

Auglaize County OSU Extension Weekly Agriculture Newsletter – January 15, 2020

Scouting and Latest Information



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

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. If you are in need of some grass hay, I know of an individual that has lots of Teff hay.

Joke: What do you call a pig thief??

Rain fell Three days in the past week. Rainfall for Thursday, January 9th, ranged from 0.4” near Uniopolis to 1.1” at about 1 mile northeast of Fryburg. Rainfall on Friday ranged from 0.3” at about 1 mile northeast of Fryburg and at about 5 miles east of New Hampshire to 1.3” near Uniopolis. Rainfall on Saturday ranged from 0.3” at about 3 miles west of St. Marys to 1.33” at about 1 mile northeast of Fryburg. Rainfall for the week ranged from 1.9” at about 3 miles west of St. Marys to 2.73” at about 1 mile northeast of Fryburg. The average rainfall for the week was 2.31”. The average high temperature should now be around 33 degrees F.

Temperatures were above normal every day. On the 11th temperatures were 33 degrees F above the normal high at 63 degrees F. We averaged 13.7 degrees above normal for the week.

Wheat – 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 – Nothing to report.

Corn – There is still corn to be harvested in the county.

Soybean – Nothing to report.

Weeds – Nothing to report

Insects - No report.

There WERE changes to the XtendiMAX label this past week. There were NO changes to the Engenia, FeXapan and Tavium labels. The Engenia label still has the most approved products compared to XtendiMAX and FeXapan. One new herbicide was added to the XtendiMAX label this past week, which totals 202 herbicides. No new adjuvants were added the XtendiMAX label, now totaling 386. 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 64 DRA's. No new nutritional products were removed from the XtendiMAX label which totals 215. No new products were added to the Insecticides, Fungicides, Plant Growth Regulator and Other group on the XtendiMAX label which totals 97. No new adjuvants were added to the Engenia label, which now totals 500. No new herbicides were added to the Engenia label, which brings the total herbicide count to 146. No new products were added to the Other category (growth regulators, and fungicides) on the Engenia label, which totals 29. No new insecticide were added to the label which currently has 28 products. No new Drift Reducing Adjuvants (DRA's) were added to the Engenia label, which totals 108. No new nozzles were added to the Engenia label, which totals 29. No new nutritional products were added to the Engenia label which totals 177 products. No new product was added to the pH Modifier group of the Engenia label which totals 16 products. The FeXapan label has many of same the 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 13 herbicides, 66 DRA's, 185 adjuvants, and 41 nozzles approved for use with Tavium.

Upcoming Meetings

Get signed up for these important meetings!! Time is running out for some of these meetings.

- 1. Plant and Soil Nutrient Management.** This meeting will be held **January 22, 2020** from 8:30 AM to 4:00 PM. The location will be the Eagles in Wapakoneta. Topics to be discussed include Soil pH and amendments, Phosphorus, Potassium, and Nitrogen management, New Tri-State Fertility Recommendations, micro-nutrients, and biostimulants, growth regulators and more. The cost of the program is free and fertilizer, CLM, and CCA credits are available. Please bring one soil test report with you to the meeting! Register before January 16, 2020. Contact the Auglaize County Extension office at 419-739-6580 for more information.
- 2. Auglaize County Agronomy Day.** The meeting will take place on January 27, 2020 from 9:00 AM to 3:00 PM. This meeting will meet the needs for pesticide (all categories) and fertilizer recertification. Kelley Tilmon will speak about insect pests at 10:00 AM. The meeting location is St. Joseph Parish Life Center (101 W. Pearl St.) in Wapakoneta. Lunch is on your own. The meeting is free if you are attending just for the information. If you need recertification credits for pesticide license the fee is \$30.00. If you need recertification credits for fertilizer, the fee is \$10.00. If you need both the fee is \$40.00. You can register by contacting the office at 419-739-6580.
- 3. Farm Transition/Succession Workshop.** This meeting is a two day workshop. The meeting will take place on February 3 and February 25, 2020 from 10:00 AM to 3:00 PM at Mid-Ohio Energy in Kenton, Ohio. David Marrison, Robert Moore, and Peggy Hall will be the speakers for this meeting. The cost for the meeting is \$30 per person and registration is due January 27, 2020. To register contact the Hardin County Extension office at 419-674-2297 or email stachler.1@osu.edu.

Answer to joke: A ham-burglar

Preparing your planter for spring



Now that Christmas is over it is time to start preparing for the 2020 planting season. Preparing your planter for spring is extremely critical. With lower than desired commodity prices fine tuning the planter provides an opportunity to improve yields this season and reduce costs. Corn yields can be reduced by 2.5 bushels per acre for every one inch of spacing difference from the average plant spacing. The more evenly spaced the seeds and the more uniform the emergence the greater the corn yield. You only get one chance to plant a corn crop each spring to maximize yields, so make it count.

The following is a list of things to work on now before planting:

1. Check double disk openers. The disks should be no less than 14.5" in diameter. There should be 2 to 2.5" of contact with the two blades. To check the contact distance use a business card that is normal thickness. Insert the card between the two blades and slide it from the top down along the front of the disks until the card won't lower any further. Mark that spot with chalk. Next, take the card from the back and slide it forward until it stops and mark that spot. Measure the distance between the two marks, if less than 2 inches, reshim the blades or replace the blades. Check the bearings on the disk openers. If the blades wobble while turning, replace the bearing. Check blades for cracks and that the bearing housings are correctly riveted.
2. Calibrate corn meters as this may increase yields by six bushels. Several companies offer this service. Use it. The most accurate calibration is when you take along seed samples of the hybrids being planted.
3. Check seed tubes. Be sure there are no obstructions in the tube and that it is smooth, especially at the opening of the tube. The tube can become worn by the disk openers or damaged by objects during planting. Be sure the seed tube is installed securely. Clean seed tubes and sensors.
4. Adjust closing wheels to ensure equal distance from the center of the seed trench. To determine this alignment lower the planter onto concrete and move the planter ahead. Then observe if the disk markings on the concrete line up with the closing wheels. Be sure there is no side to side movement of the wheels.

5. Check depth gauge wheels. Replace bearings if the wheel wobbles at all. Wheels must maintain slight contact with the disk openers at all times. Check the contact by holding the gauge wheel up in planting position and rotating the wheel. Rear bushings and depth control arms need to be in good shape to insure they can be properly adjusted to maintain correct contact with the disks.
6. Check parallel linkage. Worn bushings increase row bounce which increases seed bounce. Stand behind the row unit and wiggle it up and down and back and forth checking to make sure bushings are tight.
7. Check for excessive seed box movement. Excessive motion will cause seed meters to improperly drop seed into the seed tube.
8. Adjust no-till coulters to run 1/4th inch higher than the seed opening disks. Do this by placing planter in the down position on a level flat surface.
9. Check all chains and drive sprockets. Replace worn chains and lubricate them.
10. Drive shafts and bearings need to be properly lined up to insure smooth operation.
11. Check planters with finger pick-ups for wear on the back plate and brush. Use a feeler gauge to check tension on the fingers, then tighten them correctly.
12. Lubricate all grease fittings.
13. Check the frame for any cracks or bends.
14. Check all wiring harnesses for any broken wires.

Work safely around the planter between pesticides and working on the equipment. Any part of the planter that comes in contact with treated seed is contaminated with pesticides, so where appropriate personal protective equipment. Wear chemical resistant gloves when working on these parts. In addition, use gloves to keep grease and oil from your hands.

C.O.R.N. Newsletter

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

No news this week

Other Articles

The Ohio Ag Law Blog--New fact sheet describes how to prepare for a crop insurance audit

Source: <https://farmoffice.osu.edu/blog/fri-01102020-1001am/ohio-ag-law-blog-new-fact-sheet-describes-how-prepare-crop-insurance-audit>

By: Ellen Essman, , Senior Research Associate , Senior Research Associate Friday, January 10th, 2020
With 2019's ups and downs in the weather and the marketplace, it's likely that many farmers used the Federal Crop Insurance Program to mitigate their losses. Those farmers whose crop insurance claims reach \$200,000 or more will be audited by the USDA's Risk Management Agency.

What's the purpose of an audit—does it mean you're in trouble with the government? What can you expect when going through the audit process? How do you prepare for an audit? What kind of records and documentation do you need? All of these questions and more are answered in a new fact sheet we recently published through our partnership with the National Agricultural Law Center. Click [here](#) to read the fact sheet to better prepare you for going through an audit.

Ohio Ag Law Blog--A look back: agricultural law in 2019

Source: <https://farmoffice.osu.edu/blog/thu-01022020-143pm/ohio-ag-law-blog-look-back-agricultural-law-2019>

By: Peggy Kirk Hall, , Associate Professor, Agricultural & Resource Law , Associate Professor, Agricultural & Resource Law Thursday, January 02nd, 2020

I often receive quizzical looks when someone asks me what kind of law I practice and I say “agricultural law.” A common response is “what in the world is that”? A look back at agricultural law in 2019 provides a pretty good answer to that question. Our review of major developments in the last year illustrates the diversity of legal issues that make up the world of agricultural law. It's never dull, that's certain.

Here are the highlights of what we saw in agricultural law in 2019:

- **The Lake Erie Bill of Rights (LEBOR).** Toledo citizens gained national attention when they passed a charter amendment granting legal rights to Lake Erie and its ecosystem to “exist, flourish, and naturally evolve.” The amendment also allowed Toledoans to sue corporations and governments that

violate the lake's legal rights. Ohio's legislature quickly enacted a law prohibiting any attempt to enforce LEBOR, and Drewes Farm challenged LEBOR as unconstitutional in a lawsuit that is still tied up in federal court. While Toledoans won't be able to use LEBOR to recognize legal rights for the lake, the measure raised awareness of the water quality frustrations felt by Toledoans and others with ties to Lake Erie, and brought attention to similar efforts around the country to protect natural resources by granting them legal rights. Read our review of LEBOR [here](#).

- **Watersheds in Distress tug-of-war.** Controversial [rules](#) proposed by the Kasich administration would have expanded areas in Ohio designated as "watersheds in distress" and added regulations for farmers operating within those areas. Governor DeWine's new Director of Agriculture [yanked the rules](#) upon taking office in January, however, effectively ending the controversy over whether more regulations for farmers are the solution to Ohio's water quality problems. The governor's [H2OH initiative](#) offers an alternative to the Watersheds in distress approach.
- **Hemp hemp, hooray.** After the 2018 Farm Bill legalized hemp by distinguishing it from marijuana under federal law, then authorized states to allow hemp production, Ohio [passed legislation](#) also decriminalizing hemp. Ohio's proposed rules for cultivating and processing hemp are now out, and ODA held a hearing on the proposed rules on December 18, 2019. ODA also submitted Ohio's Hemp Production Plan to the USDA in December, and the USDA approved the plan. Once the state rules become final, Ohio's hemp program will open up and applicants can apply for cultivation licenses and begin growing hemp as a commodity crop in 2020. ODA's hemp program page is [here](#).
- **Waves of WOTUS.** We began 2019 with the Trump administration's proposed WOTUS rewrite in February, which is still under review and not yet effective. We followed that with the administration's announced repeal of the Obama-era 2015 WOTUS rule in September; the repeal became effective on December 23, 2019. There's more: the administration published a reinstatement of the WOTUS definition from 1986/1988 until its proposed rule becomes final. But that's not all. Sprinkled in and around those dates were a slew of lawsuits and injunctions challenging the Obama-era rule, the rulemaking process, and the pre-2015 definitions of WOTUS. By the end of the year, we were left with a patchwork of different WOTUS rules across the country and uncertainty about which are actually in effect. Read our latest WOTUS post [here](#).
- **Third Roundup cancer lawsuit is biggest yet.** A jury awarded a whopping \$2 billion to a California couple who claimed that Monsanto failed to warn them about the health risks of using Roundup, which they believe caused their non-Hodgkins lymphoma. This was the largest of three verdicts against Monsanto to date, but the court later reduced the amount to \$87 million. Approximately 13,000 more Roundup cases are pending in state and federal courts across the country, and more Roundup lawsuits are also underway against Home Depot and Lowe's. Bayer announced in June that it would invest \$5.6 billion on weed management research to find alternatives to the glyphosate used in Roundup.
- **Ohio's Right to Farm law expanded.** Buried deep in Ohio's budget bill were significant changes to Ohio's Right to Farm law, the law that gives agricultural activities immunity from civil nuisance lawsuits. The changes were an obvious response to the Lake Erie Bill of Rights initiative. The revisions allow agricultural activities on any CAUV land and agricultural activities conducted by a

person pursuant to a lease agreement to qualify for the immunity, in addition to the pre-existing law's coverage for land owners enrolled in the "Agricultural District Program" with the county auditor. The new law also attempts to clarify the types of agricultural activities that receive protection under the law, including fertilizer and manure applications and any expansions or changes in farm operations. Read more about the changes, which became effective October 17, [here](#).

- **Congress increases farm bankruptcy limit.** Sometimes Congress can agree on something. The Family Farmer Relief Act of 2019 is one example. The federal bill, effective August 23, 2019, raised the debt limit for family farmers and fishermen seeking to use Chapter 12 bankruptcy law to reorganize debts and stay in business. Farmers may now have an aggregate debt of up to \$10 million when using Chapter 12, rather than the previous limit of \$4.4 million.
- **Revisions to H-2A rules begin.** Long awaited revisions to the H-2A program are underway. In October, changes were made to the labor market test for H-2A labor certification, which determines whether qualified American workers are available to fill temporary agricultural positions and if not, allows an employer to seek temporary migrant workers. Employers will no longer have to advertise a job in a print newspaper of general circulation in the area of intended employment. For the final rule, visit [this link](#).
- **Meat and eggs are not so simple anymore.** While all is quiet in Ohio, the country continues to battle over what exactly is "meat" and when eggs must come from cage free hens. The most recent egg law arose in Michigan, whose lawmakers passed a bill that will require all eggs sold in the state by 2024 to be from birds housed in cage-free facilities. Oregon and Washington passed similar laws in 2019. Meanwhile, litigation in Arkansas has put a hold on carrying out a state law that prohibits labeling a food product as "meat" if it doesn't derive from an animal. A similar law and lawsuit developed in Missouri last year. And in Washington DC, the USDA and FDA jockeyed for regulatory authority over "cell cultured meat" and finally agreed to divide labeling and inspection authority between the two agencies. We expect these food battles to continue in 2020.
- **Solar leasing on the rise.** Yes, solar leasing in Ohio. Thousands of acres of farmland in Ohio will soon be home to utility-scale solar energy facilities under long-term solar energy leases. The Ohio Power Siting Board has approved six solar facilities, with eight more in the works. We've examined the legal issues raised by solar energy leasing on farmland and have summarized them in our *Farmland Owner's Guide to Solar Leasing*, available [here](#).

What might the wide world of agricultural law see in 2020? We'll tackle that question next, so stay tuned for more.

The Ohio Ag Law Blog--Ag Law Harvest

By: Ellen Essman, Senior Research Associate, Senior Research Associate Monday, December 23rd, 2019
Hemp, drones, meat labeling and more—there is so much going on in the world of ag law! With so much happening, we thought we'd treat you to another round of the Harvest before the holidays.

Hemp for the holidays. As 2020 and the first growing season approach, there has been a flurry of activity surrounding hemp. States have been amending their rules and submitting them to the USDA for approval in anticipation of next year. In addition, just last week USDA [extended the deadline](#) to comment on the interim final hemp rule from December 30, 2019 to January 29, 2020. If you would like to submit a comment, you can do so [here](#). To get a refresher on the interim rule, see our blog post [here](#). In other hemp news, EPA announced approval of 10 pesticides for use on industrial hemp. You can find the list [here](#). Additional pesticides may be added to the list in the future.

Congress considers a potential food safety fix. It's likely that over the last several years, you've heard about numerous recalls on leafy greens due to foodborne illnesses. It has been [hypothesized](#) that some of these outbreaks could potentially be the result of produce farms using water located near CAFOs to irrigate their crops. A [bill](#) entitled the "Expanded Food Safety Investigation Act of 2019" has been introduced to tackle this and other potential food safety problems. If passed, the bill would give FDA the authority to conduct microbial sampling at CAFOs as part of a foodborne illness investigation. The bill is currently being considered in the Senate Health, Education, Labor, and Pensions Committee.

Animal welfare bill becomes federal law. In November, the President signed the "[Preventing Animal Cruelty and Torture Act](#)" (PACT), into law. PACT makes it a federal offense to purposely crush, burn, drown, suffocate, impale, or otherwise subject non-human mammals, birds, reptiles, or amphibians to serious bodily injury. PACT also outlaws creating and distributing video of such animal torture. The law includes several exceptions, including during customary and normal veterinary, agricultural husbandry, and other animal management practices, as well as during slaughter, hunting, fishing, euthanasia, etc.

No meat labeling law in Arkansas? Last winter, Arkansas passed a [law](#) that made it illegal to "misbrand or misrepresent an agricultural product that is edible by humans." Specifically, it made it illegal to represent a product as meat, beef, pork, etc. if the product is not derived from an animal. Unsurprisingly, the law did not sit well with companies in the business of making and selling meat substitutes from plants and cells. In July, The Tofurky Company [sued](#) the state in the U.S. District Court for the Eastern District of Arkansas, Central Division, claiming the labeling law violates the First and Fourteenth Amendments, as well as the dormant Commerce Clause. On December 11, the District Court [enjoined](#), or stopped Arkansas from enforcing, the labeling law. This means that the state will not be able to carry out the law while the District Court considers the constitutionality of the law. We will be following the ultimate outcome of this lawsuit closely.

Ag wants to be part of the drone conversation. The Senate Committee on Commerce, Science, and Transportation is currently considering a [bill](#) called the "Drone Advisory Committee for the 21st Century Act." If passed, the bill would ensure that the Federal Aviation Administration (FAA) includes representatives from agriculture, forestry, and rangeland, in addition to representatives from state, county, city, and Tribal governments on the Drone Advisory Committee (DAC). Thus, such representatives would be part of the conversation when the DAC advises the FAA on drone policies.

Ag financing tools may get an upgrade. The “Modernizing Agriculture and Manufacturing Bonds Act,” or MAMBA (what a great name) was introduced very recently in the House Committee on Ways and Means. Text of the bill is not yet available, but when it is, it should be located [here](#). According to this [fact sheet](#), the bill would make a number of changes to current law, including increasing “the limitation on small issue bond proceeds for first-time farmers” to \$552,500, repealing “the separate dollar limitation on the use of bond proceeds for depreciable property” which would mean farmers could use the full amount for equipment, breeding livestock, and other capital assets, and modifying the definition of “substantial farmland” to make it easier for beginning farmers to gain access to capital.

Shoring up national defense of agriculture and food is on the docket. The Committee on Agriculture, Nutrition, and Forestry sent the National Bio and Agro-Defense Facility Act of 2019 (NBAF) to the floor of the Senate for consideration. Among other things, [bill](#) would allow the USDA, through the National Bio and Agro-Defense Facility, to address threats from human pathogens, zoonotic disease agents, emerging foreign animal diseases, and animal transboundary diseases, and to develop countermeasures to such diseases. Essentially, USDA and NBAF would see to national security in the arena of agriculture and food. We hope you have a wonderful holiday season! We will be sure to continue the ag law updates in the next decade!

Nanosatellites improve detection of early-season corn nitrogen stress

Date: January 13, 2020

Source: University of Illinois College of Agricultural, Consumer and Environmental Sciences

Source: <https://www.sciencedaily.com/releases/2020/01/200113153335.htm>

For corn growers, the decision of when and how much nitrogen fertilizer to apply is a perennial challenge. Scientists at the University of Illinois have shown that nanosatellites known as CubeSats can detect nitrogen stress early in the season, potentially giving farmers a chance to plan in-season nitrogen fertilizer applications and alleviate nutrient stress for crops.

"Using this technology, we can possibly see the nitrogen stress early on, before tasseling. That means farmers won't need to wait until the end of the season to see the impact of their nitrogen application decisions," says Kaiyu Guan, assistant professor in the Department of Natural Resources and Environmental Sciences at the University of Illinois, and Blue Waters professor at the National Center for Supercomputing Applications. He is also principal investigator on a new study published in *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*.

Being able to detect and address changes in crop nutrient status in real time is vitally important to avoid damage at critical periods and optimize yield. In general, existing satellite technology cannot achieve both high spatial resolution and high revisiting frequency (how often a given satellite comes back to the same spot above the Earth). Alternatively, drones can detect nutrient status in real time, but they usually can only cover local areas; thus, their utility is limited in scale.

CubeSats bridge the gap between existing satellite technology and drones. With more than 100 of the relatively tiny satellites currently in orbit, Guan says, "CubeSats from Planet get down to a 3-meter resolution and revisit the same location every few days. So, right now we can monitor crop nitrogen status in real time for a much broader area than drones."

Guan and his collaborators tested the capabilities of both drones and CubeSats to detect changes in corn chlorophyll content, a proxy for the plant's nitrogen status. The researchers focused on an experimental field in Central Illinois during the 2017 field season. Corn in the field was nitrogen-stressed to varying degrees due to multiple nitrogen application rates and timings, including all nitrogen applied at planting, and split applications at several developmental stages.

The analyzed field was one of several in a larger study looking at nitrogen rates and timing, set up by Emerson Nafziger, professor emeritus in the Department of Crop Sciences at Illinois and co-author on the study.

"The idea was to see how much effect timing and form of nitrogen fertilizer would have on yield. This study allows an evaluation of how well the imaging could capture yield responses to nitrogen applied at different rates and times," Nafziger says.

The scientists compared images from drones and CubeSats, and their signals matched well with tissue nitrogen measurements taken from leaves in the field on a weekly basis. Both technologies were able to detect changes in chlorophyll contents with a similar degree of accuracy and at the same point in the season.

"This information generates timely and actionable insights related to nitrogen stress, and so could provide guidance for additional nitrogen application where it's needed," Guan says.

The implications go beyond optimizing yield.

"The low cost of nitrogen fertilizer and high corn yield potential motivates farmers to apply extra nitrogen as 'insurance' against nitrogen deficiency that lowers yield. But applying more nitrogen than the crop requires is both a financial and environmental risk," says Yaping Cai, graduate student in Guan's research group and lead student author on the paper.

Guan adds, "A better tool for fertilizer use, enabled through new satellite technology and ecosystem modeling, could ultimately help farmers to reduce cost, increase yield, and meanwhile reduce environmental footprint for a sustainable agricultural landscape."

Research identifies possible on/off switch for plant growth

Protein could be key to saving crops endangered by extreme weather

Date: January 13, 2020

Source: University of California - Riverside

Source: <https://www.sciencedaily.com/releases/2020/01/200113093732.htm>

New research from UC Riverside identifies a protein that controls plant growth -- good news for an era in which crops can get crushed by climate change.

Researchers found the protein, IRK, while looking for clues to the ways plant cells divide or expand. They discovered IRK in the roots cells of a plant related to mustard.

"When this protein is present, the root perceives a signal that tells cells not to divide," said Jaimie Van Norman, who led the study and is an assistant professor of plant sciences at UCR. "If we can get the plant to ignore those signals, we may be able to get it to grow in conditions where it might not otherwise."

The team's work on IRK was recently published in *Developmental Cell*. The research demonstrates that turning off the gene producing IRK causes an increase in the number of times the plant's root cells divide. Additional cells can lead to bigger roots, and perhaps to plants that are better at taking up nutrients from the soil and grow larger.

There may be some instances in which farmers also want to limit plant growth. For example, keeping weeds small, or trying to pause crop growth until a severe storm passes. IRK can be instrumental for both goals.

"This discovery gives us another way to control growth," Van Norman said. "Understanding how the plant itself stops growth can also allow us to accelerate growth."

So far, Van Norman's team has only tested the effects of turning off the IRK gene in *Arabidopsis*, the mustard relative. However, Van Norman said the IRK protein is also found in other crop plants.

This research is notable not only for its potential impact on crop and food security, but also because roots have historically been less well studied than the above-ground parts of plants. This is likely due to the relatively inaccessible nature of roots, Van Norman said.

However, the roots are critical for plant survival and for the production of above-ground plant organs such as leaves flowers and fruits. Therefore, understanding their function and development is critical in efforts to improve crop productivity.

Previous research has examined the role of signals sent between cells up and down the plant from the roots up toward the shoots and vice versa. This study shows communication between cells across the root is important as well.

"There was a longstanding hypothesis that this type of horizontal communication between cells was important, and this work provides new evidence that it is," Van Norman said.

Next, Van Norman is hoping to understand whether bigger roots survive stress better. Some of the biggest challenges to crops include drought and high levels of salinity in soils.

Salts accumulate in soil both from natural and humanmade sources, such as fertilizers and salts in irrigation waters. If there is too much salt built up near the soil surface, it can prevent vital processes in plant growth and even cause crops to fail entirely.

Out of an abundance of caution and without accurate salinity measurements, farmers have traditionally over-irrigated their fields to send salts into lower soil depths where they are less harmful to crops. However, this practice is being scrutinized as both the quantity and quality of water becomes scarcer.

"It may be the case that by understanding what happens when the IRK-producing gene is turned off, we can make root growth less sensitive to soil conditions that pose a threat to food security," Van Norman said.

Prepared by Jeff Stachler

Ohio State University Agriculture and Natural Resources Extension Educator, Auglaize County