

Auglaize County OSU Extension Weekly Agriculture Newsletter – March 18, 2020

Scouting and Latest Information



Hello!! Good afternoon! I pray you are well.

Governor DeWine recently issued a state of emergency and implemented a variety of strategies to reduce the spread of the disease. In order to do our part in reducing risk to our employees or clientele, we have implemented a teleworking plan. OSU Extension offices will be closed to the public until further notice. While our offices will be **physically closed**, we are committed to **continuing to conduct our work** as fully as possible. In recent years, we've invested in the technology needed to facilitate effective teleworking. We will utilize all our teleworking capabilities to **continue serving** our clientele and communities. You should continue to feel free to call, email, etc. with any OSU Extension staff member as you normally would. OSU Extension is deeply committed to the health and well-being of its staff and doing our part to help slow the spread of the Novel Coronavirus (COVID-19). Please call 701-541-0043 or e-mail me at stachler.1@osu.edu for all assistance. For anyone else in office visit our website at auglaize.osu.edu and go to the about tab to get their information. I'm able to make essential farm visits, but I must get permission first.

If you are a buyer or seller of hay, let me know and I can keep a list to share with others. Call the OSU Extension office at 419-739-6580 or e-mail me at stachler.1@osu.edu.

Farm bill sign up has ended!

I'm looking for people to **conduct research** with me this season, especially research on waterhemp!! Please contact me soon so we can get things lined up. If you have any suggestions on research, let me know.

If anyone is interested there is a grower in the county that would like to hire someone to do some strip tillage this spring as he will not have time to plant and make strips at the same time. If you are interested in doing this or know of someone who is interested, please contact me and I will get you in touch with the farmer.

Joke: What do farmers use to make crop circles??

Rain fell for four days this past week and snow Saturday! Rainfall on Tuesday, March 10th ranged from 0.2" near Mercer Line and St. Rt. 197 roads to 0.39" near Santa Fe – New Knoxville and Shelby-Fryburg roads. Rainfall on Thursday ranged from 0.61" near Valley and Idle roads to 1.25 near Dowty and County Road 66A roads. Total liquid precipitation on Saturday ranged from 0.03" near Valley and Idle roads to 0.25" near Santa Fe-New Knoxville and Shelby-Fryburg roads and near Uniopolis. Rainfall on Monday ranged from a Trace near County Road 66A and St. Rt. 66 to 0.07" near Santa Fe-New Knoxville and Shelby-Fryburg roads. Rainfall for the week ranged from 1" near Valley and Idle Roads to 1.68" near County Road 66A and Dowty roads. Rainfall for the week averaged 1.36", 0.95" more than last week.

The average high temperature now is 48 degrees F, three more than last week! We are on the rise. Temperatures were above normal for 4 days of the week and below normal for 3 days of the week. The range in high temperature for the week was 38 to 59 degrees F. The average high temperature for the week was 49 degrees F, which is 2 degrees cooler than last week and near the normal.

Wheat – Wheat is greening up! There is no NEED to apply nitrogen fertilizer at this time, unless the wheat did not tiller last fall. You CAN apply nitrogen now if desired but ONLY if making a second application. Now is the time to evaluate wheat stands since some of them are marginal. Weeds are beginning to grow and flower in wheat. If your fields typically just have winter annual weeds, then herbicides can be applied at any point in time now. I have photos below of some common weeds in wheat. Remember to scout closely and control the cressleaf groundsel since it is poisonous. Huskie is the most effective herbicide, but it has a four-month rotation restriction to soybean, so no double crop soybeans. Where double crop soybeans will be

grown, apply tribenuron or thifensulfuron plus tribenuron plus 2,4-D ester at 0.5 pounds acid equivalent per acre. Remember 2,4-D should be applied prior to the joint stage. I have not rated the wheat for some time. I rate the wheat the same as last week which was 7% excellent, 29% good, 69% fair, and 0% for poor and very poor.

Alfalfa – Alfalfa is growing, so dormant applications can no longer be applied except for Velpar which needs to be on before 2-inch alfalfa.

Corn – Nothing to report.

Soybean – Nothing to report.

Weeds – Winter annual weeds are growing and flowering. I need to check some more for emergence of summer annual weeds, but they may be starting to emerge because I saw two emerged Canada thistle plants yesterday. If you need help planning your herbicide programs, feel free to call me.



upper left is henbit, center is field pennycress



common chickweed



cressleaf groundsel



shepherd's-purse



purple deadnettle



plant in center is purslane speedwell; other is mouseear chickweed

Insects – Based upon my windshield insects are becoming active again. With the warm winter we are likely to see more insect issues compared to last year, but that is no guarantee.

There were NO changes to the XtendiMAX, FeXapan, Engenia, and Tavium labels. The Engenia label still has the most approved products compared to XtendiMAX and FeXapan. No new herbicides were added

to the XtendiMAX label this past week, which totals 234 herbicides. No new adjuvants were added to the XtendiMAX label, now totaling 397. No new nozzles were added to the XtendiMAX label, which totals 36. No new Drift Reducing Adjuvant (DRA's) were added to the XtendiMAX label this week, making a total of 90 DRA's. No new nutritional products were added to the XtendiMAX label which totals 238. No new products were added to the Insecticides, Fungicides, Plant Growth Regulator and Other group on the XtendiMAX label which totals 104. No new adjuvants were added to the Engenia label, which now totals 560. No new herbicides were added to the Engenia label, which brings the total herbicide count to 167. No new products were added to the Other category (growth regulators and fungicides) on the Engenia label, which totals 31. No new insecticides were added to the label which currently has 34 products. No new Drift Reducing Adjuvants (DRA's) were added to the Engenia label, which totals 126. No new nozzles were added to the Engenia label, which totals 31. No new nutritional products were added to the Engenia label which totals 223 products. No new products were added to the pH Modifier group of the Engenia label which totals 17 products. The FeXapan label has many of the same products and nozzles as the XtendiMAX label, but NOT all are the same, so check the FeXapan label carefully. There are 120 herbicides, 49 DRA's, 312 adjuvants, 151 nutritionals, 44 insecticides, fungicides, and others, and 26 nozzles that have been approved for the FeXapan label. There are 47 herbicides, 77 DRA's, 258 adjuvants, 30 nutritionals, 16, insecticides, 7 fungicides, 8 other products, and 41 nozzles approved for use with Tavium.

Upcoming Meetings

1. **eFields Webinar Meeting.** eFields is an Ohio State University program dedicated to advancing production agriculture through the use of field-scale research. This webinar will report 2019 research results. This webinar is scheduled to take place on March 25, 2020 from 9:00 to 10:00 AM. To register for the webinar go to the following website: go.osu.edu/eFieldsWebinar
2. **All face to face meetings have been cancelled or postponed through March 31st. Meetings after this date will go on as planned at least until further notice.**

Answer to joke: A pro-tractor!

How to Terminate Cover Crops



Not much cover crop got planted last fall and most of it is very small at this time. Cover crops provide protection from soil erosion, utilize nutrients applied in the fall, and improve soil health. However, the termination of cover crops can be difficult if not managed properly.

Improperly terminated cover crops can potentially become weeds, especially annual ryegrass, can slow soil drying and warming the soils in the spring, and cause yield loss. When cover crops are allowed to get excessively large the plants can actually dry out the soil and cause yield loss, especially for corn. It is important to control cover crops at least 10 days in advance of planting corn to break the green bridge between the cover crop and corn emergence to reduce the risk of cutworm and armyworm problems. When selecting an herbicide program for termination of a cover crop consider: The cover crop species; The cover crop growth stage; Other weed species present; The crop to be planted; The weather conditions at application; and the type of herbicide used.

Annual ryegrass is the most difficult species to control. Terminate ryegrass before it reaches six inches in height or before the plants begin to joint. If applying glyphosate to ryegrass greater than six inches increase the rate. Apply glyphosate at a minimum rate of 1.5 pounds acid equivalent per acre or 44 fluid ounces of a Roundup branded product. If plants get over six inches apply glyphosate up to 2.5 pounds acid equivalent per acre. Purdue University data shows adding Sharpen at 1 ounce per acre with glyphosate at 1.5 pounds per acre can improve ryegrass control. Mixing atrazine or metribuzin with glyphosate may reduce control due to antagonism. During periods of cold weather allow the ryegrass to resume growth and allow several days of

temperatures above 55 to 60 degrees F before spraying. Apply glyphosate when plants are actively growing and daytime temperatures are above 55°F. Do not spray if nighttime temperatures go below 40 degrees F. High rates of paraquat plus atrazine applied before corn planting can effectively control ryegrass. Apply the paraquat plus atrazine mixture at a spray volume of 20 gallons per acre.

Cereal rye and wheat are much easier to control. However the recommendation is still to terminate these crops early. Apply glyphosate at least at 0.75 pounds acid equivalent per acre or 22 fluid ounces per acre of a Roundup branded product for rye and 1.125 pounds acid equivalent per acre or 32 fluid ounces per acre of a Roundup branded product for wheat. If plants get over 18 inches in height or tank-mixing other products with glyphosate, increase the rate to 1.125 to 1.5 pounds acid equivalent per acre.

For control of crimson clover and Austrian winter pea apply glyphosate at 1.125 pounds acid equivalent per acre plus 2,4-D ester at 1 pint per acre. Red clover is more difficult to control. Plants should have some good growth on them before applying herbicides. For red clover, apply glyphosate at 1.5 pounds acid equivalent per acre plus 2,4-D ester at 1 pint per acre. Control may not be complete, so scout to determine if an early postemergence application of glyphosate is necessary in glyphosate-resistant soybean or corn. Another option to more effectively control red clover in the burndown is to apply dicamba at 8 fluid ounces per acre plus 2,4-D ester at 1 pint per acre plus glyphosate at 1.125 pounds per acre. However, soybean planting must be delayed 14 days following one inch of rain, so be careful. Be sure the seed slot is closed for corn and soybean as injury will occur. It is advised to delay planting of corn at least 7 days to reduce injury risk when using dicamba. The use of a clopyralid product will more effectively control legume species in corn.

Scout fields for weeds prior to herbicide application to determine the need for additional herbicides.

C.O.R.N. Newsletter

<https://agcrops.osu.edu/newsletter/corn-newsletter>

Wet Weather for the Rest of March



Current Conditions...Soil moisture conditions remain wet due to last years very wet conditions along with an overall damp winter. Current soil moisture conditions can be found at the NOAA/NWS website: https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml# What it shows is Ohio is ranked anywhere from the top 5-25% of wettest years on record for soil wetness depending on where you are in Ohio. This is slightly drier than at the same time last year but bottom line it is still wet. The last 30-days of rainfall is generally between 90-140% of normal across Ohio. The extreme northwest corner of Ohio has been running at about 80% of normal. About 75% of the state has been running wetter than normal the last 30 days with about 25% a little drier than normal. You can get all the latest information on precipitation at 4 km resolution at: <https://water.weather.gov/precip/> This data is quality controlled by humans at the river forecast centers like OHRFC.

Future Conditions...The outlook for the rest of March calls for slightly above normal temperatures with much above normal rainfall. Temperatures for the week of March 16 will be above normal but with big temperature swings. Temperatures will likely run a little colder than normal the week of March 23.

Rainfall will average 1.75 to 3.50 inches for the remainder of March, see NOAA/NWS/OHRFC attached image. Normal for that period is 1.5 to 2.0 inches.

For April expect above normal temperatures and above normal rainfall.

For May expect above normal temperatures with a gradual turn from wetter than normal to normal rainfall.

Frost/Freeze Outlook...Indications are even with somewhat above normal temperatures expected overall this spring, there is enough swings in the pattern to expect about a normal last frost/freeze across the state.

Soil Temp Outlook...Soil Temperatures are running mainly in the 30s north of I-70 and in the 40s to the south of I-70. Temperatures due to the winter have generally been above normal. However, we expect them to trend close to normal due to the high amount of water in the soils. Therefore, even if air temperatures run

somewhat above normal, evaporation off the wet soils will keep ground temperatures close to normal as we go into the growing season.

For summer, indications still remain a gradual turn from wetter to drier with warmer than normal conditions.

Climate Outlook Websites...You can see all the latest climate outlooks at the NOAA Climate Prediction Center: <https://www.cpc.ncep.noaa.gov> For the latest Water Resources Outlooks for soil conditions, floods etc, you can monitor the NWS Ohio River Forecast Center Page at: <https://www.weather.gov/ohrfc/WRO>

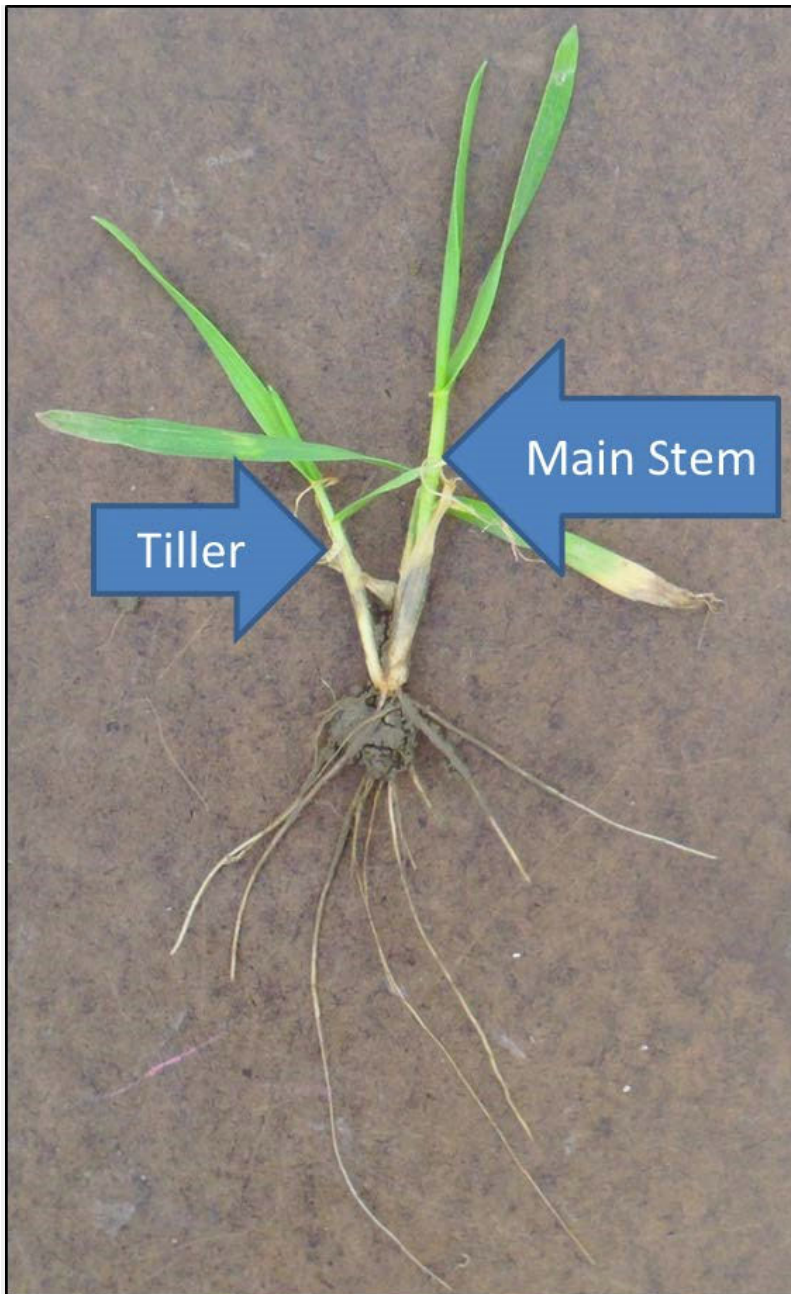
Author(s):

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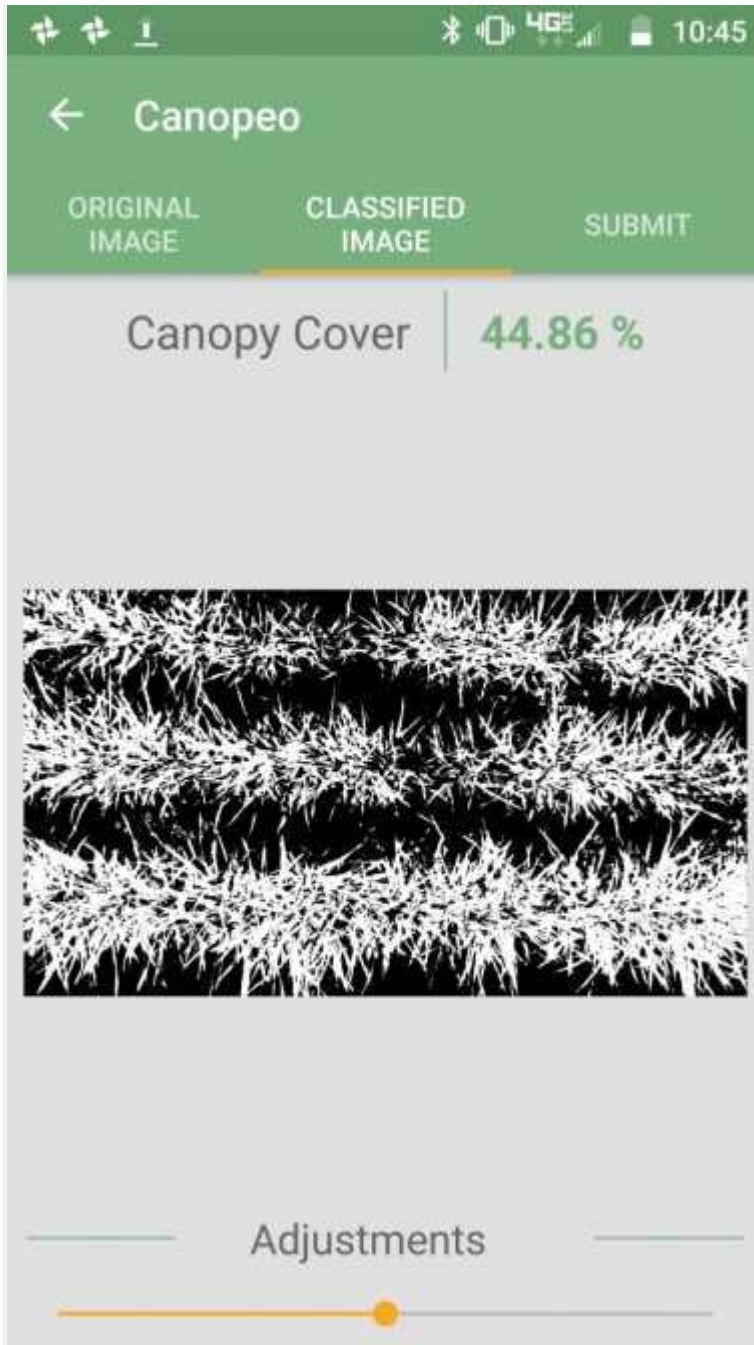
Winter Wheat Stand Evaluation



Between planting in the fall and Feekes 4 growth stage (beginning of erect growth) in the spring, winter wheat is vulnerable to environmental stress such as saturated soils and freeze-thaw cycles that cause soil heaving. All of which may lead to substantial stand reduction, and consequently, low grain yield. However, a stand that looks thin in the spring does not always correspond to lower grain yield. Rather than relying on a visual assessment, we suggest counting the number of wheat stems or using the mobile phone app (Canopeo) to estimate wheat grain yield.



Wheat stem count method. Wheat stems (main stem plus tillers) should be counted at Feekes 5 growth stage (leaf sheaths strongly erect) from one linear foot of row from several areas within a field.



Canopeo mobile phone app method. Canopy cover should be measured at Feekes 5 growth stage using the mobile phone application, Canopeo (<http://canopeoapp.com>). After accessing the app, hold your cell phone parallel to the ground to capture three rows of wheat in the image and take a picture. The app will convert the picture to black and white and quantify (as a percentage) the amount of green pixels in the image. For example, the screen shot here shows 44.86% canopy cover. (Keep in mind, this app will quantify anything green in the image. So, if you have a weedy field, the weeds will also be quantified in the canopy cover estimate.)

After counting the number of wheat stems or measuring canopy cover using the Canopeo app, the table below can be used to estimate wheat grain yield. For example, if an average of 51 stems is counted from one foot length of row, the predicted grain yield would be 100 bu/acre. Similarly, if the average canopy cover was 35%, the predicted grain yield would be 100 bu/acre.

Grain Yield (bu/acre)	Stem Count (number/foot of row)	Canopy Cover (%)
85	27	17
90	34	23
95	42	29

100	51	35
105	63	41
110	80	47
115	100	53
120	---	59
125	---	65
130	---	71

This table was generated using data from two years and two locations (four different environments). During these two years, wheat grain yield was relatively high. We do not have data for wheat grain yield <85 bu/acre. However, we are continuing this work and hope to capture a wider range of yields to expand this table.

For more information, please see: <https://stepupsoy.osu.edu/wheat-production/yield-estimates>

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Phosphorus Placement Effects on Yield and Water Quality in a Corn-Soybean Rotation



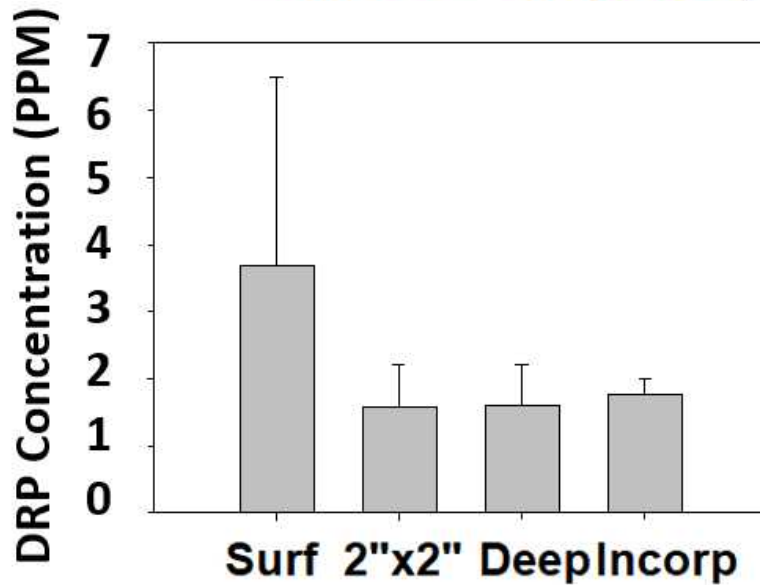
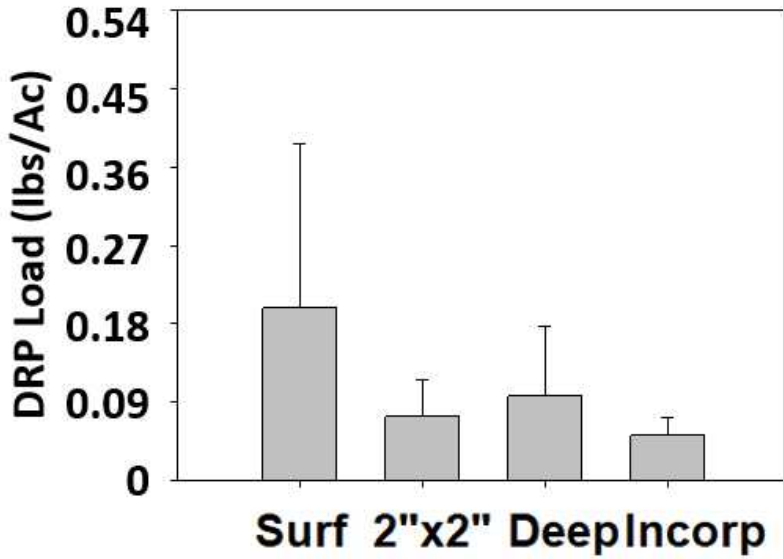
Phosphorus placement has been discussed as a 4R Best Management Practice that results in lower nutrient losses than when P is surface applied and left on the surface. The concept is that by mixing granular fertilizer with the soil, we expose the nutrient to more soil surface area for attachment. A replicated trial was established at the Northwest Agricultural Research Station-OARDC located near Custer, OH to measure water quality and crop yield with four fertilizer placement options.

Four phosphorus fertilizer treatments are being used:

1. Surf - Broadcast surface application in fall
2. 2"x2" - 2 by 2 placement at spring planting
3. Deep - Deep banding using strip till unit in fall
4. Incorp - Surface application with disk incorporation in fall

Corn and soybean are planted on 50% of the plot each year. The rate of phosphorus applied for fall treatments is 128 pounds P_2O_5 applied after the soybean crop and 64 pounds P_2O_5 in the 2 by 2 placement to both corn and soybean. Fertilizer treatment were applied in fall of 2018/spring 2019. The STP level is 40 PPM Mehlich III. Water samples are collected using ISCO samplers with only water from subsurface drainage collected.

Preliminary water quality results are presented below for the period January to September 2019. The surface placement plot yielded the highest concentration of DRP and loading in the collected tile water. All treatments that placed P_2O_5 in contact with the soil resulted in lower DRP concentrations and loading. Figure 1. DRP Concentration and Load from phosphorus placement measured through subsurface drainage.



Corn and soybean yield average 144.4 and 47.7 bushels per acre respectively with no significant response to fertilizer placement. Yield response data is shown in Table 1 below.

Table 1. Corn and Soybean yield from phosphorus placement in 2019.

Placement	Soybean (bu/A)	Corn (bu/A)
Surf	45.8	132.0
2"by2"	49.7	152.7
Deep	48.2	133.7
Incorp	47.0	159.2
LSD (0.1)	4.0	49
CV	4.2	17
	NS	NS

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Topdressing Wheat with Liquid Swine Manure



Veenhuis toolbar on wheat

Wheat fields will begin to firm up in Ohio and the topdressing with nitrogen fertilizer will soon start. There is usually a window of time, typically around the last week of March or the first week of April, when wheat fields are firm enough to support manure application equipment. By this date, wheat fields have broken dormancy and are actively pulling moisture and nutrients from the soil.

The key to applying the correct amount of manure to fertilize wheat is to know the manure's nitrogen content. Most manure tests reveal total nitrogen, ammonia nitrogen and organic nitrogen amounts. The ammonia nitrogen portion is readily available for plant growth. The organic nitrogen portion takes considerably longer to mineralize and generally will not be available when wheat uptakes the majority of its nitrogen in the months of April and May.

Most deep-pit swine finishing manure will contain between 30 and 40 pounds of ammonia nitrogen per 1,000 gallons. Finishing buildings with bowl waters and other water conservation systems can result in nitrogen amounts towards the upper end of this range. Finishing buildings with fixed nipple waters and surface water occasionally entering the pit can result in nitrogen amounts towards the lower end of this range.

The typical application rate for liquid swine finishing manure on wheat is 4,000 gallons per acre. Wheat removes 0.49 pounds of P₂O₅ per bushel harvested. When also harvesting the wheat straw, a ton of wheat straw contains between three and four pounds of P₂O₅. So, a 100 bushel wheat crop with one ton of straw also removed would withdraw about 52 pounds of P₂O₅ per acre. This is likely about the same amount of P₂O₅ as 4,000 gallons of swine manure would contain but review your manure test to make this determination.

If you are participating in the H₂O_hio program, manure must be incorporated if being applied to wheat in the spring. The grassland application toolbar (also known as the **Veenhuis toolbar**, see header above and

picture below) slices furrows in wheat, forage, and pasture fields at a spacing of about 7.5 inches and places manure over the furrows. I believe the Ohio Department of Agriculture will approve this as incorporation but check with your local Soil and Water Conservation District in advance to be sure. OSU Extension has conducted manure research using the grassland applicator in replicated plots and got yields slightly better than top-dressed urea.



A farmer near New Washington, Ohio has a refurbished 22-foot wide grassland applicator with a hitch designed to be pulled behind a manure tanker. He is willing to rent the toolbar on a per acre basis if anyone wants to give the technology a try. Aerway and Gentill toolbars will not currently qualify in the H2Ohio program as manure incorporation toolbars.

When applying livestock manure to wheat it's recommended to follow the NRCS #590 Waste Utilization Standard to minimize potential environmental impacts. These standards include a 35 foot wide vegetative strip setback from ditches and streams. Applicators in the Western Lake Erie Basin also need to look at the weather forecast to be certain there is not greater than a 50 percent chance of a half-inch of rain in the 24 hours following manure application if surface applying. Print this forecast so you have proof in the event of a surprise rain downpour.

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"What's your number?" The SCN Coalition is still in progress



There is a lot of information already out and if you haven't take the time, check out the website, www.TheSCNcoalition.com for training and infographics about soybean cyst nematode, you can bookmark this for as you prepare your fields— while on autosteer. Only on autosteer. Our Ohio site, with updated information is also ready www.u.osu.edu/ohscn/. Take your time to see where this pest has been detected, where some of the hot spots are and what we need to be aware of for management. This pest can not be eradicated or removed from a field once it is there, but there is no reason why it should take a lot of our soybean yield, we just need to manage it and that starts with knowing your number. The first surveys for SCN, early 1990's, found it sporadically in the state but some populations were very high. In a survey of fields in southern Ohio during the late 2000s, high populations of SCN were found in

fields where yields were consistently low. One of the more recent check-off funded projects, identified that more fields than 20 years ago has SCN. Among the 143 fields sampled at a depth of 6 to 8 inches in 51 counties in Ohio, SCN was detected in 81% of the fields and only 6 of the 147 were above the yield damaging levels.

In the current survey, SCN is now at economically damaging levels in approximately 15% of the fields sampled in the current survey. This is a concern.

In addition to more fields planted more frequently to soybean, there are other potential reasons for this increase. SCN has been managed very well for the last 20 years by the deployment of soybean varieties with the PI 88788 source of resistance. However, in Ohio as well as many areas of the Midwest, certain fields have populations that are adapting to this resistance. This resistance is a “slow shift” where the SCN reproduction on the resistant line is greater than 10% compared to a susceptible control cultivar. In fungi, where resistance has developed towards some fungicide this measurement would be 100%, one mutation and the fungus is good to go. In SCN there are several loci and as we now know many copies of the genes, so it is taking longer to adapt but also it is a slow shift where the SCN reproduction of some populations in Ohio and other areas of the Midwest are in the 15, 20, and 30%. Ultimately this means that the resistance can still be used. But for how long, and what fields are we expecting yield loss even with varieties developed from the PI 88788 source of resistance.

In the current survey, we are picking up populations that are adapting to the PI 88788 and Peking sources of resistance.

We are still accepting samples, but we will not process them until later this spring. If you collect samples just hold them in a cool spot in the barn or cellar, out of the light and heat. The survey will end this summer, so while we are practicing social distancing and you need to get out and get some fresh air, take your soil sampler and hit some of those low spots in the fields.

Author(s):

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eFields 2019 Results Webinar - March 25, 9 AM



Have you been enjoying the 2019 eFields Report and are excited to learn more? The Ohio State Digital Ag team is hosting an eFields Results webinar on March 25th, 9 – 10 AM. Join us to learn more about the eFields program and results we are seeing across the state. The webinar will feature presentations highlighting popular trials including seeding rate, nutrient management, and crop management. We would also like to hear from you about what topics you are interested in seeing in eFields in the future. There is no cost to attend; for more information or to register visit: go.osu.edu/eFieldsWebinar.

Author(s):

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H2Ohio Signup to be Extended



The deadline to enter into a contract with the H2Ohio program for farmers in the 14-county, Maumee River watershed is being extended. The original deadline was March 31st but due to COVID-19, more farmers and Soil and Water Conservation District personnel are conducting information exchanges through phone calls and e-mails.

The H2Ohio deadline is expected to be extended to June 2nd, tentatively. Contact your local Soil and Water Conservation District for more details.

Author(s):

[Glen Arnold, CCA](#)

Other Articles

Chow line: Food safety and coronavirus

[Sanja Ilic and Tracy Turner](#)

MARCH 13, 2020

SOURCE: <https://cfaes.osu.edu/news/articles/chow-line-food-safety-and-coronavirus>

Read paragraphs 3 and 4 for some important information about COVID-19



Photo: Getty Images

Do I need to worry about food safety in regard to coronavirus? Specifically, can food become contaminated with coronavirus and thereby infect people?

There have been no reports of this happening.

As of this time, the U.S. Department of Agriculture, is unaware of any instances suggesting that coronavirus, COVID-19, has been transmitted by foods. This includes meats, fruits, and vegetables. Moreover, the USDA has created a website dedicated to answering questions regarding food, food safety, and [COVID-19](#).

Coronaviruses are a large **family of viruses that include the common cold, severe illnesses such as severe acute respiratory syndrome (SARS), and Middle East respiratory syndrome (MERS)**, all of which can infect both humans and animals, according to the World Health Organization (WHO).

Common **symptoms** of COVID-19 **include fever, coughing, shortness of breath, and breathing difficulties**. Symptoms range from mild to severe respiratory illness. Advanced age or conditions such as various cancers, COPD, asthma, heart disease, and diabetes are associated with an increased severity of COVID-19 infections and fatality rates.

Coronaviruses transmit person-to-person through droplets that are produced when an infected individual coughs or sneezes, said Qihong Wang, a scientist and coronavirus researcher with The Ohio State University College of Food, Agricultural, and Environmental Sciences (CFAES).

“The virus is most often transferred to another individual when droplets directly reach their nose, mouth, or eyes, or through close contact such as a handshake,” she said. “The virus can also transmit by touching an object or surface with the virus on it and then touching your mouth or eyes before washing your hands.”

Experimental studies with a bovine coronavirus have shown that the virus can be stable on the surface of lettuce, said Linda Saif, a scientist and coronavirus researcher at CFAES and Ohio State’s College of Veterinary Medicine.

“Coronaviral RNA was detectable on the lettuce surface for 30 days, and infectious bovine coronavirus was detected on the lettuce surface for at least 14 days after inoculation,” said Saif, who is a world-renowned expert on coronaviruses. “However, from experience with previous outbreaks of SARS and MERS, the transmission through food consumption is not likely to occur.”

Further, the transmission through foods is not possible if the foods are cooked properly since coronaviruses are inactivated by heat, much like other human pathogens, Saif said.

“There is no information whether COVID-19-infected food handlers could contaminate uncooked produce that is not further treated,” Saif said.

Although consumers should not be too worried about COVID-19 transmissions from food, everyone should follow good hygiene practices when preparing foods to lessen their chances of contracting the virus from other sources, said Sanja Ilic, food safety state specialist with Ohio State University Extension, CFAES’ outreach arm.

“It’s important to protect yourself and your loved ones that may be at risk from the severe form of COVID-19,” Ilic said. “The Centers for Disease Control and Prevention recommends that everyone wash their hands often; refrain from touching their mouth, nose, and eyes; and use hand sanitizer that is at least 60% alcohol.”

“In addition, everyone should avoid crowded spaces and any contact with people that may be infected.”

Cleaning surfaces is also important, she said.

A recent study found that coronaviruses can persist up to nine days on inanimate surfaces such as metal or plastic, according to the [Journal of Hospital Infection](#). Coronaviruses persist longer at lower temperatures and when the humidity is higher. Surface disinfection with 0.1% sodium hypochlorite or 62%–71% ethanol significantly reduces the infectivity of coronavirus on surfaces within one minute of contact.

“As with any food safety measures, you should always wash your hands before, during, and after food preparation and before you eat any foods,” Ilic said. “Additionally, you should be sure to carefully wash any surfaces used for food preparation.”

When handling raw meats, fish, and poultry, keep them separate from other foods, cook them to the correct temperature, and refrigerate the cooked foods within two hours of preparation. This is because bacteria that can cause food poisoning multiply the quickest between 40 and 140 degrees Fahrenheit, Ilic said.

Always use a food thermometer to ensure that your meat is cooked to the correct internal temperature to destroy any harmful bacteria such as *E. coli* or salmonella, according to the USDA.

For meats such as steak and pork, that temperature is 145 degrees. For ground meats—including beef, pork, veal, and lamb—the correct temperature is 160 degrees, the USDA says. And poultry such as chicken and turkey should be cooked to an internal temperature of 165 degrees.

Other food safety tips from the USDA can be found [here](#).

At restaurants and retailers—particularly those that offer buffet-style foodservice—be mindful to protect yourself and others, Ilic said.

“Avoid touching the fresh produce, and make sure you never cough or sneeze in or around fresh produce display refrigerators,” Ilic said. “Don’t serve yourself at the buffet without washing your hands first, and avoid coughing or sneezing around self-serve or buffet foods.”

New viable CRISPR-Cas12b system for plant genome engineering

Date: March 9, 2020

Source: University of Maryland

Source: <https://www.sciencedaily.com/releases/2020/03/200309130101.htm>

In a new publication in *Nature Plants*, assistant professor of Plant Science at the University of Maryland Yiping Qi has established a new CRISPR genome engineering system as viable in plants for the first time: CRISPR-Cas12b. CRISPR is often thought of as molecular scissors used for precision breeding to cut DNA so that a certain trait can be removed, replaced, or edited. Most people who know CRISPR are likely thinking of CRISPR-Cas9, the system that started it all. But Qi and his lab are constantly exploring new CRISPR tools that are more effective, efficient, and sophisticated for a variety of

applications in crops that can help curb diseases, pests, and the effects of a changing climate. With CRISPR-Cas12b, Qi is presenting a system in plants that is versatile, customizable, and ultimately provides effective gene editing, activation, and repression all in one system.

"This is the first demonstration of this new CRISPR-Cas12b system for plant genome engineering, and we are excited to be able to fill in gaps and improve systems like this through new technology," says Qi. "We wanted to develop a full package of tools for this system to show how useful it can be, so we focused not only on editing, but on developing gene repression and activation methods."

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It is this complete suite of methods that has ultimately been missing in other CRISPR systems in plants. The two major systems available before this paper in plants were CRISPR-Cas9 and CRISPR-Cas12a. CRISPR-Cas9 is popular for its simplicity and for recognizing very short DNA sequences to make its cuts in the genome, whereas CRISPR-Cas12a recognizes a different DNA targeting sequence and allows for larger staggered cuts in the DNA with additional complexity to customize the system. CRISPR-Cas12b is more similar to CRISPR-Cas12a as the names suggest, but there was never a strong ability to provide gene activation in plants with this system. CRISPR-Cas12b provides greater efficiency for gene activation and the potential for broader targeting sites for gene repression, making it useful in cases where genetic expression of a trait needs to be turned on/up (activation) or off/down (repression).

"When people think of CRISPR, they think of genome editing, but in fact CRISPR is really a complex system that allows you to target, recruit, or promote certain aspects already in the DNA," says Qi. "You can regulate activation or repression of certain genes by using CRISPR not as a cutting tool, but instead as a binding tool to attract activators or repressors to induce or suppress traits."

This ability gives CRISPR-Cas12b an edge over CRISPR-Cas12a, particularly when gene activation is the goal. Additionally, the system retains all the positives that were inherent in CRISPR-Cas12a for plants, including the ability to customize cuts and gene regulation across a broad range of applications. In fact, Qi and his lab were even able to repurpose the CRISPR-Cas12b system for multiplexed genome editing, meaning that you can simultaneously target multiple genes in a single step.

"Added complexity allows targeting of more specific or other effectors for gene activation, repression, or even epigenetic changes," says Qi. "This system is more versatile because we can play with more modifications, more domains, and there are therefore more opportunities to engineer the whole system. Only when you have this kind of hybrid system with more complexity do you get the most robust gene activation and editing capabilities."

The initial work for CRISPR-Cas12b completed in this paper was conducted in rice, which is already a major global crop. However, Qi and his lab hope to explore more systems to further enhance and improve plant genome engineering, including developing applications to additional crops.

"This type of technology helps increase crop yield and sustainably feed a growing population in a changing world. In the end, we are talking about broad impact and public outreach, because we need to bridge the gap between what researchers are doing and how those impacts affect the world," stresses Qi.

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Comparisons of organic and conventional agriculture need to be better, say researchers

CHALMERS UNIVERSITY OF TECHNOLOGY

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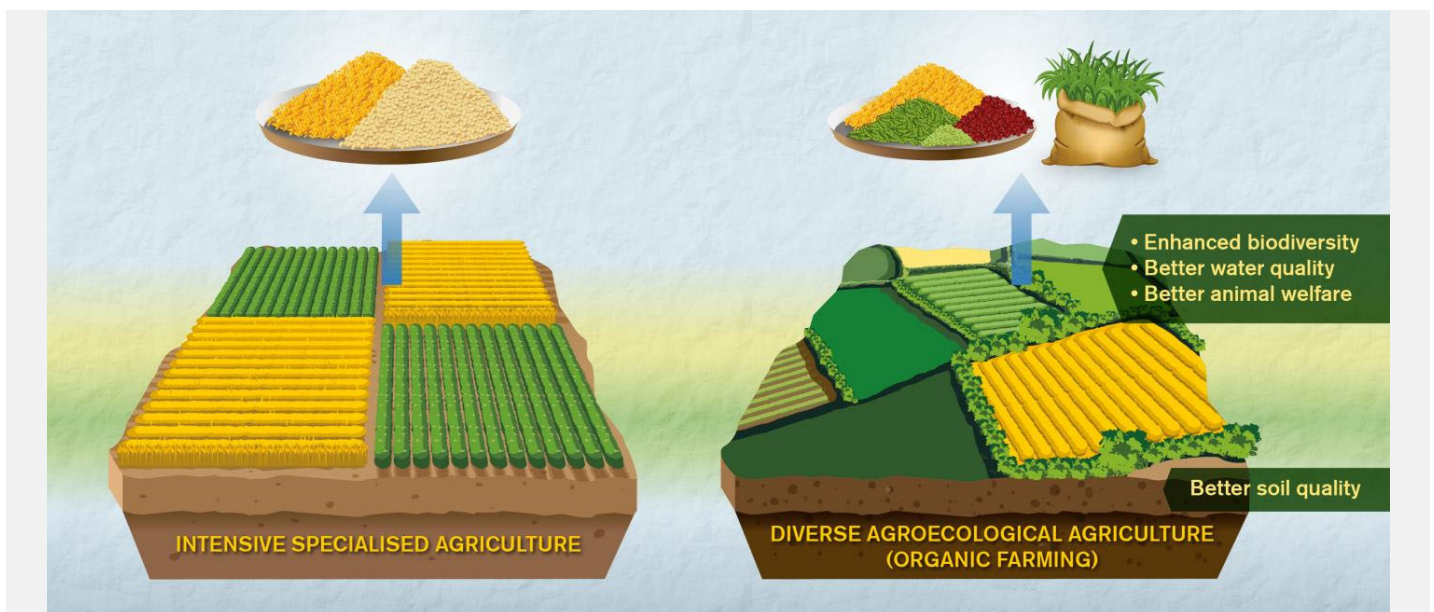


IMAGE: THE ENVIRONMENTAL EFFECTS OF AGRICULTURE AND FOOD ARE HOTLY DEBATED. BUT THE MOST WIDELY USED METHOD OF ANALYSIS OFTEN TENDS TO OVERLOOK VITAL FACTORS, SUCH AS BIODIVERSITY, SOIL QUALITY, PESTICIDE... [view more](#)

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The environmental effects of agriculture and food are hotly debated. But the most widely used method of analysis often tends to overlook vital factors, such as biodiversity, soil quality, pesticide impacts and societal shifts, and these oversights can lead to wrong conclusions on the merits of intensive and organic agriculture. This is according to a trio of researchers writing in the journal *Nature Sustainability*.

The most common method for assessing the environmental impacts of agriculture and food is Life Cycle Assessment (LCA). Studies using this method sometimes claim that organic agriculture is actually worse for the climate, because it has lower yields, and therefore uses more land to make up for this. For example, [a recent study in *Nature Communications* that made this claim](#) was widely reported by many publications, [including the BBC and others](#).

But according to three researchers from France, Denmark and Sweden, presenting an analysis of many LCA studies in the journal *Nature Sustainability*, this implementation of LCA is too simplistic, and misses the benefits of organic farming.

"We are worried that LCA gives too narrow a picture, and we risk making bad decisions politically and socially. When comparing organic and intensive farming, there are wider effects that the current approach does not adequately consider," says Hayo van der Werf of the French National Institute of Agricultural Research.

Biodiversity, for example, is of vital importance to the health and resilience of ecosystems. But globally, it is declining. Intensive agriculture has been shown to be one of the main drivers of negative trends such as insect and bird decline. Agriculture occupies more than one-third of global land area, so any links between biodiversity losses and agriculture are hugely important.

"But our analysis shows that current LCA studies rarely factor in biodiversity, and consequently, they usually miss that wider benefit of organic agriculture," says Marie Trydeman Knudsen from Aarhus University, Denmark. "Earlier studies have already shown that organic fields support biodiversity levels approximately 30% higher than conventional fields."

Usage of pesticides is another factor to consider. Between 1990 and 2015, pesticide use worldwide has increased 73%. Pesticide residues in the ground and in water and food can be harmful to human health, terrestrial and

aquatic ecosystems, and cause biodiversity losses. Organic farming, meanwhile, precludes the use of synthetic pesticides. But few LCA studies account for these effects.

Land degradation and lower soil quality resulting from unsustainable land management is also an issue - again, something rarely measured in LCA studies. The benefits of organic farming practices such as varied crop rotation and the use of organic fertilisers are often overlooked in LCA studies.

Crucially, LCA generally assesses environmental impacts per kilogram of product. This favours intensive systems that may have lower impacts per kilogram, while having higher impacts per hectare of land.

"LCA simply looks at the overall yields. Of course, from that perspective, it's true that intensive farming methods are indeed more effective. But this is not the whole story of the larger agroecosystem. A diverse landscape with smaller fields, hedgerows and a variety of crops gives other benefits - greater biodiversity, for example," says Christel Cederberg of Chalmers University of Technology, Sweden.

LCA's product-focused approach also fails to capture the subtleties of smaller, diverse systems which are more reliant on ecological processes, and adapted to local soil, climate and ecosystem characteristics. LCA needs a more fine-grained approach.

"We often look at the effects at the global food chain level, but we need to be much better at considering the environmental effects at the local level," says Marie Trydeman Knudsen. The researchers note in their study that efforts are being made in this area, but much more progress is needed.

A further key weakness is when hypothetical "indirect effects" are included, such as assuming that the lower yields of organic agriculture lead to increased carbon dioxide emissions, because more land is needed. For example, another prominent study - from a researcher also based at Chalmers University of Technology - suggested that organic agriculture was worse for the climate, because the requirement for more land leads indirectly to less forest area. But accounting for these indirect effects is problematic.

"For example, consider the growing demand for organic meat. Traditional LCA studies might simply assume that overall consumption of meat will remain the same, and therefore more land will be required. But consumers who are motivated to buy organic meat for environmental and ethical reasons will probably also buy fewer animal-

based products in the first place. But hardly any studies into this sort of consumer behaviour exist, so it is very difficult to account for these types of social shifts now," says Hayo van der Werf.

"Current LCA methodology and practice is simply not good enough to assess agroecological systems such as organic agriculture. It therefore needs to be improved and integrated with other environmental assessment tools to get a more balanced picture" says Christel Cederberg.

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