

# NORTHEAST OHIO AGRI-CULTURE NEWSLETTER

Your Weekly Agriculture Update for  
Ashtabula and Trumbull Counties

January 30, 2024



*White mold update! Recording of the meeting will be available soon.*

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## ***Hello Northeast Ohio Counties!***

We had a great and productive meeting last week discussing white mold solutions for NE Ohio. For those that were not able to attend, a recording of the meeting will be available soon. I encourage you to listen to Dr. Webster's presentation – it's full of practical information to control white mold. I hope to have the recording link available for you next week.

Registration is still open for the Small Farm Financial College on March 9 and March 16. You can find more information on the flyer at the end of today's newsletter. You can also call our office at 330-638-6783.

Have a great week!

**Lee Beers**  
**Trumbull County**  
**Extension Educator**

# **WINTER APPLICATION OF MANURE IN OHIO**

By Glen Arnold

Source: <https://agcrops.osu.edu/newsletter/corn-newsletter/2024-032023-41/winter-application-manure-ohio>

Most producers have had the needed dry weather this fall to get livestock manure applied to fields. However, a wetter than normal corn crop and full elevators, did delay corn harvest longer than normal in some areas. For livestock producers waiting on frozen ground to apply manure, here are some things to keep in mind. Frozen ground would be soil that you cannot inject the manure into or cannot conduct tillage within 24 hours to incorporate the manure.



Permitted farms are not allowed to apply manure in the winter unless it is an extreme emergency, and then movement to other suitable storage is usually the selected alternative. Several commercial manure applicators have established manure storage ponds in recent years to help address this issue.

In the Grand Lake St Marys (GLSM) watershed, the winter manure application ban from December 15<sup>th</sup> to March 1<sup>st</sup> is still in effect. Thus, no manure application would normally be allowed in that time period.

The Natural Resource Conservation Service (NRCS) Code 590 was revised in 2020 and now applies statewide in Ohio (except to GLSM). It states the surface application of manure on frozen and snow-covered soil is not acceptable. An emergency exists as a temporary situation due to unforeseen causes and after all other options have been exhausted. In this situation only limited quantities of liquid manure shall be applied to address manure storage limitations until non frozen soils are available for manure application. All applications of liquid manure to frozen and snow-covered soils must be documented in the producers' records and must be applied in accordance to ALL the following criteria:

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- The rate of application shall not exceed the lesser of 5,000 gallons/acre or P removal for the next crop.
- Applications are to be made on land with at least 90% surface residue cover (cover crop, good quality hay or pasture field, all corn grain residue remaining after harvest, all wheat residue cover remaining after harvest).
- Manure shall not be applied on more than 20 contiguous acres. Contiguous areas for application are to be separated by a break of at least 200 feet.
- Apply manure to areas of the field with the lowest risk of nutrient transport such as areas furthest from streams, ditches, waterways, with the least amount of slope.
- Application setback distance must be a minimum of 200 feet from grassed waterways, surface drainage ditches, streams, surface inlets, water bodies and 300 feet minimum from all wells, springs and public surface drinking water intakes. This distance may need to be further increased due to local conditions.
- For fields exceeding 6% slope manure shall be applied in alternating strips 60 to 200 feet wide generally on the contour, or in the case of contour strips on the alternating strips.

For farmers with solid manure, stockpiling could be an option. There are two different types of stockpiles: Short term and long term.

The short term stockpile information can be found in NRCS FOTG 318 Short Term Storage of Animal Waste and Byproducts Standard (“NRCS 318”). Essentially, short term stockpile is a pile of solid manure that is being kept temporarily in one or more locations. It is considered a temporary stockpile as long as the pile is kept at the location for no more than 180 days and stockpiled in the field where the manure shall be applied. Setback distances listed in NRCS 318 should be followed to prevent discharge to waters of the state. There are multiple recommendations listed in NRCS 318 that speaks to location, timing, and preventative measures that should be taken while stockpiling the manure short term.

The long term stockpile information can be found in NRCS FOTG 313 Waste Storage Facility Standard (“NRCS 313”). Long term stockpile is directly related to solid manure being piled and kept at a facility for longer than 180 days at a permanent location. It is recommended that all permanent long term storage stockpiles should be following the guidelines in NRCS 313 with the utilization of a stacking facility and the structural designs of fabricated structures. A stacking facility can be open, covered or roofed, but specific parameters should be in place to prevent manure runoff from the site. These recommendations are listed in the NRCS 313.

Regardless of your county, it's probably best to check with your local Soil and Water Conservation District office before considering winter manure application in Ohio. The rules have changed, and you should become aware of those that affect your operation.

## ***The role of sulfur in pastures***

By Dan Lima, OSU ANR Extension Educator, Belmont County

Sulfur is an element found in two out of the 20 protein-forming amino acids in plants. It is also essential for chlorophyll production, the most important pigment in the plant kingdom. Additionally, a higher amount of sulfur is needed in legumes for nitrogen fixation. Legumes are thought to be the most sensitive plants to sulfur deficiency due to the fact it will slow down all three essential functions in this category.



Sulfur is needed in legumes for nitrogen fixation.

For these reasons, plants, and all life for that matter, need sulfur to survive. It is considered a secondary macro-nutrient because of its essential requirement at lower levels than the other macro-nutrients: nitrogen, phosphorous and potassium. Plant symptoms of sulfur deficiency are young leaves with light green veins and interveinal areas. Younger leaves due to protein synthesis and light green due to decreased chlorophyll content.

### **Goals**

There is a distinction when it comes to amending soil for sulfur; are you adjusting the pH or adding S as a nutrient? Elemental sulfur ( $H_2SO_3$ ) takes several months to react and will cause acidification. There are times when this is important, especially in alkaline soils found in western Ohio.

The other common option is sulfate found in many fertilizers like ammonium sulfate also known as "AMS" ( $(NH_4)_2SO_4$ ) and gypsum (Calcium Sulfate). Sulfate is readily available for plant uptake unlike elemental sulfur which needs to be oxidized by soil microbes and takes several months to convert to a plant usable form.

This oxidation process of elemental sulfur also drops the pH of the soil. Sulfate is the available form of the S nutrient and is found to be more prevalent in areas of high organic matter. You are more likely to see sulfur deficiencies in coarse, sandy soils due to sulfate leaching.

Historically, eastern Ohio had some of the highest sulfur content soil in the state due to the impact of coal energy production. After the impacts of acid rain were discovered and mitigated, less sulfur was found on the soils of eastern Ohio.

### ***Testing***

Many soil testing labs have established a threshold of 15 ppm (Mehlich 3), as the critical level for sulfur in the soil. Currently, we have seen a shift in the amount of sulfur in eastern Ohio as soil tests are coming back deficient (less than 15 ppm) in S. When amending the soil, elemental sulfur and sulfate are the two easiest forms to add sulfur to the ground.

Most forage analysis laboratories will test for S in tissue samples. Many people consider this a more accurate test of S deficiency due to its low soil concentration in the soil.

Much like analyzing for micro-nutrients, a tissue sample analysis that can be obtained through a hay forage analysis can indicate S deficiencies. Leaf concentrations ranging from 0.2%-0.5% are considered adequate by most labs.

The work and cost required to amend S might make a forage analysis practical in this case. “Best management practice” for feeding hay to livestock is to have a laboratory forage analysis done to optimize nutritional animal needs. Remember that all life requires S, so if the dried grass is deficient, the animal could also be deficient. This is just another tool we have available for pasture fertility.

### ***Amendments***

Manure is a great way to add micronutrients to a field in a well-balanced and cost-effective manner. Manure is also rich in organic sulfur and easily converted to sulfate through soil-microbe chemistry.

If a forage analysis is done to monitor field forage quality, it can also be a tool to determine S-deficient fields that need to be amended. A basic price analysis with urea priced at ~\$500 per ton and granular AMS priced at ~\$425 per ton would cost \$0.54 and \$1.01 per unit N, respectively.

If manure is not available, it is almost twice the cost to fertilize a field with sulfur utilizing AMS. At this price, a forage analysis would make sense before such a large investment. Furthermore, AMS is not always available at your local co-op and would take even greater effort to obtain.

My concluding thoughts are to adjust the pH needs of a field first with either agricultural lime or elemental sulfur- if acidification is required. Secondly, address macro-nutrient needs of N, P and K. Finally, I would recommend examining S levels of a field by utilizing a forage analysis in addition to a soil test.

Chances are if you have addressed pH needs and macro-nutrients, a soil test has already been accomplished. If the S levels are below 15 ppm in a soil test, a forage analysis would provide a definitive answer for sulfur needs. A sulfur level of 0.2%-0.5% in a forage analysis should be adequate for plant needs.

Also, remember that manure is a great way to add sulfur if AMS is difficult to obtain and/or if manure is more cost-effective.

## ***IS YOUR FARM BUSINESS READY FOR YOUR DEATH?***

By David Marrison

Source: <https://farmoffice.osu.edu/blog/fri-01262024-1211pm/your-farm-business-ready-your-death>

“I guess it comes down to a simple choice, really. Get busy living or get busy dying.” This famous line was quoted by Andy Dufresne, played by Tim Robbins, in the iconic movie titled “The Shawshank Redemption” released in 1994.



As we each traverse through our lives, we all are presented with moments that make us pause and reflect on how precious the time is we have been given here on earth. Every time I watch The Shawshank

Redemption, I pause and think of the deeper message in this line: that life can be spent going through the motions and waiting around for something to happen or you can make something happen.

As we look at developing a plan for transitioning the farm to the next generation, are we waiting around for something to happen? Or will we work to make something happen? As farmers, we have to contend with and solve the day-to-day problems which arise on the farm. And there is never a shortage of problems that arise. Because of this, the time for deeper planning functions such as farm transition planning is often pushed down the to-do list. So, what will be the trigger to make something happen with regards to your succession plan?

### **What will be your trigger?**

One of the hypothetical questions we pose in farm succession workshops is, “What knowledge would you need to pass on if you knew you had only two months to live?” This exact scenario happened to our family in 2010 when my father was

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diagnosed with pancreatic cancer just as we entered into Spring planting season on our dairy farm in northeast Ohio.

My father valiantly battled this disease but passed away seven weeks later. Our family learned a lot and had to scramble to manage the farm in the midst of his illness. I am grateful for the short time we had with my dad to make preparations. But it was not long enough to learn everything we needed to know to run the farm without him.

I challenge you to think how your farm and family would react to the loss of the principal operator. What knowledge and skills need to be transferred to the next generation so they can be successful without you? What can you do today to make something happen?

### **Who Will Manage the Farm in the Future?**

As you develop your succession or transition plan, there are a myriad of decisions to be made. These decisions include identifying the next leader/manager of the farm, how to be fair to off-farm heirs without jeopardizing the future of the on-farm heirs, how to distribute assets through the estate plan, how and when the senior generation will retire, and how the business will deal with unexpected issues such as divorce, disability or paying for nursing home expenses. I would contend that the most crucial planning functions are to identify the next manager of the farm and then strategically plan how to develop them to lead the farm in the future.

The first step is to identify who the next leader or leaders of the farm will be. The next generation could be an immediate family member (son, daughter, grandchild) or extended family member (brother, sister, niece, nephew). With that said, the next leader does not have to be from your family as some farms have transitioned successfully to a non-blood friend or neighbor. The key is to choose a successor who will be the best caretaker of the farm and the land they will be entrusted with.

As you review potential managers and heirs to your farm, it is important to talk with them about their vision for the future and how it aligns with the current farming operation. What are their goals and aspirations for the farm? What concerns do they have about the future of the farm?

Complete a skills assessment with each potential heir/manager to examine their current strengths and which areas they will need to receive training in order for them to be a better leader for the farm in the future. Talk with them to learn more about what they would be most concerned or scared about if they had to take over the farm today. Are there additional responsibilities they would like to assume and what is their expectation for an appropriate time for management control to be transferred?

The new manager should have experience with how other farms are operated. Having the future manager work on another farm prior to returning to the home farm is a valuable experience. Mentor relationships should also be developed for the new manager to have a trusted team to help them grow.

### **Putting the Transition into Motion**

The transition can be accomplished gradually by turning over more responsibility and authority to the successor. In fact, this process may (and should) take 5-10 years. It is important to develop a timeline for transferring ownership, management responsibilities, and knowledge from one generation to the next.

As the senior generation transitions their role and responsibilities to the next generation, thought should be given to the overall labor hours which will be available. In some cases, the responsibilities of two members of the senior generation will be transitioned to a single successor. Think of husband/wife combination transitioning to one of their children. This could cause a labor shortage. Could some tasks be outsourced to independent contractors (like accountants)? Can some production practices be accomplished through custom hire arrangements (silage harvest or cattle breeding)?

The biggest task in the transition plan is making sure the next generation has a firm foundation of knowledge to manage the operation in the future. This will look different for each farm and for the type of manager that is needed.

**Owner-Operator.** If the next manager is going to be an owner-operator, then training will need to include how to manage all aspects of the farm. These include production skills to raise livestock and/or crop enterprises and marketing skills to effectively market each commodity produced. The owner-operator will also need financial skills to manage the operation's finances and taxes and human resource skills to manage employees. Additionally, they will need to know how to maintain facilities, tools, and equipment as well as how to manage risk through crop, livestock, and farm insurance.

**Owner-Landlord.** To the contrary, if the next manager will be more of an owner-landlord, they will need to be trained less on the day-to-day production activities and more on how to manage the farm asset. Some skills which are necessary for landlords include tenant and farm rental management, farm finance and tax management, farm insurance decision making, and facilities and other farm assets maintenance.

Strategies recommended for farm businesses to utilize in the transition process are:



- Every person who is part of the business (family member and employees) should have a written job description which includes job duties, responsibilities, and expectations.
- Create an organization chart of all employees and how each employee relates to one another.
- Develop a timeline for the successor to work through each job description on the farm. It is good to start the new family member as an employee and not the top manager.
- Provide meaningful opportunities for decision-making as well as accepting responsibility for the future manager.
- Develop a plan on how the future manager can increase their equity in the farm business through gifting, purchasing or inheritance.
- Develop a timeline for retirement and managerial transfer from senior generation to the succeeding generation.
- Utilize family business meetings to discuss the transfer and changing roles within the business.

Some experts advise that the current manager take a number of planned absences before retiring to provide an opportunity for the successor to see what it is like to manage the business alone. This will also allow the current manager to see that the farm does not fall apart without them. So how do you know if the next generation is ready? There are two other approaches which you can use to help prepare the next generation to lead without you:

- **Opossum Approach.** Just as an opossum plays dead, so too should the principal operator. Take an unannounced week away from the farm during one of the busiest times of the year for your farm and allow the junior generation to take over with no communication from the senior generation. I know this sounds crazy but how else will you know what knowledge and skills need to be transferred? It is a lot easier to come back after a short vacation and be able to answer the questions your son or daughter has. You won't have this opportunity when you pass away.
- **365-Day Challenge.** Outside of using the opossum approach, it should be the goal of the senior generation to transfer at least one knowledge point or skill to the next generation each day. So, by the end of the year, your heirs will have 365 new tools in their management toolbox. If you do this over the next five to ten years, you can teach your heirs an incredible amount.

### **Take Advantage of OSU Extension Workshops**

Attend one of our **“Planning for the Future of Your Farm” workshops** this Winter to learn about the communication and legal strategies that provide solutions for dealing with farm transition needs and decision making. A webinar version and several in-person options for the workshop are being offered.

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**Webinar version.** You and your family members can attend the workshop individually and online from the comfort of your homes. The four-part webinar series will be February 5, 12, 19, and 26, 2024, from 6:30 to 8:30 p.m. via Zoom. Pre-registration is required so that a packet of program materials can be mailed in advance to participating families. Electronic copies of the course materials will also be available to all participants. The registration fee is \$75 per farm family. Register by February 2, 2024 to receive course materials in time. **[Register on this page.](#)**

**In-person workshops.** Our local Extension Educators are hosting in-person workshops at five regional locations across Ohio. Registration costs vary by location due to local sponsorships.

February 2, 2024 - Tiffin, Ohio - **[Register through this link.](#)**  
April 4, 2024 - Lebanon, Ohio - **[Register through this link.](#)**

More information about our Planning for the Future of Your Farm workshops is available at: **[go.osu.edu/farmsuccession.](https://go.osu.edu/farmsuccession)**

### **Final Thoughts**

So, are you ready “to make something happen” to transition your farm to the next generation? Farm managers are encouraged to think about how the next generation can be prepared to lead the farm in the future. And as Andy Dufresne stated in *The Shawshank Redemption*, “remember, hope is a good thing, maybe the best of things, and no good thing ever dies.” Good luck as you plan for the future of your farm!

## ***Robust Cover Crop Systems for Soybeans***

By Gary Schnitkey and Laura Gentry

Source: <https://farmdocdaily.illinois.edu/2024/01/robust-cover-crop-systems-for-soybeans.html>

Cover crop use in soybean fields is evolving to a standard system. This system plants cereal rye after harvest in the fall and plants soybeans early in the spring. This system typically yields the same as systems without cover crops and has reduced herbicide costs. Despite these advances, this cover crop system requires revenue from cost-share or carbon programs to have the same returns as systems without cover crops. We describe the economics of this system using results from Precision Conservation Management (PCM).

### Precision Conservation Management

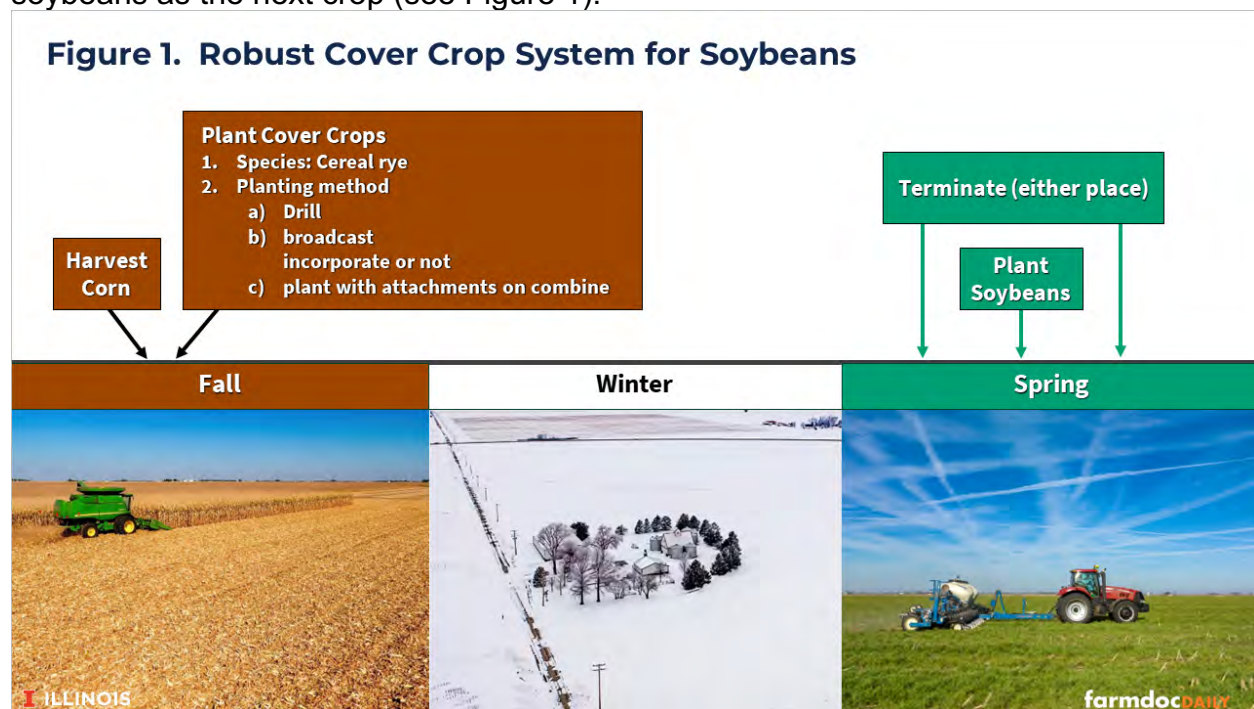
We summarize data from Precision Conservation Management (PCM), a farmer service program led by the IL Corn Growers Association and Illinois Soybean Association, in partnership with over 30 entities, including other commodity associations, conservation

groups, private foundations, supply chain providers, the Soil and Water Conservation Districts, and the Natural Resources Conservation Service (NRCS). PCM was started in 2015 to address the goals of the Illinois Nutrient Loss Reduction Strategy. The mission of PCM is to help farmers make decisions about adopting on-farm conservation practices in a financially responsible way. Through PCM's regional specialists, PCM works one-on-one with over 500 farmers in Illinois, Kentucky, and Nebraska (see [PCM website](#)).

This article evaluates a subset of PCM fields to understand the economics of cover crops in soybeans more fully. The most profitable farms using cover crops were identified, and characteristics of the most profitable fields were evaluated. Interviews were conducted with a small subset of farmers with the most profitable fields.

### Description of System

Integrating cover crops on Illinois fields presents challenges as cover crops typically involve significant system changes. The following system emerges as a standard for soybeans as the next crop (see Figure 1):



**Species:** Cereal rye is the species of choice when soybean is the following crop. Cereal rye typically has lower costs than other species and can be planted relatively late in the fall and still emerge in the spring. Cereal rye overwinters reliably most years across Illinois, taking up nitrogen in the fall and spring and releasing it back to the crop later in the growing season. Termination can be accomplished relatively easily with a broad-spectrum herbicide such as glyphosate.

**Planting:** Planting typically occurs after corn harvest, although some farmers also plant at harvest with attachments to the combine. Planting before harvest has fallen out of favor because seeding methods, such as aerial applications, are relatively expensive. Planting can occur by:

- Drill — Some farmers drill, which results in good emergence. A significant disadvantage of drilling is that it is slow. Drilling may work on one or two fields, but drilling becomes problematic if large acreages are devoted to cover crops.
- Broadcast without Incorporation — Cereal rye can be applied with fall fertilizer applications. This method avoids an additional field pass, with the only additional cost being the cost of the seed. Emergence can be an issue.
- Broadcast with incorporation — After broadcast application, fields are worked lightly with vertical tillage-type implements.
- Seeding with attachments on combine — This system eliminates the need for another field pass. The disadvantage is that it slows harvest.

**Planting Soybeans:** Yield advantages exist for planting soybeans early, with or without cover crops. If possible, soybean planting occurs in April in central Illinois.

**Terminating Cereal Rye:** Farmers have different preferences for terminating cover crops. Some terminate cover crops before planting soybeans. So doing reduces the risk of having cover crops compete with soybeans for moisture in dry years. Some wait to terminate cover crops after planting soybeans. So doing provides more material on the surface which can be moisture conserving in dry years, and potentially allows for fewer herbicide passes thereby reducing herbicide costs. Choice varies, with one farmer suggesting, “You have to do what the weather tells you to do.”

The above system is easier to adapt by those farmers already using a no-till system between corn and soybeans. For farmers using no-till, broadcasting cereal rye seeds after harvest is a straightforward step to begin cover crops. Farmers with tillage passes will find the above system more of a modification, particularly those that have spring tillage as part of their systems.

#### Historic Results


We evaluated the results of the cover crop systems described above by analyzing PCM data. Results come from highly productive soils in central Illinois, where corn is the preceding crop. The three systems are:

- Cover crops. To be included, a field must 1) use cereal rye as the cover crop species (no blends) and 2) plant cover crops after harvest using a drill or broadcast method. We did divide returns by seeding method. Drill and broadcast with incorporation had higher cover crop planting cost than does broadcast without incorporation. Higher costs were offset by a slightly higher, but not statistically different, yields.

- No-till without cover crops. These systems did not have tillage passes between corn harvest and soybean planting.
- One-pass without cover crops. These systems had one tillage pass between corn harvest and soybean planting. This tillage typically occurs in the spring before planting.


Table 1 shows per-acre results for the systems for the years 2019 through 2022. Results are:

**Table 1. Per Acre Soybean Results from Precision Conservation Management, Central Illinois, High-Productivity Farmland, Average from 2019 to 2022.**



	Cover Crops <sup>1</sup>	No cover crops	
		No-till	One-pass
Yield (bushels/acre)	67.3	67.8	68.0
Gross Revenue (\$ per acre)	\$783	\$783	\$786
Direct costs <sup>2</sup>	177	189	174
Power costs <sup>3</sup>	73	75	87
Overhead costs	33	33	33
Cover crop costs <sup>4</sup>	25	0	0
Total non-land costs	\$308	\$297	\$294
Operator and Land Return	\$475	\$486	\$492

<sup>1</sup> Includes cover crop fields with cereal rye as the species and seeded after harvest using drill or broadcast with or without incorporation.  
<sup>2</sup> Direct costs include fertilizer, pesticides, seed, drying, Storage, and crop insurance.  
<sup>3</sup> Power costs relate to each field pass whether preformed by the farmer or custom applied.  
<sup>4</sup> Cover crop costs includes the seed and additional field passes related to planting cover crops.

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- Yields across the systems are 67.3 bushels per acre for cover crop systems, 67.8 bushels per acre for no-till without cover crops, and 68.0 bushels per acre for one pass without cover crops. There is no significant difference in yields across these systems. Overall, the use of cover crops does not result in lower yields, and there is evidence that cover crops reduce low-end yields (see *farmdoc daily*, [October 3, 2023](#)).
- Direct costs are \$177 per acre for cover crops and \$189 for no-till systems. Cover crop systems have lower direct costs than no-till systems. Most of these lower costs come from herbicides, with some farmers eliminating one herbicide pass.
- Power costs are \$73 per acre for cover crops and \$75 per acre for no-till systems, essentially the same. One-pass systems have higher costs at \$87 per acre because of the additional field pass.
- Cover crop costs are \$25 per acre for cover crop systems. This includes seed, and additional field passes to plant the seed.

The above historical results do not include cost share or carbon program payments. For example, several farmers using cover crops received payments from NRCS programs such as Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), or Regional Conservation Partnership Program (RCPP). Without cost share or carbon payments, operator and land returns for cover crop systems were lower than the non-cover crop systems: \$475 per acre for cover crop versus \$486 for no-till and \$492 per acre for one-pass systems. At the current point in time, cover crop planting costs are not offset by lowering other costs or increasing yields.

#### Commentary

The use of cover crops in modern Midwest corn-soybeans systems is in its infancy. However, strides are being made to make cover crops an economical part of agriculture. Cover crops could be like conservation tillage in the 1970s and 1980s, a new system that takes time for farmers to improve techniques while technologies develop. The system presented here is not unique, as other studies by the Illinois Nutrient Research and Education Council, Natural Resources Conservation Service, and University of Illinois point towards this approach. The confluence of studies pointing to the same system suggests robustness in the system.

Cover crop systems have not achieved economic parity with non-cover crop systems without additional revenue from cost-share or carbon programs. Further advances could cause cover crop systems to achieve parity. For example, cover crop systems could improve soils such that yields increase in the future. Those yield increases could be off in the distance on the high-quality soils in central Illinois. Moreover, soil health likely plays a higher role in adverse years, such as the drought years in 1988 and 2012. When another such adverse year occurs, cover crop systems will likely show lower yield losses than on fields without cover crops.

Many of the interviewed farmers used cover crops for over five years. Most indicated that cover crops were part of the “long game” in which they were seeking the conservation and improvement of soils. Some viewed fertilizer and practice regulations as part of the future and thought that cover crop use would better prepare their operations to meet these challenges. All indicated that there is a learning curve to using cover crops.

All this information and more is featured in a new publication coming out in the March edition of *Prairie Farmer* titled, “Managing Risks with Cover Crops.” Be sure to check it out for more U of IL Extension analysis of cover crops as well as insights from the most profitable PCM farmers about their experiences and lessons learned using cover crops profitably. The guidebook will also be available digitally at [www.precisionconservation.org](http://www.precisionconservation.org).

# **CROP RESPONSE TO PHOSPHORUS FERTILIZER IN OHIO**

By Greg LaBarge

Source: <https://agcrops.osu.edu/newsletter/corn-newsletter/2024-03/crop-response-phosphorus-fertilizer-ohio>

Phosphorus (P) is an essential plant nutrient and P fertilizers are added to supplement the soil's available P. There are economic and environmental benefits to making informed decisions about P fertilizer use. The under-application of P fertilizer can result in reduced yields, while over-application adds to input costs, with economic losses resulting from both scenarios. From an environmental perspective, excessive P going into streams and lakes can result in toxic algal blooms.



A few frequent questions about P fertilizer use are: Does P fertilizer always result in a positive yield response? How much yield increase is expected with applied P? What is the likelihood of yield penalty if P fertilizer is not applied?

A recently published factsheet, **'Soil Phosphorus and Crop Response to Phosphorus Fertilizer in Ohio'** (<https://ohioline.osu.edu/factsheet/anr-0146>), provides a general overview of soil P and highlights the findings of Culman et al. (2023) to answer these practical questions (Rakkar and LaBarge, 2024). The study summarized 457 replicated field P trials conducted over the last 45 years across 40 counties in Ohio. The robust dataset evaluated corn, soybean, and wheat response to added P fertilizer in trials conducted on farms and at research stations.

Below are some key takeaways:

## **Does P fertilizer always result in a positive yield response?**

No. Out of the 457 field P trials, a significant increase in crop yield was observed in 107 trials with P application. The crop response to added P also varied among crop types. Corn responded to P application in 29.9% of trials, soybean in 14.2%, and wheat in 36.8% (Fig. 1).

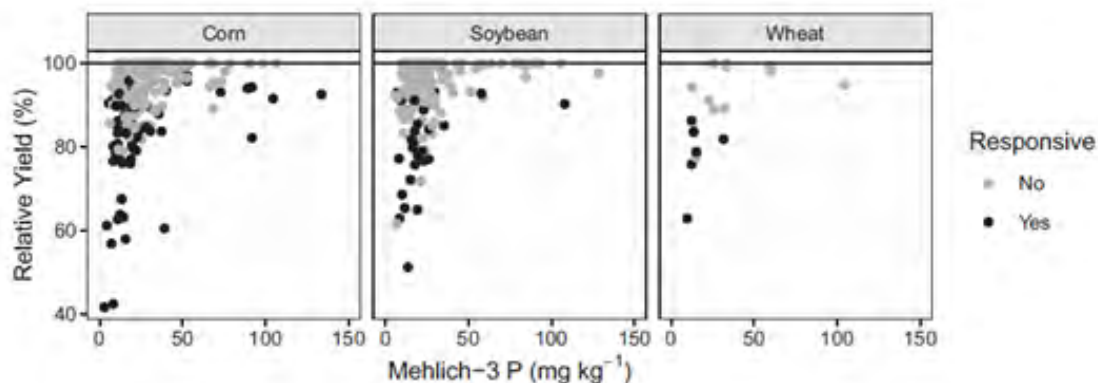


Fig. 1. Relation of relative yield and soil Mehlich-3 P for corn, soybean, and wheat across 457 field trials (Culman et al., 2023).

### How much yield increase is expected with applied P?

It depends on the Mehlich-3 soil test P level. The Mehlich-3 soil P measures the readily available soil P for crop uptake. Culman et al. (2023) classified Mehlich-3 soil P levels into five categories: <10, 10–20, 20–30, 30–40, and >40 ppm to evaluate the yield increase for each soil P category.

The crop yields were presented as Relative Yield, which refers to the yield with no P application divided by the maximum yield obtained across all P treatments. In other words, 100% relative yield means no yield increment with added P. The lower the relative yield, the higher the yield increment.

Generally, as the soil test P levels decreased, the yield increment increased with P input (Table 1). When the soil test P was less than 10 ppm, the median relative yield was 87%. As the soil test P level increased above the critical level of 20 ppm, the median relative yield ranged from 97% to 99%, signifying minimal yield increment with added P.

Table 1. Summary of crop response to P fertilizer by soil P classification. (adapted from Culman et al., 2023)



<b>Mehlich-3 soil P classification (ppm)</b>	<b>Number of trials</b>	<b>Fertilizer responsive trials (%)</b>	<b>Median Relative Yield (%)</b>
>40	71	14	99
30-40	53	13	98
20-30	121	12	97
10-20	164	34	93
<10	30	67	87

### **What is the likelihood of yield penalty if P fertilizer is not applied?**

We can also determine the likelihood of yield penalty based on Mehlich-3 soil P with the information in Table 1. When the soil P level was less than 10 ppm, 67% of trials showed increased crop yields with applied P. When the P levels were above the critical level of 20 ppm, only 12-14% of trials showed increased crop yields. In other words, the likelihood of yield penalty with no P application decreases as soil P levels go above 20 ppm. If the soil test P level is less than 20 ppm, there is an increased risk of yield penalty with no P application.

For more soil fertility resources, information, and tools, use the link [go.osu.edu/fertilityresources](http://go.osu.edu/fertilityresources).

## ***Lee's Monthly News Column***

Hello Trumbull County! We've been very fortunate in the last several years to see our agricultural community expand each year. This is primarily through new and beginning farmers deciding to start a farming enterprise. I anticipate seeing this continue due to a general interest in farming, and especially due to the pandemic as many people looked for other ventures to increase income or find enjoyment. If you are thinking about starting a farm in 2024, or started one recently here are a few tips to help you find success are below.

Make a plan. I'm guilty as anyone else about starting a farm enterprise without much planning, but learn from my mistakes. Don't buy a few cows on a whim at an auction and then figure out how to make it work. Planning for your operation will save you money, and help keep you on task. You should take an inventory of your assets and determine if you will need to make any investments before starting. Do you need fencing, have shelter for animals, adequate storage for crops or feed, or any other

possible infrastructure? Asking these questions in advance will help you plan your purchases in advance, and likely find a better deal on equipment.

Ask for help. The farming community is full of great people that want to see you succeed. Local farmers are the best resource you have at your disposal. They are familiar with our climate, soils, regulations, and have made many mistakes that you can learn from. Seeking help on the internet can be overwhelming. There is a lot of good information out there, a lot of bad information, and sometimes is a combination of both. Research on the internet will provide results from all over the world, while a farming practice may yield good results in Georgia, it may not be the best practice for Ohio.

Connect. In addition to connecting with other local farmers, connect with local organizations to expand your knowledge bank. OSU Extension, Soil and Water Conservation District, Farm Bureau, trade associations, etc. can provide additional resources that will help you better understand the business of farming. If you want to farm, you likely have the fundamental skill set to grow crops or raise livestock. Sometimes it's the business of farming that is a little more difficult to navigate. Budget sheets, taxes, regulations, and agricultural laws are the hardest for many new farmers to understand. These organizations can help relate those topics to your farm in easier to understand terms.

Be adaptable. The downfall of many new small farms is the inability, or unwillingness, to adapt to markets and capability. Much of this can be tied back to a lack of planning, but farms need to adapt to stay relevant. During your planning process consider the "what ifs" of your operation. What if you can't sell two acres of tomatoes? What if cattle are too large for your facilities? These are very real possibilities and can have financial consequences. If your original plan is not successful, tweak it so that it is. If tomatoes are not a profitable venture, diversify to a crop (or crops) that are. If cows are too big, maybe consider sheep or hogs. It's your farm, and nothing is written in stone unless you wrote it.

Farming has many ups and downs, but is an incredibly rewarding experience. Learning from your mistakes, being adaptable, and persevering will help you get through the first couple of years. It's the first few years of farming that are the hardest, but once you climb that learning curve, it gets easier.

If you are considering taking the farming leap, or are already in the water, don't hesitate to reach out to our OSU Extension office. We are here to help and want to see you succeed. We are having a Small Farm Financial College on March 9 and March 16 to help farmers of all sizes understand the business of farming. Call our office at 330-638-6783 or email me at [beers.66@osu.edu](mailto:beers.66@osu.edu) for more information. Take care and stay safe!

## **Upcoming Extension Programs**

The following programs have been scheduled for NE Ohio farmers. Check back each week as more programs are added to the calendar

### **Northeast Ohio Small Farm Financial College**

March 9 and March 16, 2024

Learn more or register at [go.osu.edu/NEOSFFC](https://go.osu.edu/NEOSFFC)

### **Private Pesticide/Fertilizer Applicator Training**

February 14, 2024 – Geauga County

March 11, 2024 – Ashtabula County

March 28, 2024 – Online via Zoom

Register at [Go.osu.edu/NEOPAT](https://Go.osu.edu/NEOPAT)

### **Northeast Ohio Agronomy School**

March 27, 2024 - Registration Opens Feb. 1<sup>st</sup>

### **Pruning Classes**

March 2<sup>nd</sup> – Hartford Orchard LLC

March 30<sup>th</sup> – Sage's Apple Orchard

**CFAES**

# 2024 Northeast Ohio Private Pesticide Applicator Re-Certification & Fertilizer Application Re-Certification Sessions

## Private Pesticide Applicator Re-certification:

Does your Private Pesticide Applicator's License expire on March 31, 2024? If so, OSU Extension in Northeast Ohio has planned four pesticide re-certification sessions for producers. Each of these sessions will offer 3 credits for pesticide re-certification for CORE and All Categories (1-7). Private Pesticide Applicators are encouraged to choose the session which best fits their schedule.

**Cost: \$40/Person**

## Fertilizer Applicator Re-Certification:

Does your Private or Commercial Fertilizer Applicators Certification expire soon? A one-hour session will be held after the pesticide session for those who need to renew their Fertilizer Application Certification.

**Cost: \$10/Person**

### 2024 Re-certification Programs:

- **Online via Zoom, Tuesday, December 14, 2023, 5:00 PM to 9:00 PM**
  - Pesticide starts at 5:00 PM, Fertilizer starts at 8:00 PM
- **Trumbull Co. Extension Office in Cortland, OH - Thurs, January 18, 2024, 5:00 PM – 9:00 PM**
  - Pesticide starts at 5:00 PM, Fertilizer starts at 8:00 PM
  - For more information call: 330-638-6783
- **Geauga Co. Extension Office in Burton, OH - Wed, February 14, 2024, 1:00 PM – 5:00 PM**
  - Pesticide starts a 1:00 PM, Fertilizer starts at 4:00 PM
  - For more information call: 440-834-4656
- **Ashtabula Co. Extension Office in Jefferson, OH – Mon, March 11, 2024, 1:00 PM – 5:00 PM**
  - Pesticide starts at 1:00 PM, Fertilizer starts at 4:00 PM
  - For more information call: 440-576-9008
- **Online via Zoom, Thursday, March 28, 2024, 5:00 PM to 9:00 PM**
  - Pesticide starts at 5:00 PM, Fertilizer starts at 8:00 PM



**To register, please visit**

**[Go.osu.edu/NEOPAT](https://go.osu.edu/NEOPAT)**





# NORTHEAST OHIO SMALL FARM FINANCIAL COLLEGE

Small and beginning farmers are encouraged to participate in this new in-depth farm management educational program!

This course will offer 10 hours of farm management education that will help start your farm on the path to financial success.

Instructors include OSU Extension Educators Andrew Holden and Lee Beers, and Farm Management Field Specialist in, David Marrison.

This two Saturday course will feature both live, in-person lectures, recordings from other state specialist, hands-on activities, take home assignments, and the ability to apply what is taught directly to your new or current farming operation.

**DATE:** Saturday, March 9 and Saturday, March 16, 2024

**TIME:** 9:00 AM – 3:00 PM

**LOCATION:** TBD

**COST:** \$100 per participant, \$50 per additional family member

Register here: [go.osu.edu/NEOSFFC](https://go.osu.edu/NEOSFFC)

Call Andrew Holden at 440-576-90089 with any questions!



**CFAES**

## Topics:

### **Starting Your New Farm Business**

Goals and Expectations  
Mission Statements  
Business Plan  
Farm Business Structure

### **Recordkeeping, Budgets and Taxes**

Enterprise Budgets  
Projecting Farm Income  
Cost of Production  
Introduction to Farm Taxes

### **Managing Your Small Farm's Finances**

Balance Sheets  
Cash Flow Statements  
Financial Statements  
Managing Income and Expenses

### **The Legal Side of Farm Financial Management**

Farm Financing  
Loan Options for Small Farms  
Farm Leases and Contracts  
Risks on the Farm  
Liability Insurance

## Sponsors:

OSU Extension-Ashtabula & Trumbull Counties

OSU Beginner and Small Farms Program

Farm Financial Management and Policy Institute (FFMPI)

Risser Farm Management Fund

Bruns Insurance Services



# Fertilizer Applicator Certification Training

**FEBRUARY 29, 2024 6 – 9 P.M.**

**[go.osu.edu/trumbullfert2024](https://go.osu.edu/trumbullfert2024)**

Do you apply fertilizer to 50 acres or more for crops that are primarily for sale? If so, you are required by Ohio law to attend a training session or take a test to become certified. OSU Extension Trumbull County is offering a training session (no test) that will meet all certification requirements. **Pre-Registration is required a week in advance.** Cost for this training session is \$35/person and includes training materials, and handouts. To register online with a credit or debit card please visit <https://go.osu.edu/trumbullfert2024>. You can also register by completing the back portion of this flyer and mail with check to the address below. Please make checks payable to Ohio State University Extension.

**Location:** OSU Extension Trumbull County, 520 West Main St, Cortland, OH 44410

**Cost:** \$35/person

**Contact information:** 330-638-6783 or [beers.66@osu.edu](mailto:beers.66@osu.edu)



THE OHIO STATE UNIVERSITY  
EXTENSION

**[trumbull.osu.edu](https://trumbull.osu.edu)**

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TRUMBULL COUNTY EXTENSION PRESENTS

# March Into Pruning! 2024 Pruning Clinic

OSU Extension is teaming up with Hartford Orchards LLC to provide a hands-on pruning clinic! The morning will start with a brief overview of pruning inside before we head out to the orchard. Please dress for the weather and bring your favorite pruners, loppers, or saws!

**DATE:** March 2, 2024

**TIME:** 9:00AM to 11:AM

**LOCATION:** Hartford Orchards LLC, 6953 OH-305, Hartford, OH 44424

**COST:** \$20 – Includes free hand pruners!

**PRE-REGISTRATION REQUESTED:** Register online at [go.osu.edu/pruning2024](https://go.osu.edu/pruning2024) or with the QR code.



For more information, visit [trumbull.osu.edu](https://trumbull.osu.edu) or call 330-638-6783

**CFAES**

**Topics Include:**

Fruit Tree Growth

Tools of the Trade

Proper Pruning  
Techniques

Knowing When to  
Stop!

Small Fruit Pruning  
Discussion

Q&A

EVENT SPONSOR:

Hartford  
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