Hello Northeast Ohio Counties!

Well, that escalated quickly. A lot has happened in the last week, and COVID-19 became the center of attention. Life as we know it will be temporarily different, but hopefully we will get through this fine and be back to normal soon.

OSU Extension offices will be closed by 5PM on Wednesday. We will still be here to serve you as always, but it’s going to look different for a few weeks as we move to working remotely. You can still send us an email, call our main office number, and we will help you find the answer to your questions.

Have a good week, and stay healthy!

Lee Beers  Andrew Holden  Angie Arnold
Trumbull County  Ashtabula County  Portage County
Extension Educator  Extension Educator  Extension Educator
Thank You to Our NE Ohio Agronomy School Sponsors!

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**OSU Extension Working Remotely**

By Lee Beers

As you may have heard by now, Ohio State University and other organizations throughout the state have moved to remote work to help prevent the spread of COVID-19. OSU Extension offices throughout the state will be temporarily closing offices starting Wednesday at 5:00pm at the latest. Staff in each office will continue to work remotely so we will be available- but only by phone, email, or teleconferencing. If you need to reach our offices, please call the main number as you normally would. Our office phone will ring directly to our computers and we can talk with you just as we did before COVID-19. If we are unable to answer you call, please do leave a message so we can get back to you.

In addition to our offices closing, all OSU Extension (including Master Gardener and 4-H) events scheduled before March 31st have been canceled or postponed. Currently, events scheduled for April 1st or later are planned to go forward, but we will let you know if that changes.

These decisions were not taken lightly, and have been guided by Governor DeWine, the CDC, and Ohio State University leaders. We are still here to serve the residents of NE Ohio; it will just look a little different for a little while. The safety of our community, staff, and all of our volunteers is of the upmost priority and we want to do everything we can to help stop or slow the spread of this virus.

Our newsletter will still be coming out each week, but those who normally receive a copy by mail will not receive one until our offices resume normal operations. We know you are overwhelmed by COVID19 information (I know we are!) so we will do our best to keep the newsletter COVID19 free unless it is relevant to our local community and agriculture. For the most up to date information please visit the CDC’s dedicated website here: https://www.cdc.gov/coronavirus/2019-ncov/index.html. Stay healthy and stay in touch!

**Wet Weather for the Rest of March**

By: Jim Noel

Source: https://agcrops.osu.edu/newsletter/corn-newsletter/2020-06/wet-weather-rest-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

**Chow line: Food safety and coronavirus**

By: Sanja Ilic and Tracy Turner  

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 Qiuhong 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.”

Chow Line is a service of The Ohio State University College of Food, Agricultural, and Environmental Sciences and its outreach and research arms, Ohio State University Extension and the Ohio Agricultural Research and Development Center. Send questions to Chow Line writer Tracy Turner, 364 W. Lane Ave., Suite B120, Columbus, OH 43201, or turner.490@osu.edu.

New viable CRISPR-Cas12b system for plant genome engineering
By: Materials provided by University of Maryland.
Journal Reference:
Meiling Ming, Qiurong Ren, Changtian Pan, Yao He, Yingxiao Zhang, Shishi Liu, Zhaohui Zhong, Jiaheng Wang, Aimee A. Malzahn, Jun Wu, Xuelian Zheng, Yong Zhang, Yiping Qi. CRISPR–Cas12b enables efficient plant genome engineering. Nature Plants, 2020; DOI: 10.1038/s41477-020-0614-6
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."

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.

This work is funded by the National Science Foundation (NSF Award No. IOS-1758745) and the National Institute of Food and Agriculture, United States Department of Agriculture (USDA-NIFA Award No. 2018-33522-28789).

**Winter Wheat Stand Evaluation**

By: Laura Lindsey
Source: [https://agcrops.osu.edu/newsletter/corn-newsletter/2020-06/winter-wheat-stand-evaluation](https://agcrops.osu.edu/newsletter/corn-newsletter/2020-06/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.

<table>
<thead>
<tr>
<th>Grain Yield (bu/acre)</th>
<th>Stem Count (number/foot of row)</th>
<th>Canopy Cover (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>90</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>95</td>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>100</td>
<td>51</td>
<td>35</td>
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<tr>
<td>105</td>
<td>63</td>
<td>41</td>
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<tr>
<td>110</td>
<td>80</td>
<td>47</td>
</tr>
<tr>
<td>115</td>
<td>100</td>
<td>53</td>
</tr>
</tbody>
</table>
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

| 120 | --- | 59 |
| 125 | --- | 65 |
| 130 | --- | 71 |

**Trumbull County Farmer Lunch Series Returns for 2020**

OSU Extension, Trumbull SWCD, and USDA-NRCS have teamed up again to offer a series of educational luncheons in 2020. We will be taking a break in March and hope you attend our NE Ohio Agronomy School on March 11th, but we’ll be back on April 15th with a farmer discussion on cover crops and what works in our region, and what does not. Each of these events is $5/person and this includes lunch. Lunch is again sponsored by the Trumbull County Holstein Club to keep costs down. The programs start at 11:30A.M. and will conclude by 1:00P.M. If you would like to register or have further questions, please call 330-638-6783 or email beers.66@osu.edu

**Survey aims to gauge farmers' current experiences**

Extreme weather, trade tensions, declining prices, lack of access to health care and urban sprawl. To get a better handle on how Ohio farm families are adapting to these challenges, researchers at The Ohio State University are asking farmers to share their experiences through a new statewide survey. The survey asks farmers not only about their farm businesses, but also about how farming trends are affecting the well-being of their households and communities.
For further information contact the project co-leads:

Dr. Douglas Jackson-Smith (jackson-smith.1@osu.edu; 330-202-3540)
Dr. Shoshanah Inwood (inwood.2@osu.edu; 330-263-3790)

https://cfaes.osu.edu/news/articles/taking-the-pulse-ohio-farmers
Upcoming Events

**March 26, 2020 12PM – 4PM - CANCELLED**
Pesticide and Fertilizer Recertification - Portage Co.

**April 15, 2020 11:30AM**
Trumbull Farmer Lunch Series – Cover Crops – A Farmer Discussion

**April 28, 2020 11AM**
Dairy Calf and Heifer Nutrition
Trumbull County

**June 14th, 2020**
Dairy Banquet/ Ice Cream Social

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