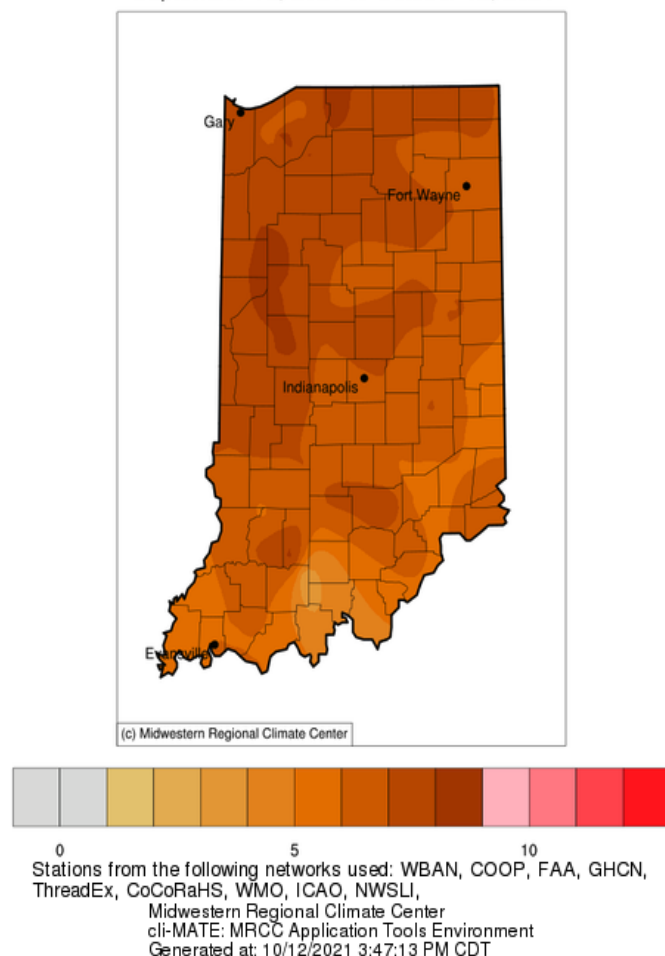


Figure 1. Difference in the maximum temperature and the 1991-2020 normals for September 13, 2021 through October 12, 2021.

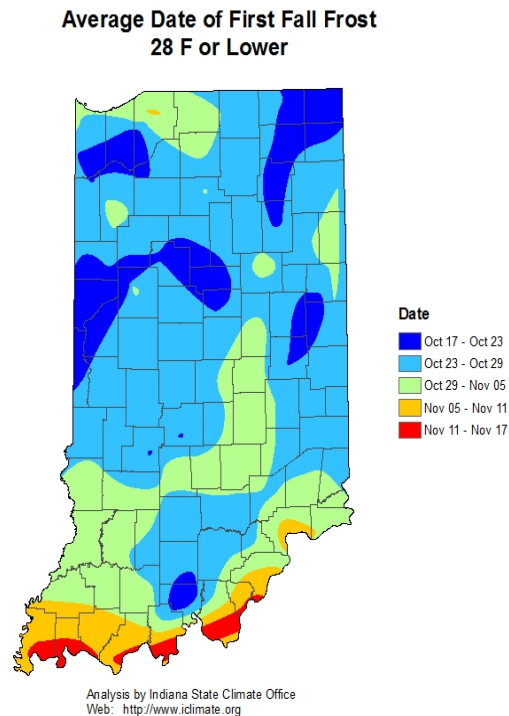


Figure 2. Average date of the first hard freeze (28°F or less) based upon data from 1981-2010.

Precipitation has been a bit more normal lately with periodic rain events passing through providing enough moisture to minimize any concerns for drought. In fact, the US Drought Monitor released on 14 October 2021 shows Indiana completely free of any drought or even abnormally dry conditions! Will this continue and are we possibly facing more issues around flooding? Some parts of Indiana have received an abundance of precipitation over the last 30 days which has likely caused localized flooding and some challenging harvesting conditions (Figure 3). However, the shorter-term outlooks for the rest of October are favoring below-normal precipitation with too much uncertainty on how precipitation amounts will be relative to normal over the next several months.

Accumulated Precipitation (in): Percent of 1991-2020 Normals

September 13, 2021 to October 12, 2021

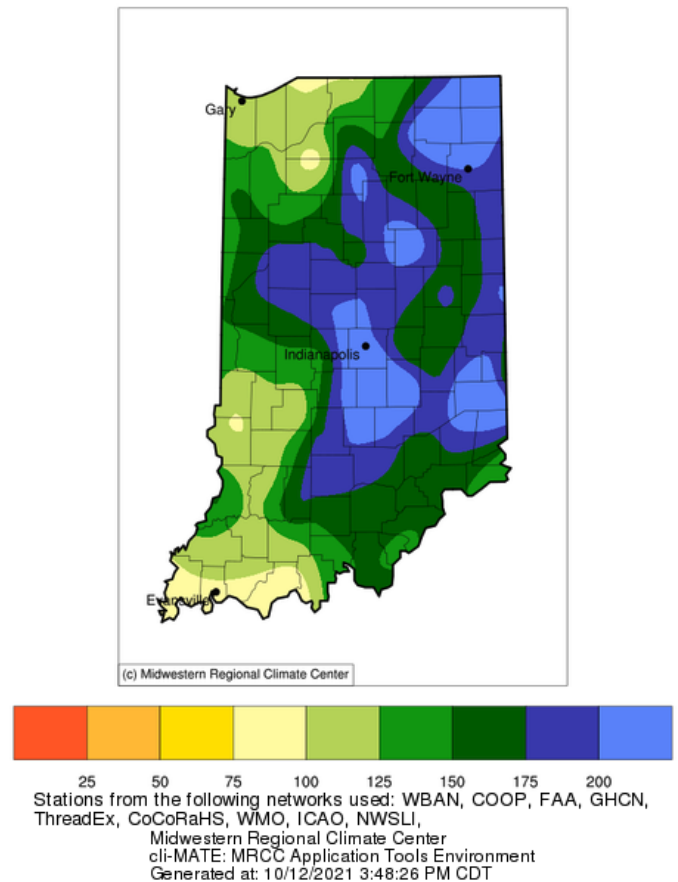


Figure 2. Average date of the first hard freeze (28°F or less) based upon data from 1981-2010.

The latest El Nino – Southern Oscillation (ENSO) report from the national Climate Diagnostics Center is now indicating an 87% likelihood that a La Niña will develop by December. While correlations between La Niña events and winter climate in the Midwest are low, there are some indications that the early part of the winter (December into early January) tends to start off mild with warmer temperatures and near-normal precipitation but falling as rain rather than snow. The latter half of winter in Indiana tends to be a bit harsher with colder-than-normal temperatures and precipitation more likely to fall as snow. With climate trends favoring warmer seasons, will this pattern hold for this upcoming winter? We will just have to wait and see.

The growing season is wrapping up with harvests either underway or finished. With the warmer temperatures in September, the latest modified growing degree-day maps (Figure 4) are indicating above normal values compared to average (Figure 5) and recent years (Figure 6).

Growing Degree Day (50 F / 86 F) Accumulation

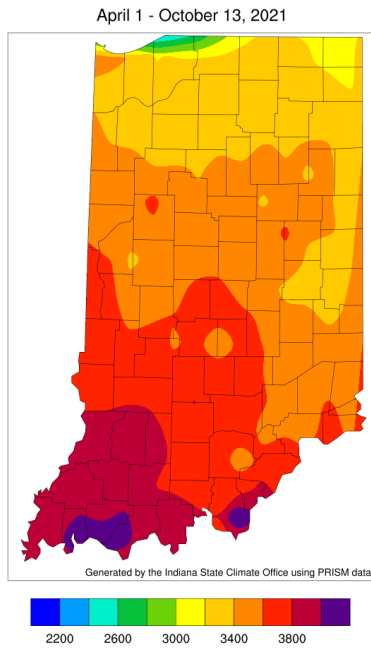
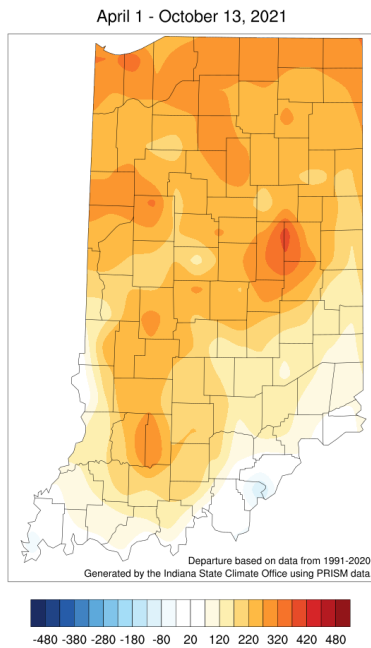


Figure 4. Modified growing degree day accumulations from April 1 to October 13, 2021.

Growing Degree Day (50 F / 86 F) Departure From Average



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Figure 5. Modified growing degree day departures from the 1991-2020 averages from April 1 to October 13, 2021.

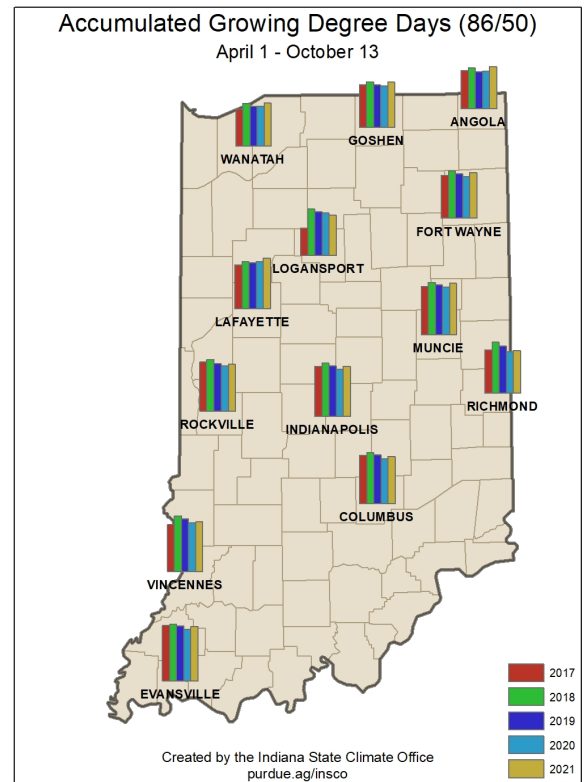


Figure 6. Comparison of 2021 modified growing degree day accumulations from April 1 - October 13 to the past four years.