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Pest&Crop newsletter

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In This Issue

Grain Quality – It's Time To Check Your Stored Grain

(Klein Ileleji)

The weather is beginning to warm up with more sunshine days and temperatures in the 40°F and 50°F indicating that Spring is around the corner. While it is great news to welcome the warmth and do away with our winter jackets and warm clothing, warm weather is bad for grain storage. Winter cold weather is great for grain, and the winter period after harvest provides the best conditions for naturally cooling stored grain by ambient aeration.

We advise a three phase aeration process to get grain cooled down to 28-35°F over the winter period as follows:

- *Phase 1:* Fall cool down by ambient aeration
  - October, 40-45°F
  - November, 35-40°F
  - December, 28-35°F
- *Phase 2:* Winter maintenance in January and February by ambient aeration cooling grain to 28-35°F
- *Phase 3:* Spring holding, seal fans and ventilate headspace intermittently.

Figure 1. An unsealed and sealed bin aeration fan (seal fans in the spring).

At 28-35°F and less than ideal grain moisture levels for safe storage, that is, above 15% for corn and 13% for soybean, biological activity (mold and insect development) is halted and risks of grain going out of condition is very low. However, a good start to keep stored grain in good condition is ensuring that grain is dried to safe levels based on how long it would be stored before selling. For corn, we advise drying to 15% (wet basis) if you intend to store for up to 6 months (sell in the spring), and 13% if you intend to store through the warm summer into the fall or beyond one year. For soybean, store at 13% (w.b.) for up to 6 months, 12% from 6 to 12% and 11% beyond one year.

The first 6 months of storage immediately after harvest poses the least risk to spoilage, and the warm summer months poses the most risk to spoilage. We are in Aeration Phase 3, the spring holding period when fans are to be sealed (Fig. 1) to prevent air from moving naturally through the fan duct to warm up the plenum as ambient temperature rises during this period. Grain being a good insulator can hold the low temperatures it was cooled to if it is not warmed up by ambient aeration. So, in the spring, aerating the grain is not advised. For cylindrical steel bins commonly used in on-farm and off-farm storage in the Midwest, it is important to note that the air space above the grain in the bin, the headspace would warm up faster than any other region of the stored grain. This is due to radiative heat transfer from the steel bin roof, making the grain surface, which experiences these high temperatures, the most likely region where spoilage could occur. The warming of the headspace evaporates moisture from grain at the top layer of the bin increasing the headspace relative humidity during the daytime. At night-time when the headspace air cools to dewpoint, condensation, which occurs under the surface of the bin roof and possible the grain spout, could drip on to the grain surface and over time cause molding and crusting on the top grain layer. *Therefore, ventilate the bin headspace at night (exchange headspace air with roof exhaust fan for 1 to 2 hours) to prevent condensation on the grain surface that could lead to crusting and spoilage.* Connecting a

headspace roof exhaust fan to a simple programmable on/off timer is one approach.

Figure 2. Hotspot development observed from the surface of grain in a bin.

Another reason to check stored grain in the spring, especially the top layer for signs of crusting or molding is because any snow drifts on the top layer that came in through the eaves or snow accumulation on a leaky roof has melted and added moisture to the stored grain. Depending on the amount of snow drift or roof accumulation, the added moisture can be substantial to cause hot spot development. Hotspots in stored grain can begin to develop in the winter when we expect grain to be cold and safe in storage, and exacerbate in the spring, when the weather begins to naturally warm up the grain. A careful observation of the top layer of grain is required to identify hotspot development from the surface. A key is to carefully look for signs of corn kernel or oilseed discoloration on the surface (Fig. 2). Additionally, as temperature increases from the spring to the summer, it is advisable to increase the frequency of monitoring stored grain. In bins with temperature cables buried in the grain, it is advisable to track the change in grain temperature over time as well as the difference between the ambient temperature and that of the grain bulk. A temperature rise in the grain bulk, especially for a cable in the center of the bin, is an indicator of increased biological activity. The smell of deteriorating grain, an indicator of spoilage, can be determined by running the fans a few hours in the evening. However, don't wait to smell spoilage before you act, it might be too late.

For those who could not dry corn to 15% in the fall, but stored at 17-18%, the warm

spring temperature offers the opportunity to dry to a safe storage moisture using natural air in-bin

systems. Begin to implement natural air drying immediately if you haven't started already. Natural air (ambient) in-bin drying can be used to dry corn with up to 20% moisture in the spring

using airflow rates of 1-2 cfm/bu. Drying should be started when the air temperature is over 40 to 60°F and 55-75% relative humidity (RH). Also note that the fan motors and compression of the air, especially with axial flow fans, warm up the air 3 to 5°F and in doing so reduce the RH by several percent points, thereby providing good quality drying air. Again, the goal of natural air drying is to remove moisture from stored grain by using the heat energy in natural air.

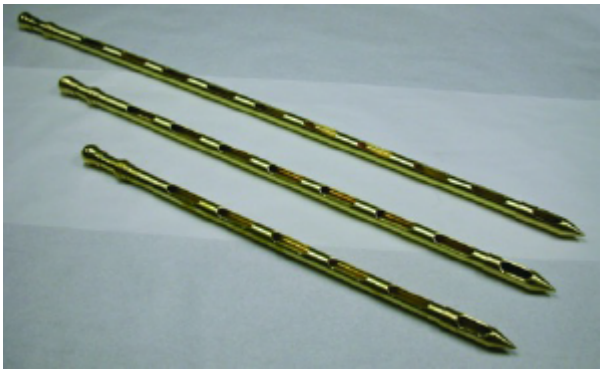

Figure 3. Grain probes by Seedburo (Source: https://www.feedandgrain.com/product/seedburo-probes)

Do the following to implement natural air drying:

- *Sample grain bin to determine moisture content and check for signs of spoilage on the surface*

and at several depths (up to 6 ft) using a grain probe (Fig. 3). Ensure that you follow safe grain bin entry procedures by having more than one person conduct this operation. Allow time for the

headspace to be ventilated when the hatch is first opened. Sniff for signs of odors that accompany spoilage prior to entry. Also wear an appropriate dust mask (N95 grade mask). If the bin has been partially unloaded, it is advisable to use a long pole to poke for bridged grain and use a safety line to enter. For your safety, never work alone in a grain bin. You must be accompanied by one or two other persons, with one of them looking in from outside the bin. Also, never enter your bin when the unloading auger is running and enter by following appropriate "log-out/tag-out" procedures.

- *Run fans continuously when ambient temperatures average 40 to 60°F with RH below 75%*

while monitoring the movement of the drying front. Drying speed will depend on grain initial

moisture, airflow rate and weather. Turn off fans when it is raining (or snowing as might be the case in Indiana). Monitor the drying front by sampling the grain at several depths with a grain probe and determining moistures as an indicator of movement of the front. Also, the force required to push the probe down the grain bed is an indicator of the location of the drying front. It should be easier to push the probe through dry grain than through wet grain. Monitor the bottom layers closely to identify signs of and to prevent over drying of the bottom layers.

- Be careful not to warm up grain above 60°F if you intend to store through the summer months.

Warming grain above this temperature will increase its susceptibility to mold and increase the

rate of insect pest development.

Summary:

- If grain has been cooled to 28-35°F, seal fans to prevent rewarming of the grain bulk so that grain remains cool for a longer period. Do not aerate to rewarm grain to warm spring temperatures.
- Look for signs of surface crusting or molding on the top later of stored grain. If you need to enter the bin, be careful to follow safe entry procedures for confined bin spaces. Never enter a bin alone and ensure you have appropriate harness and personal

protective equipment.

- Exchange warm humid headspace air at night using a roof exhaust fan. If grain bulk temperatures are below 40°F, do not aerate the whole bulk to prevent early rewarming in the spring.
- If grain moisture was above 15.5% when stored, consider implementing natural air drying to 15% or below depending on when you intend to sell.
- Check stored grain frequently as weather warms up. If you don't already have one, consider getting a stored grain monitoring system using temperature and or CO_2

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

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

Last Fall 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 thiencarbazone, 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 thiencarbazone 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 thiencarbazone. 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 a premix containing atrazine 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. However, glufosinate products are also in short supply this year and you will be better off saving the glufosinate for postemergence control of glyphosate-resistant weeds if you are growing glufosinate-resistant crops. If glufosinate is used to terminate cover crops prior to corn, the best management strategy will be to apply it with something that has grass activity such as an isoxaflutole, rimsulfuron, or thiencarbazone 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 ½ 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 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. The 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 to wait that long to terminate cover crops with the roller-crimper fits your production goals.

Mowing – Mowing is pretty straightforward and allows some flexibility in timing. The obvious considerations here are timing and frequency (mowing can be done more than once before planting 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 than previous years.

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 PowerMax 3 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.

Spring Herbicide Applications On Winter Wheat

(Bill Johnson) & *(Marcelo Zimmer)*

The warmer temperatures experienced in Indiana over the past weekend and the forecast for warmer temperatures moving forward will allow winter wheat fields in Indiana to green up and resume growth. During winter wheat green-up, there are a few field activities that need to be considered, including winter wheat herbicide applications and winter annual weed burndown applications in no-till fields. The following information will outline winter annual weeds to look out for, weed scouting tips, crop stage restrictions, and herbicide recommendations.

Some common broadleaf weeds to scout for in your winter wheat are dandelion, purple deadnettle, henbit, chickweed, Canada thistle, wild garlic, and annual ryegrass if you are in the far southwest part of the state. These winter annual species emerge in the fall and can remain relatively inconspicuous through the winter; however, they become competitive and troublesome during the spring if not controlled early. Summer annual weeds such as ragweed will be of less concern in the early spring and will be outcompeted by the wheat crop if managed properly. Grass weeds to be aware of and scouting for are: annual bluegrass, annual ryegrass, cheat, and downy brome.

Determining the severity of weed infestations in your wheat fields is key in determining the necessity of a herbicide application. As with all agronomic crops, you should scout your entire field to determine what weed management practices need to be implemented and determine any areas of severe weed infestations. Wheat fields that contain uniform infestations of at least one broadleaf weed and/or three grass weeds per square foot should be taken into consideration for a herbicide application to avoid yield loss and harvest interference problems. Some fields that have less uniform infestations, but rather pockets of severe infestation should be managed to reduce weed seed production and future infestations.

When determining your herbicide program for spring applications, the stage of the wheat crop should be considered. The majority of wheat herbicides are labeled for application at certain wheat growth stages and some commonly used herbicides have very short windows in which they can be applied. The popular broadleaf weed herbicides 2,4-D and MCPA are efficient and economical, but can only be applied for a short period of time between tillering and prior to jointing in the early spring. Wheat growth stages and herbicide timing restrictions are outlined in Figure 1.

If weed infestations are severe enough to require a herbicide application, the use of liquid nitrogen fertilizer solution as a carrier is a popular option for applying herbicides and topdressing the wheat crop in a single pass over the field. Caution should be taken when using liquid fertilizer as a herbicide carrier as moderate to severe crop injury can result, especially in saturated soil conditions. Many POST applied wheat herbicide labels allow for liquid nitrogen carriers, but require

different rates and types of surfactants than if the herbicide was applied with water as the carrier. Table 1 includes precautions to be taken when applying wheat herbicides using liquid fertilizer as a carrier; further details and directions can be acquired from the herbicide label.

Another consideration growers should take into account when planning early spring herbicide applications is the plant back restrictions to double-crop soybeans. A large percentage of the herbicides listed in Table 1, especially those with activity on annual ryegrass and downy brome, have soybean plant back restrictions greater than the typical three-month time period between spring applications and double-crop soybean planting. The soybean plant back restrictions greatly reduce the number of options available to wheat producers who double-crop soybeans after wheat. Refer to Table 1 for more specific plant back timing restrictions.

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Table 1. Spring applied wheat herbicide rates, crop stage restrictions, weed control spectrum, soybean plant back timing, and liquid fertilizer carrier recommendations (Source: 2021 Weed Control Guide for Ohio, Indiana and Illinois).

Active Ingredient	Trade Name(s)	Rate Per Acre	Application Timing	Winter Annual Weeds Controlled	Liquid Fertilizer Carrier Recommendations	Soybean Plant Back Restriction
2,4-D	Various	1 to 2 pts.	Tillering to before jointing	Prickly and wild lettuce, mustads, field pennycress, shepherd's purse, horseweed (marestail), dandelion*	The use of a liquid fertilizer as a carrier will increase the risk of crop injury	No restriction for early spring applications
Bromoxynil	Buctril, Moxy	1 to 2 pts.	Emergence to boot stage	Mustards, henbit, field pennycress, shepherd's purse	UAN used as a carrier in early spring may increase leaf burn, do not use fertilizer carrier after jointing	No restriction for early spring applications
Bromoxynil + pyrasulfotole	Huskie	13.5 to 15 oz.	After 1-leaf stage up to flag leaf emergence	Purple deadnettle, henbit, prickly and wild lettuce, horseweed (marestail), mustards, field pennycress, shepherd's purse, chickweed	Can be applied in a liquid fertilizer solution that does not exceed 50% nitrogen and is not being applied above 30 lb/Acre	4 Months
Bromoxynil + fluroxypyr + 2,4-D	Cleansweep D	1 to 1.5 pts.	Tillering to before jointing	Henbit, horseweed (marestail), mustards, field pennycress, shepherd's purse, Canada thistle		4 Months
Bromoxynil + fluroxypyr + MCPA	Cleansweep M	1 to 1.5 pts.	2-leaf to flag leaf emergence	Henbit, horseweed (marestail), mustards, field pennycress, shepherd's purse, Canada thistle		4 Months
Clopyralid	Stinger	0.25 to 0.33 pts.	After 2-leaf stage until boot stage	Horseweed (marestail), Canada thistle, dandelion*, prickly and wild lettuce		10.5 Months

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Active Ingredient	Trade Name(s)	Rate Per Acre	Application Timing	Winter Annual Weeds Controlled	Liquid Fertilizer Carrier Recommendations	Soybean Plant Back Restriction
Clopyralid + 2,4-D	Curtail	1 to 2.67 pts.	Tillering to jointing	Prickly and wild lettuce, mustards, field pennycress, shepherd's purse, Canada thistle, dandelion*, horseweed (marestail)	UAN can be used as a liquid fertilizer carrier	10.5 Months
Dicamba	Banvel, Clarity, Sterling Blue, others	0.125 to 0.25 pt.	Emergence to before jointing	Prickly and wild lettuce, horseweed (marestail), shepherd's purse, dandelion*	Conduct compatibility test as outlined by label prior to application	No restriction for early spring applications
Florasulam + MCPA	Orion	17 oz.	3-leaf to preboot stage	Prickly and wild lettuce, chickweed, field pennycress, shepherd's purse, mustards		9 Months
Halauxifen-methyl + florasulam	Quelex	0.75 oz.	2-leaf to flag leaf emergence	Horseweed (marestail), henbit, chickweed, field pennycress, shepherd's purse, mustards	Maximum of 0.25% v/v NIS should be used when applying with a liquid fertilizer	3 Months
MCPA	Chiptox, Rhomene, Rhonox, others	1 to 4 pts.	Tillering to before jointing	Field pennycress, shepherd's purse. mustards pigweed, prickly lettuce. horseweed (marestail)	The use of a liquid fertilizer as a carrier will increase the risk of crop injury	No restriction for early spring applications
Mesosulfuron-methyl	Osprey	4.75 oz.	Emergence to preboot stage	Ryegrass, bluegrass, wild oat, field pennycress, wild oat	Can be applied in a liquid fertilizer solution that does not exceed 15% nitrogen fertilizer. Maximum of 0.25% v/v NIS should be used when applying with a liquid fertilizer	90 Days
Pinoxaden	Axial XL	16.4 oz.	2-leaf to preboot stage	Ryegrass	Can be applied in a liquid fertilizer solution that does not exceed 50% nitorgen fertilizer. Crop injury may be possible.	120 Days
Pinoxaden + fluroxypyr	Axial Star	16.4 oz.	2-leaf to preboot stage	Ryegrass	Can be applied in a liquid fertilizer solution that does not exceel 50% nitrogen fetilizer. Crop injury may be possible.	4 Months
Propoxycarbaz one-sodium	Olympus	0.6 to 0.9 oz.	Emergence to before jointing	Cheat downy brome, purple deadnettle, horseweed (marestail), mustards, field penny cress, shepherd's purse	Maximum of 0.25% v/v NIS should be used when applying with a liquid fetilizer carrier. Temporary crop injury may occur.	12 Months and 24″ of precipitation
Propoxycarbaz one-sodium + mesosulfuron-methyl	Olympus Flex	3 to 3.5 oz.	1-leaf to before jointing	Cheat, downy brome, purple deadnettle, horseweed (marestail), mustards, field pennycress, shepherd's purse, annual gluegrass, ryegrass	Maximum of 0.25% v/v NIS should be used when applying with a liquid fertilizer solution. Carrier solutions should not contain more than 15% nitrogen fertilizer	5 Months and 18″ of precipitation
Prosulfuron	Peak	0.5 oz.	Emergence to second node visible	Mustards, field pennycress, prickly and wild lettuce, shepherd's purse, wild garlic, wild onion	Apply with NIS at 1-2 qt./100 gal. when using a liquid fertilizer carrier	10 Months
Pyroxsulam	PowerFlex, PowerFlex HL	3.5 oz.	3-leaf to jointing	Cheat, downy brome, ryegrass, chickweed, mustards, field pennycress, shepherds purse	Can be applied in a liquid fertilizer solution that does not exceel 50% nitrogen and is not being applied above 50 lb/Acre. NIS at 0.25% v/v should be added to solution.	3 Months
Thifensulfuron + tribenuron	Harmony Extra TotalSol	0.45 to 0.9 oz.	After 2-leaf stage but before flag leaf becomes visible	Wild garlic and onion, field pennycress, mustards, chickweed, henbit shepherd's purse, prickly and wild lettuce, horseweed (marestail), purple deadnettle	Include a sulfactant at 0.5-2 pts./100 gal. when applying in a carrier that consist of less than 50% nitrogen fertilizer	45 Days
Tribenuron	Express TotalSol	0.25 to 0.5 oz.	After 2-leaf stage but before flag leaf becomes visible	Chickweed, deadnettle, henbit, wild lettuce, mustards, field pennycress, shepherd's purse	Liquid fertilizer carriers should have 0.06-0.25% v/v NIS added. Temporary crop yellowing and stunting may occur when applied in liquid fertilizer. This injury is occasionally severe, and risk of severe injury may increase under saturated soil conditions.	45 Days

*The highest labeled herbicide rates should be used to achieve control of dandelion plants with spring applications.

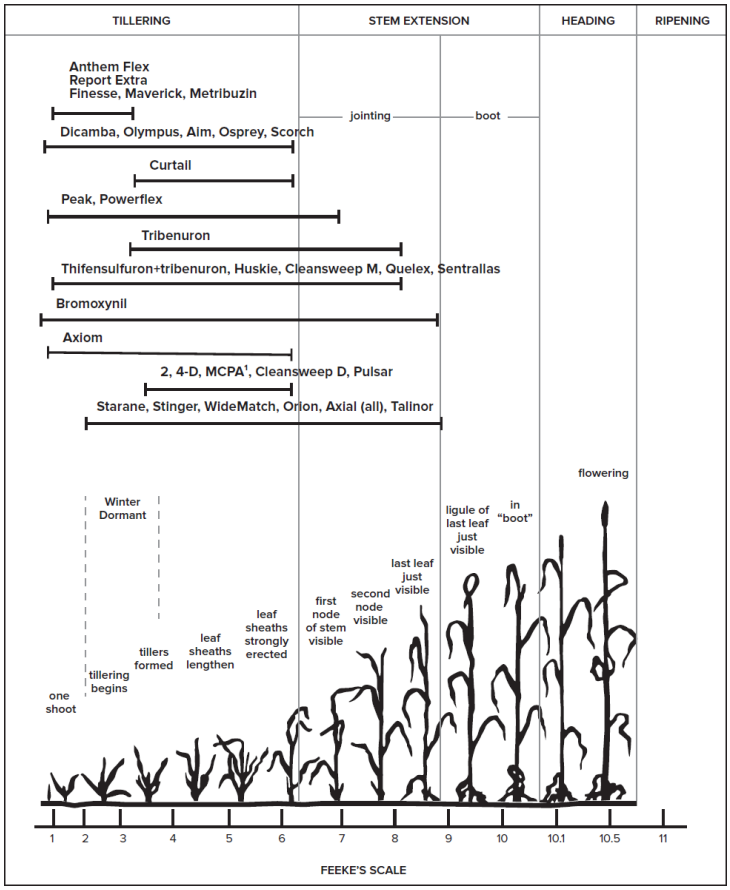

Figure 1. Feeke's scale of winter wheat stages and herbicide application timings (Source: 2022 Weed Control Guide for Ohio, Indiana and Illinois).

Filter The Kool-Aid Before You Drink It!

(Bob Nielsen)

Frankly, today's agricultural world is teeming with misinformation, half-truths, pseudo-data, bogus ideas, and sincere but incompetent researchers. Distinguishing fact from fiction can be difficult when evaluating claims for crop inputs. This YouTube presentation discusses concepts related to becoming a critical thinker and a healthy skeptic when it comes to making important agronomic decisions. It will help you learn how to distinguish between factual agronomic information and crap-tual agronomic information.

Nitrogen Management Guidelines For Corn In Indiana

(Jim Camberato), *(Bob Nielsen)* & *(Dan Quinn)*

MULTI–YEAR SUMMARY OF CORN RESPONSE TO NITROGEN FERTILIZER

This report summarizes corn yield response to fertilizer nitrogen (N) rate in field–scale trials conducted around the state of Indiana since 2006. These results are applicable to N management programs that use efficient methods and timings of N fertilizer application.

The **Agronomic Optimum N Rate (AONR)** represents the total amount of fertilizer N (including starter N) required to maximize yield, but not necessarily profit. The AONR in these trials varied among regions of the state from about 211 to 254 lbs N / ac, depending partly on soil organic matter and soil drainage characteristics.

At five Purdue Ag. Centers where we conducted paired trials of corn following soybean (corn/soy) and corn following corn (corn/corn) from 2007 to 2010, the average AONR for corn/corn was 44 lbs greater than for corn/soy while average corn/corn yields were 18 bu / ac less than the corn/soy yields.

Economic Optimum N Rates (EONR) are defined as those that maximize dollar return from the nitrogen fertilizer investment. Because the yield benefits from additional N decrease as N rates approach the AONR, the EONR will almost always be less than the AONR. Region–specific EONR, calculated for various combinations of N fertilizer cost and grain price, are provided in the accompanying tables.

Click here to read the whole article.

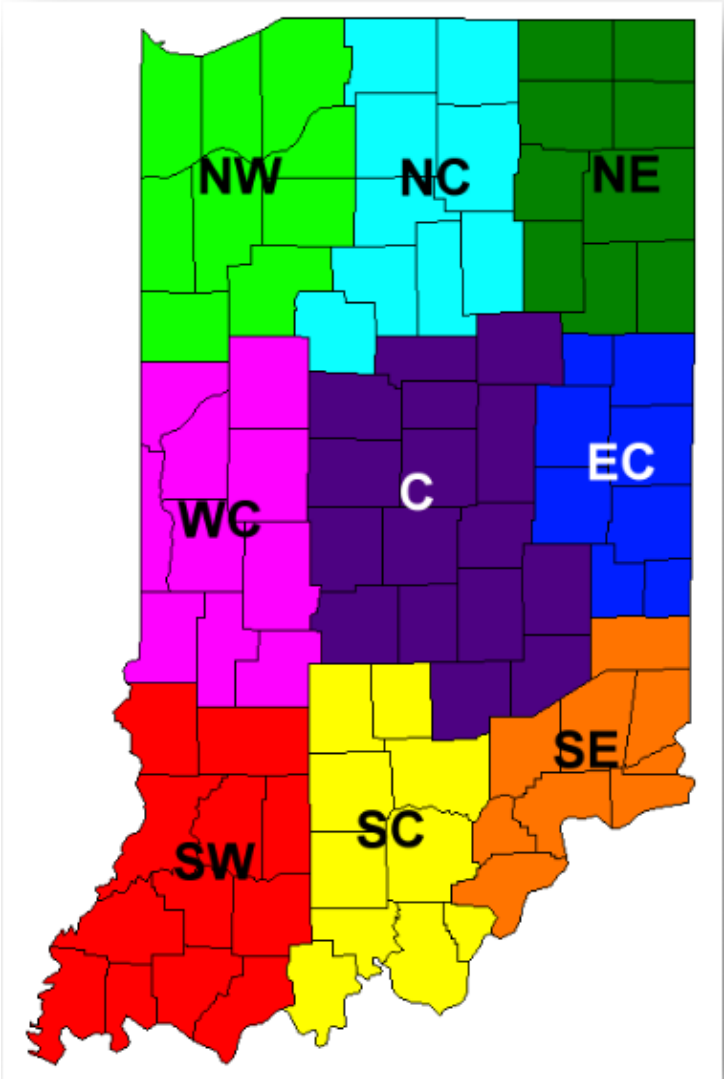

Fig. 1. Indiana crop reporting districts as identified by USDA-NASS.

Modify Your Plans When Faced With High-Priced Phosphorus And Potassium Fertilizers

(Jim Camberato) & *(Bob Nielsen)*

Summary

• Phosphorus (P) and potassium (K) recommendations are made based

on results of recent and representative soil samples. If you have not soil sampled recently, then your best strategy for dealing with high prices is to first invest in soil sampling and analysis.

• If you find soil test levels of phosphorus and potassium are optimal or above (see Table 1), the most profitable rate of P and K fertilizer is zero pounds per acre regardless of fertilizer cost.

• Apply fertilizer P and K dollars on field areas deficient in P and K (see Table 1), where there is a likelihood of getting a yield increase due to the application of fertilizer. The most profitable rate of P and K is less than the standard build–up (or "feed–the–soil") recommendation we would normally make, however an official "feed–the–plant" recommendation for how much less to apply is not yet available. Use caution in reducing the recommended rate when soil test P and K levels are deficient.

Click here to read this article.

Purdue Crop Chat Episode 30, Soil Conservation Management

(Shaun Casteel) & *(Dan Quinn)*

Purdue Extension's corn and soybean specialists are back for another edition of Purdue Crop Chat. Dr. Shaun Casteel and Dr. Dan Quinn are joined on this episode by Dr. Shalamar Armstrong, associate professor of soil conservation and management at Purdue, to discuss soil health practices, the impacts of certain cover crops, and the emerging carbon credit markets that are generating a lot of interest from farmers.

The Purdue Crop Chat is presented by the Indiana Corn Marketing Council and Indiana Soybean Alliance. Your Indiana corn and soybean checkoff investments yesterday are paying off today. New research, new uses, demand creation — bringing dollars back to the farm. Check it out at YourCheckoff.org.

Hear the full podcast.

Corn Response To Starter Fertilizer In Indiana

(Jim Camberato) & *(Bob Nielsen)*

Starter 2×2 fertilizer in corn does not consistently increase grain yield but frequently reduces grain moisture at harvest by as much as 1.5 percentage points. Across our 52 field scale trials, there were no clear relationships between the likelihood of yield response to starter fertilizer and factors like previous crop, soil type, soil drainage, tillage system, planting date, or region of the state. However, while yield increases due to starter 2×2 fertilizer occurred less than half of the time in our trials, the potential for increased yield due to starter 2×2 fertilizer as high as 10 – 15 bu/ac makes its use attractive to consider. If you already have starter 2×2 fertilizer attachments on your planter and if you focus on traditional starter fertilizer sources (e.g., 28-0-0, 10-34-0), we believe that the use of starter 2×2 fertilizer, at 25 to 40 lbs N/ac, is a low-cost form of "crop insurance" against unpredictable soil and weather conditions at and after planting during the important stand establishment period. The higher frequency of drier grain at harvest due to starter fertilizer, and the annual cost savings that represents, adds to the attractiveness of making starter 2×2 fertilizer part of your corn production strategies.

Click here to read this article.

Figure 1. Taller plants, more biomass, and more advanced growth stage are common results of starter fertilizer use.

Consider Forage Sorghum As A Corn Silage Alternative?

(Keith Johnson)

Corn is an excellent silage crop. However, if corn harvested as silage has lost yield potential and forage quality the last several years because of tar spot, maybe an alternative to consider is forage sorghum. Other considerations regarding forage sorghum are better drought tolerance and slightly less nitrogen fertilizer requirement than corn. Forage sorghum yield was slightly higher than corn when harvested as silage at the Feldun-Purdue Agricultural Center located near Bedford, Indiana, last year. One consideration regarding forage sorghum is the possible need to select a hybrid that has sugarcane aphid tolerance. The aphid has been noted at Feldun. A tolerant hybrid kept the sugarcane aphid from being on leaves for two weeks longer than a susceptible hybrid and the insect had no impact on the tolerant hybrid's yield.

Forage sorghum (*Photo Credit: Keith Johnson*)

The following article was an award winner at the 2022 American Forage and Grassland Conference's National Youth in Forage Essay competition. The conference was recently held at Wichita, Kansas.

Swapping Your Silage

Stephanie Newcomer
Northwood High School Sophomore

Across the Corn Belt of the United States, farmers are battling the newly found disease, tar spot. With no known totally effective preventative, it continues infecting the leaves and stalks of corn, leaving farmers desperate to find ways of saving the yield and quality of their corn, especially those producing corn silage for ruminant consumption. Many fungicides are being used as a preventative but can quickly dissipate, so what about changing the type of forage silage instead.

Tar spot is a fungal pathogen called *Phyllachora maydis*. In 2015, this pathogen was first confirmed in Indiana corn fields but quickly spread to other corn fields in surrounding states. Tar spot severity is determined by the weather. For example, tar spot enjoys temperatures ranging from sixty-three to seventy-two degrees Fahrenheit, with a humidity level at approximately seventy-five percent. In extreme conditions, tar spot can be detrimental to corn. It weakens the stalk quality of the corn which increases the chance of stalks falling, reducing the yield. One important effect of tar spot in corn silage is the increase of nondigestible fiber. This fiber is produced due to insufficient moisture level in the corn. It will not provide energy once consumed since it cannot be properly digested. This suboptimum moisture content can cause loose packing in storage, slow fermentation, and a higher than ideal pH. If there is improper packing or fermentation of corn silage, the likelihood of mold will increase and possibly cause disease to ruminants consuming it. This one fungal pathogen has a domino effect in the production of corn silage, and still affects the forage throughout its use. So, what is a potential replacement?

When comparing the components of corn silage and sorghum silage, one notices the only major difference is the energy content, with sorghum silage providing less energy; however, by adding an energy supplement such as molasses, the energy content can be increased, making sorghum silage a possible replacement. While there are many positive aspects of replacing corn silage with sorghum silage, there are still some concerns; for example, what are negative effects it could have regarding production of ruminants, especially dairy cows. An experiment conducted by M. Khosravi, Y. Rouzbehan, M. Rezaei, and J. Rezaei (10/10/2018), tested the effects of total replacement of corn silage with sorghum silage and displayed no undesirable effects on milk production or lack of nutrients for the cattle. Another concern of sorghum is the production of prussic acid, which occurs after environmental factors cause plant cells to rupture. Any animal consuming it will die within twenty minutes after consumption. While this is a valid concern, prussic acid is no longer a worry after fermentation of sorghum occurs, meaning that it is safe for sorghum silage use.

Since fungicides for tar spot can be unreliable, farmers can continue feeding quality silage by replacing corn silage with sorghum silage. It is a potentially safe alternative that delivers similar nutrients and is not a large concern as tar spot destruction.

“Forage Forum Friday” Presentations Available For Review

(Keith Johnson) & *(Elysia Rodgers, Dekalb County ANR Educator)*

Purdue University Extension, in collaboration with the Indiana Forage Council, conducted a “Forage Forum Friday” webinar series that has many different topics related to forage crop production, utilization, and marketing. The webinars were recorded and are available for your use and review at Purdue Extension-Forage Forum Fridays – YouTube. The series was planned with the leadership of Extension Educators Miranda Edge, Mark Kepler, Brooke Stefancik, Elysia Rodgers, and Extension Forage Specialist Keith Johnson.

2022 Popcorn Agri-Chemical Handbook

(Genny Bertalmio)

The 2022 Popcorn Agri-Chemical Handbook is available to ensure everyone in the popcorn industry is informed about products registered for use on popcorn or in popcorn storage facilities. The handbook lists agri-chemicals registered and regulatory status or special use restrictions.

The handbook provides appendix information on residue tolerances as found in the BCGlobal Pesticide MRL Database, which includes popcorn (corn, pop) and denotes established levels by the U.S., Codex and over 140 markets.

The handbook notes the Mode or Mechanism of Action (MOA) numerical classification of each listed chemical when used on a product label. The classification schemes are published by the Insecticide Resistance Action Committee, the Herbicide Resistance Action Committee and the Fungicide Resistance Action Committee. The handbook also highlights the Signal Word “Danger” when used on a product label as required by the EPA’s Label Review Manual.

The Popcorn Board urges you to provide the above links or print and distribute the updated version of this critical information to growers. Contact Genny Bertalmio, +1.312.673.4883 or gbertalmio@popcorn.org, for further information.

The Popcorn Board accepts voluntary contributions to ensure continued funding of its efforts to provide this important information to the popcorn industry. Checks should be mailed to The Popcorn Board, 8333 Solutions Center, Chicago, IL 60677-8003.

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