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Auglaize County OSU Extension Weekly Agriculture Newsletter – September 2, 2020

Scouting and Latest Information

Soybean field

Corn field

Hello!! Good Afternoon! I pray you are well!

This will be my last full newsletter. I will have a short newsletter about weed control in Auglaize County soybean fields later this week or early next week. I want to thank everyone for your hospitality and support while I have been in this position!! As a recap, I will be leaving Auglaize County for Griggs County, ND as the Agriculture and Natural Resources and 4-H Youth Development Agent. My last day is noon on September 9th (next week).

If you are a buyer or seller of hay or straw, let me know and I can keep a list to share with others.
List of individuals searching for hay or straw: None
List of individuals selling hay or straw:

1. About 200 3' X 3', 2019 wheat straw bales for sale.
2. At least 500 small square wheat straw bales from 2019 for sale.

Call the OSU Extension office at 419-739-6580 or my cell phone at 701-541-0043 or e-mail me at stachler.1@osu.edu to get the contact information.

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Joke: How did the farmer find his lost cow??

Agricultural Fun Fact: There are roughly 350 “squirts” in a gallon of milk

Rain fell only **1** day in the last week somewhere in the county. Most of the county is very dry, especially the area at an angle starting from east of New Knoxville up through Fryburg and into the Waynesfield area! Rainfall on Saturday, August 29th ranged from a 0.09” near Santa Fe-NewKnoxville and Sydney-Fryburg roads and near Fiekert and St. Rt. 385 roads to 0.6” near Harris and St. Rt. 29 and near Kossuth. Rainfall for the week was the same as for Saturday. Rainfall for the week averaged 0.35”, 0.19” more than last week. Rainfall for the month of August ranged from 1.24” near Wapakoneta-Fisher and Townline-Lima Roads to 2.74” near Fiekert and St. Rt. 385 roads. The average rainfall for the county for the month of August was 1.87”, 1.63” less than normal. Year to date rainfall is averaging 27.35”, only 0.92” more than the normal through August of 26.43”. There is at least a 54% chance of rain Sunday, otherwise it will be dry.

The average high temperature now is 79 degrees F, 2 degrees less than last week. Temperatures were above normal for **5** day in the past week and below normal for **2** days in the past week. The range in high temperature for the week was 75 to 88 degrees F. The average high temperature for the week was 83.0 degrees F, which is 0.4 degrees F warmer than last week and 4 degrees F **warmer than** the current normal high temperature of 81 degrees F. Temperatures will be mostly above normal for the week.

Wheat

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We are only about 3 weeks from seeding wheat, so hopefully you are getting ready. Choose varieties that have as much disease resistance as possible, especially to Fusarium head blight and yield the best. Look at fertility as wheat needs more phosphorus than corn and soybean and do a strip test next spring with sulfur as we have seen a yield increase for two years when sulfur was applied at 20 lb/A early in the spring.

Alfalfa

The leafhopper populations decreased slightly this past week, but are still at or above the threshold level of about 1 per inch of height. If you plan to take four cuttings, hopefully you are done with 3rd cutting as 4th cutting should be completed by September 15th to allow enough energy to be stored for next year's growth and winter survival.

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Corn

Husks turning brown and corn denting

Ear of corn denting

Corn development progressed rapidly last week due to the warmer than normal temperatures and lack of moisture! I slightly downgraded the corn quality for the week. I rated the corn crop at 1% excellent, 20% good, 78% fair, 1% poor, and 0% very poor. The crop quality for last week was 2% excellent, 25% good, 72% fair, 1% poor, and 0% very poor. The range in corn development is from R3 (milk) to R5 (dent) stage and some at ½ milk line. Most of the corn is at the R5 stage. Grey leaf spot is still present at very low levels as of Sunday, so it is not getting worse. I found northern corn leaf blight in about 67% of fields which is an increase from last week, but is coming in slow and late enough that it will not cause economic yield loss. Late planted corn is really healthy as long as it has enough water. You can still see the flea beetle damage in many fields and the corn flea beetle is still present, but I do not think it got worse this past week.

Soybean

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Three nodes of 4-bean pods

Late R7 soybean (beginning maturity)

Sclerotinia stem rot

The soybean crop condition has decreased again this past week due to the moisture stress that was visible! The current condition of soybean in the county is 3% excellent, 46% good, 51% fair, 0% poor, and 0% very poor. Last week's condition was 15% excellent, 66% good, 17% fair, 2% poor and 0% very poor. The range in soybean stage is from R3 (begin podding) stage for double crop soybean to R7 (one pod brown on a plant) stage in one field, but most fields are at R6 (full seed - at least one pod having a large seed at one of 4 upper

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nodes of plant) stage. It is still very difficult to find frogeye leaf spot in fields! The most frequent disease is still downy mildew and it seems to be getting worse. I saw a few more fields having sudden death syndrome, but still very few at this time. I found sclerotinia stem rot for the first time this season in a field. Most fields have at least 5% defoliation with one up to 20% defoliation from grasshopper and Japanese beetles, but this is not enough defoliation to warrant insecticide use. I see no spider mites at this time. Watch for stink bugs! I found more this past week! Start scouting for bean leaf beetle as I have found the bean leaf beetle in some fields and some pod damage from them.

Weeds

Proper perimeter weed management

Too many weeds on field perimeter!

Please manage weeds on the outside perimeter of fields so you do not pull them into the field during harvest. Hand weed waterhemp plants from fields, especially if there are just a few plants. You will be rewarded. I'm seeing more waterhemp poke out above the soybean canopy.

Insects/Other

I have no insect counts as I'm no longer trapping for insects. Insects are still active, but very few populations warrant an insecticide application other than potato leafhopper.

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With the cancellation of dicamba products applied to dicamba soybean, I did not update the label information below. Not sure of label changes for Tavium (http://www.syngenta-us.com/herbicides/tavium-tank-mixes) **this week. With the end of Engenia, FeXapan, and XtendiMAX, I deleted the tank-mix information, but since Tavium is still legal, I kept that.** There are 47 herbicides, 101 DRA's, 316 adjuvants, 96 nutritionals, 16, insecticides, 7 fungicides, 8 other products, and 41 nozzles approved for use with Tavium.

Enlist One and **Enlist Duo** for Enlist soybeans and corn also have approved tank-mix partners and nozzles like the dicamba products. **There were no changes to the labels this week!** The list of approved tank-mixtures for both of these products has been updated. Please follow these labels online at https://www.enlist.com/en/herbicides.html . There are 48 nozzles, 153 herbicides (10 new ones), 20 glyphosate formulations (1 new one), 10 glufosinate formulations (1 new one), 11 Dry AMS products, 85 insecticides, 30 fungicides, 21 plant growth regulators, 645 other products, and 315 fertilizers / nutrients labeled with Enlist One. There are 23 nozzles, 89 herbicides (15 new ones), 51 insecticides (3 new ones), 17 fungicides, 22 plant growth regulators, 8 Dry AMS products, 512 Other products, and 168 fertilizers / nutrients labeled with Enlist Duo.

Other information about the Enlist products include the following:

1. Enlist Duo rate is 4.75 pts/A which only has 1.0 lbs ae/A of glyphosate which is really not enough. You would think you could just add more glyphosate, but you CAN NOT add more glyphosate with Enlist Duo.
2. Enlist One can be mixed with ANY rate of glyphosate, glufosinate and 192 other herbicides.
3. Never use Enlist One alone on Enlist crops and always apply Enlist One at 2 pts/A
4. You CAN NOT add glufosinate with Enlist Duo!
5. When adding a postemgergence grass soybean herbicide like quizalofop, clethodim, sethoxydim, or fluazifop to Enlist One add 33% higher rate of these products to reduce the antagonism with grasses OR apply the postemergence grass herbicides 7 days after the Enlist One.

Upcoming Meetings

1. **All OSU Extension face to face meetings have been cancelled or postponed, although we are allowed to apply for exemptions now to host meetings.**

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2. The Farm Science Review has been cancelled for 2020 due to COVID-19, however it will proceed virtually, but the process has not been determined yet!

Answer to joke: He tractor down!!

Cover Crops after Corn Silage

Corn silage harvest is mostly completed in the county. This allows a wide window of opportunity to get cover crops established on corn silage ground. Earlier planting of cover crops is beneficial and allows for a greater number of species to be planted. The touted benefits of cover crops are dependent upon the species producing above ground biomass and developing a root system below ground. More growth is generally equal to more benefits. In addition to protecting the soil against erosion, cover crops can improve soil quality, provide supplemental forage for grazing or mechanical harvest, can utilize excess nutrients in the soil, and provide an option for manure application during late fall and winter periods.

Some cover crop grass options after corn silage include spring oats, spring and/or winter triticale, winter cereal rye, winter barley, annual ryegrass, and winter wheat. Note that winter wheat used as a cover crop should not be planted until after the hessian fly-free date, about September 27th. Legume options

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are more limited but include crimson clover and winter peas. Generally these would be included in a mix with one or more of the small grains. Legumes have the potential to produce some nitrogen for the next crop, but for that to happen they have to be planted as early as possible, preferably at least 4-6 weeks before frost, and make sure the seed is inoculated with the correct *Rhizobia* bacteria. Winter peas planted early, probably before the mid-September time frame, will most likely winter kill. When winter peas are planted late they often will overwinter. I have talked with farmers who have planted winter peas in the late September to early October time frame and had it overwinter. The downside is those late planting dates generally do not produce much fall growth so if soil cover is the goal, plant earlier.

With regard to the small grain crops, oats (or spring triticale) drilled immediately after corn silage by the end of the first week in September could provide 0.5 to 1.5 tons of dry matter before a killing frost depending upon moisture, fall temperatures, and days until that killing frost. Since oats and spring triticale winter kills, spring termination management is not needed, but from a manure management perspective oats or spring triticale as a cover crop does not provide an option for a winter manure application to a living crop. Barley should be planted between September 15 and 30. Triticale should be planted at the same time as winter wheat and cereal rye, between September 27 and the end of October. With the exception of winter wheat, any of these crops can be planted earlier if the primary purpose is as a cover crop and supplemental forage. All of these small grains except oats and spring triticale will overwinter and begin growing again in the spring. The grower must have a plan for the spring forage growth and/or crop termination before planting corn or soybeans. Remember that both oats and spring triticale will produce more forage in the fall, so either of these crops plus a winter-hardy small grain like winter rye, winter triticale, winter wheat or barley can provide forage later in the fall and again next spring. It is worth mentioning that cereal rye begins growth early in the spring and it has a rapid maturation so the grower must be prepared to either utilize it as forage early or terminate it early.

Another cover crop and supplemental forage option after corn silage that I am a little reluctant to mention is annual ryegrass. The reluctance is because some growers have had problems terminating the annual ryegrass with herbicides in the spring. Growers who have taken a mechanical harvest off first with a later spring herbicide application have fared better. If the goal is to provide cover and forage then variety selection for winter hardiness is important. Refer to the Ohio Forage Performance Trials for selecting varieties (http://www.oardc.ohio-state.edu/forage2016/). Mark Sulc, OSU Extension forage specialist, has planted annual ryegrass in **early September** for several years, and says that one can expect 800 to 2000 lbs. of dry matter/acre by late November and early December, with yields of 3 to 5 tons of dry matter/acre the following year from improved varieties with good winter survival and with adequate nitrogen fertilization rates.

Another factor that needs to be considered with fall cover crop planting is potential herbicide residue in the soil. The residual activity of an herbicide in a soil is dependent upon a number of factors including soil type, soil pH, organic matter, rainfall, and temperature. The time of the herbicide application to planting of cover crop must also be considered Unfortunately most herbicide labels may not have information about potential residual effects on cover crops.

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Purdue University has been evaluating the impact of commonly used residual herbicides on cover crop establishment and posted an article summarizing their results in the Purdue Pest and Crop Newsletter (https://extension.entm.purdue.edu/pestcrop/2015/Issue22/Issue22.pdf). Quoting from that article "As a general rule, residual herbicides that have activity on grass weeds can interfere with the establishment of some cover crop species, especially the smaller seeded ryegrass species. Residual herbicides from the group 2 (ALS), group 5 (triazine), group 14 (PPO), or group 27 (bleacher) can interfere with the establishment of some of the broad leaf cover crop species."

Cover crops can provide a number of benefits when they have time to get established and grow sufficient biomass. A winter hardy cover crop may become part of a nutrient management plan and provide an additional option for manure application. This year's early corn silage harvest is an opportunity to get some cover crops planted and established in a timely manner. For more information about cover crop timing, specific species recommendations, seeding rates, and potential forage yields and quality, contact a member of the OSU Extension Ag Crops Team.

Article written by Rory Lewandowski and adapted by Jeff Stachler

C.O.R.N. Newsletter

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

We Now Turn Our Attention to Autumn Harvest Season

The cooler than normal blob of water in the eastern Pacific Ocean near the equator tends to push the first autumn freeze later than normal in our region. Therefore, there is no indication of an early freeze in September this year. It appears the first freeze for Ohio will not come until October either on schedule or a bit later than normal.

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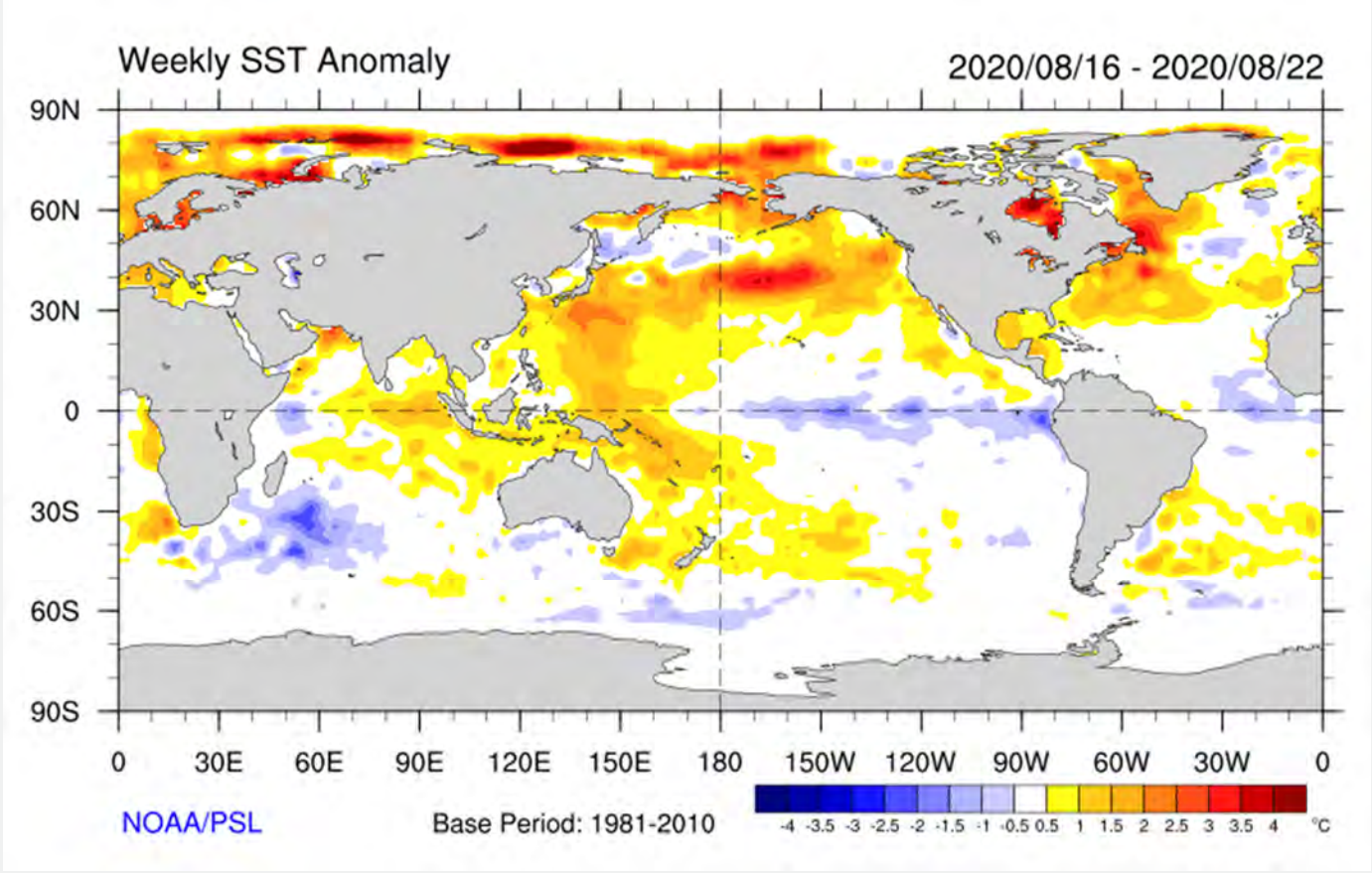

Map of Pacific Ocean

September looks to have the first half start cooler than normal followed by a return to normal temperatures for second half of the month. Precipitation will be normal or sightly above normal for September. Normal rainfall is currently 1-1.5 inches per two weeks dropping to about an inch per two weeks for the second half of September. Even though we expect rainfall at or slightly above normal in September, there is a great deal of uncertainty due to the tropics and where those systems will travel. So you will want to pay attention to later outlooks at: https://www.cpc.ncep.noaa.gov

Rainfall for the first half of September will average 0.50-2.00 inches. The heaviest rains will likely surround the state of Ohio in most directions. See attached image.

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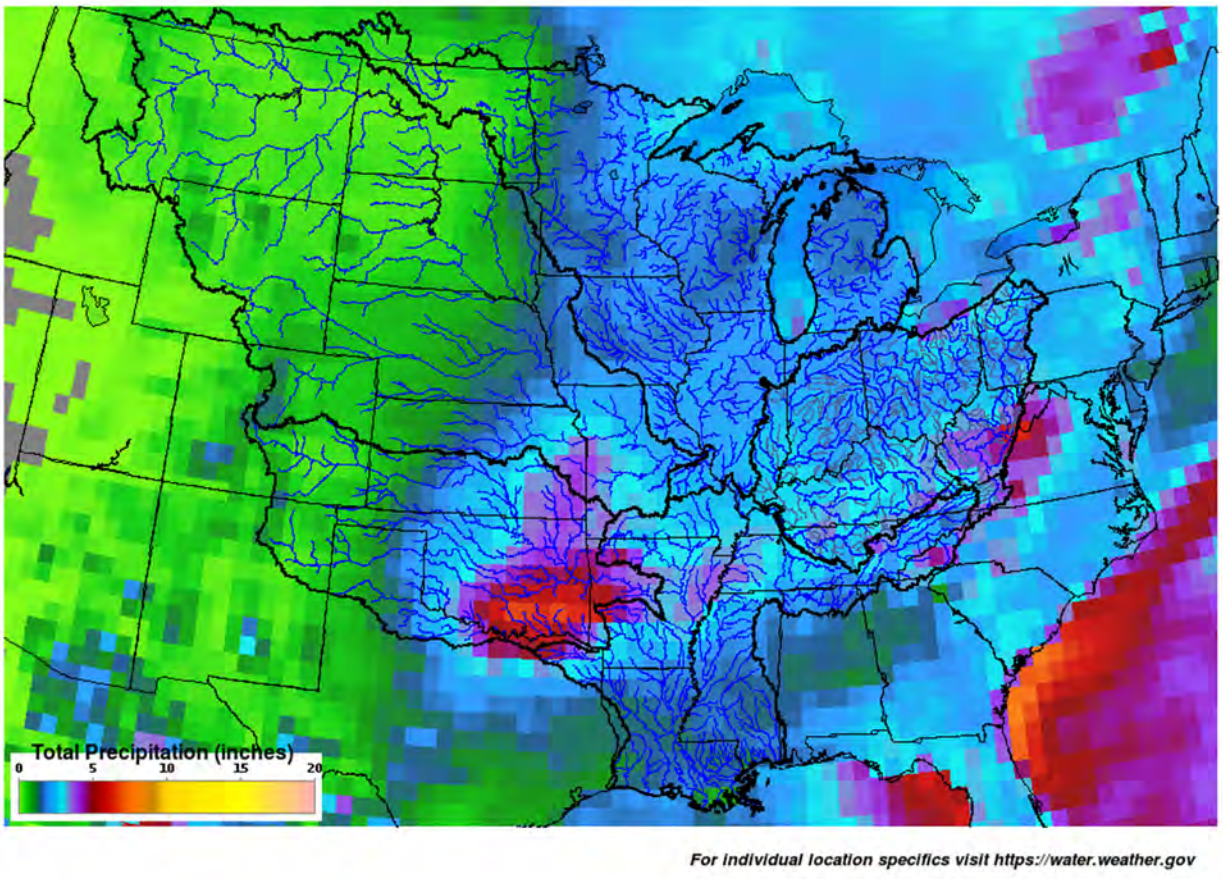

16 day precipitation outlook

October into part of November looks to resume the above normal temperatures which should create an extended autumn this year. Rainfall remains highly uncertain but it appears near normal is the most likely outcome for October and November as we have some climate models showing above normal and some below normal rainfall.

The early outlook for winter calls for above normal temperatures first half and below normal temperatures second half. Precipitation is likely to become above normal with potential influences from the tropical Pacific Ocean.

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Herbicide Residue Considerations for Fall Cover Crop Establishment

Cover Crops in Corn Stalks

Herbicides with residual that are used in corn and soybeans can affect the establishment of fall-planted cover crops, and should be taken into account when planning cover crop practices and selecting species. Soil characteristics and weather also play a role in the persistence of residual herbicides, which can vary by field and year. More information is needed on rotational intervals for many cover crop species, and this information is often not included on herbicide labels. University weed scientists have studied the effect of residual herbicides on some of the most popular cover crop species in order to provide this information to growers. In general, residual herbicides that control grass weeds can hinder establishment of grass cover crop species. Broadleaf cover crop species are most impacted by group 2 (ALS inhibitors), 5 (PSII inhibitors), 14 (PPO inhibitors), and 27 (HPPD inhibitors) herbicides (Purdue University).

A multi-state study found that the general order of sensitivity of cover crops to herbicide carryover, from greatest to least sensitive, is:

- Tillage radish > Austrian winter pea > crimson clover = annual ryegrass > winter wheat = winter oats > hairy vetch = cereal rye.

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Soybean herbicides that tended to be most injurious were:

- Fomesafen, pyroxasulfone, imazethapyr, acetochlor, and sulfentrazone.

Corn herbicide treatments that were most injurious to cover crops were:

- Topramezone, mesotrione, clopyralid, isoxaflutole, pyroxasulfone, and nicosulfuron

(University of Missouri).

Below is a table of commonly used corn and soybean herbicides, the fall cover crops that are safe to plant in rotation, and cover crop species that may be injured following these herbicides (Adapted from Lingenfelter D. and Curran W., Penn State University).

Herbicide	**Fall cover crops: safe to plant**	**Fall cover crops: potential for injury**
2,4 - D	All grasses	30 days before sensitive broadleaves
nicosulfuron/ nicosulfuron+ rimsulfuron	Fall cereal grains, ryegrass	Small-seeded legumes*, mustards, sorghum
topramezone	Wheat, barley, oats, rye, and ryegrass after 3 months	Many broadleaves are restricted, does not have much soil activity
atrazine	Sorghum species	Cereals, ryegrass, legumes, and mustards
isoxaflutole	Fall cereals grains	Cereals, ryegrass, legumes, and mustards

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mesotrione	All grasses	Small-seeded legumes, mustards
tembotrione + thiencarbazone	Wheat, triticale, rye	Small-seeded legumes, mustards, sorghum
dicamba	All crops	Only at high rates or less than 120 days after application
isoxaflutole + thiencarbazone	Wheat, triticale, rye	Small-seeded legumes, mustards, sorghum
metolachlor	Almost anything	Annual ryegrass or other small-seeded grasses
glyphosate	All	None
paraquat	All	None
thifensulfuron	No restrictions for wheat, barley, and oats	None with 45-day waiting interval
acetochlor	Most crops should be fine	Food or feed residues rather than crop injury a concern
tembotrione	Cereal grains after 4 months	Unknown; small-seeded legumes, mustards could be a problem

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glufosinate	All	Food or feed residues rather than crop injury a concern
metribuzin	Cereal grains and ryegrass	Slight risk for small-seeded legumes and mustards
dimethenamid	Most crops should be fine	Food or feed residues rather than crop injury a concern
prosulfuron	Cereal grains and sorghum are labeled, other grasses	Small-seeded legumes, mustards
halosulfuron	Cereal grains and sorghum after 2 mo., other grasses	Small-seeded legumes, mustards
pendimethalin	Cereal grains	Small-seeded legumes and annual ryegrass
flumetsulam	Cereal grains	Small-seeded legumes, mustards, and annual ryegrass
rimsulfuron	Based on short half-life, most fall cover crops should be OK	None
saflufenacil	All	None
simazine	Sorghum species	Cereals, ryegrass, legumes, and mustards

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clopyralid	All grasses	Small-seeded legumes
pyroxasulfone	Most crops should be fine	Food or feed residues rather than crop injury a concern
quizalofop	Most broadleaves	All grasses if less than 120 days or at high rates
sulfentrazone	Cereals and ryegrass	Small-seeded legumes, mustards, sorghum
chlorimuron	Cereals and ryegrass	Small-seeded legumes, mustards, sorghum
cloransulam	Wheat, triticale, rye	Small-seeded legumes, mustards, sorghum
imazethapyr	Wheat, triticale, rye, alfalfa, clover	Oats, sorghum, mustards
flumetsulam	Cereal grains	Small-seeded legumes, mustards, and annual ryegrass
imazamox	Wheat, triticale, rye, alfalfa, clovers	Slight risk for mustards
fomesafen	Cereal grains	Small-seeded legumes, mustards, sorghum

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imazaquin	Cereal grains	Small-seeded legumes, mustards
clethodim	All broadleaves	None assuming at least 30 days
saflufenacil	All	None
flumioxazin	All grasses	Small-seeded legumes and mustards

Cover crops provide a multitude of benefits and their use is becoming an increasingly popular practice in Ohio. Including cover crops in rotation with agronomic crops to realize these benefits costs time and money. It is important to evaluate the potential risk of herbicide residue on the establishment of cover crops in order to ensure success. Residual herbicides applied at the time of planting typically interfere with cover crop establishment less than those applied POST. Weather can affect the persistence of herbicides also, especially rainfall in summer. The risk of residual herbicides affecting cover establishment will be higher in areas that have been dry since herbicide application. Risk will be lower where the herbicide application was followed by some wet weather to get herbicide degradation started, compared with an application during prolonged dry weather. One of the least problematic cover crop species is cereal rye, which can be successfully established following a late corn or soybean harvest, and is tolerant to a most of the most commonly used corn and soybean herbicides. Weed control should continue to be the priority in selecting herbicides, and cover crop species selection should be based on potential injury and goals for the use of cover crops. The introductory section of the "Weed Control Guide for Ohio, Indiana, and Illinois" has some of the same information presented here, and OSU weed scientists also summarize this in a video: https://www.youtube.com/watch?v=ylr0zGnXMfs
The following resources contain information on residual herbicides and cove crops also:

https://extension.psu.edu/corn-herbicides-and-rotation-to-cover-crops https://extension.psu.edu/soybean-herbicides-and-rotation-to-cover-crops
https://ipm.missouri.edu/IPCM/2020/3/coverCropTermination-KB/
https://ag.purdue.edu/btny/weedscience/Documents/covercropcarryover.pdf

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Other Articles

Innovative State Approaches to Hemp Regulations under the 2018 Farm Bill

By:Ellen Essman, Senior Research Associate Monday, August 31st, 2020

Our newest report for the National Agricultural Law Center examines the different approaches states are taking to regulate hemp under the 2018 Farm Bill. *Innovative State Approaches to Hemp Regulations under the 2018 Farm Bill* is available on our website here and on the National Agricultural Law Center website here.
Over the last few years, the agricultural sector has been buzzing with excitement about the potential of a new crop—industrial hemp. For years, hemp was increasingly regulated across the country because it was legally classified the same as marijuana, another type of cannabis.

In 1970, the Controlled Substances Act completely illegalized hemp production. This criminalized approach to hemp changed with the 2018 Farm Bill, however, which removed hemp from the definition of "marijuana" and gave states a chance to create their own hemp regulation programs. Many states seized the opportunity. As of May 5, 2020, the United States Department of Agriculture (USDA) had approved hemp plans from 16 states: Delaware, Florida, Georgia, Iowa, Kansas, Louisiana, Montana, Nebraska, New Jersey, Ohio, Pennsylvania, South Carolina, Texas, Washington, West Virginia, and Wyoming.

In this white paper, we examine the requirements for state hemp programs prescribed by the 2018 Farm Bill. Even within these "requirements," there is room for states to innovate. We'll take a look at how they've done so as we summarize the unique aspects of state hemp programs that go *beyond* the USDA's minimum requirements. There are many creative approaches that states are taking in regulating hemp production. We will touch on some of these notable approaches and highlight the similarities and differences among the approved state hemp regulatory programs.
The **USDA's National Agriculture Library** funded our research on this project, which we conducted in partnership with the **National Agricultural Law Center.**

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Estimating 2019 Ohio Agricultural Risk Coverage and Price Loss Coverage County Level Payment Rates

August 26 2020

By Ben Brown, Department of Agricultural, Environmental and Development Economics, The Ohio State University- August 25, 2020

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Agricultural producers across the United States are periodically allowed to enroll in federal commodity programs offered through the Federal Government. These programs contribute to a public safety net protecting against variations in year to year revenue due to reductions in production, price or both. Since the 1930s, Congress has authroized a federal Farm Bill every 5-7 years providing a variety of programs to producers, agribusinesses, landowners, and consumers. Economic conditions, producer preferences, world integration, and political appetite have influenced the federal safety net over the last 90 years causing introduction, implemetnation, and in some cases repeal of programs. The current suite of Title 1. commodity programs authroized in The Agricultural Adjustment Act of 2018 (2018 Farm Bill) includes: two revenue protection programs for row crop producers through Agricultural Risk Coverage (ARC) and Price Loss Coverage (PLC) programs, Marketing Assistance Loans (MAL), and programs for dairy and sugar producers. In some cases an election must be made between programs to complete enrollment. This article estimates county based ARC and PLC payments for enrolled Ohio producers for the 2019 program year, which ends September 30, 2020. In the case payments are triggered, distribution to producers will happen later in 2020 calendar year.

Introduction

Enrollment dates for federal commodity programs depend on specifics in the implementing documents, but regularly occur every fiscal year. Election into programs does not have to match enrollment. For instance, the 2018 Farm Bill allowed producers one election period between ARC and PLC for 2019 and 2020 program years combined (September 1, 2019- March 15, 2020), but had two separate enrollment periods (program year 2019: September 1, 2019- March 15, 2020 and program year 2020: October 1, 2019- June 30, 2020). For 2021, 2022 and 2023 program years, enrollment and election periods will happen simultaneously (October 1- March 15). Producers will also be allowed to adjust their elections between ARC and PLC starting in the 2021 program year (October 1, 2020- March 15, 2021.) Payments are calculated and distributed at the conclusion of the program year.

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The ARC program provides shallow loss revenue protection using yields and national Marketing Year Average (MYA) prices to calculate a historical revenue benchmark. Payments are triggered when the product of current year yields and the commodity specific national MYA price falls below 86% of the historical benchmark. Producers have the option between two versions of ARC: ARC-Individual (ARC-IC) and ARC-County (ARC-CO). Yields provided by invidual Farm Service Agency (FSA) farm numbers are used for ARC-IC; whereas, county area yields are used for ARC-CO. The PLC program is a shallow loss protection program using an nationwide effective reference price per commodity as the benchmark. PLC payments trigger when the national MYA price falls below the effective reference price. More information about ARC and PLC program mechanics can be found in The Ohio State Unviersity's Guide to the 2018 Farm Bill Commodity Programs (Brown, Griffith, and Zoller, 2019).

Data and Methodology

The payment rates presented in this article are estimates calculated by the author as of the published date. Official ARC-CO and PLC payment rates are released by FSA typically in October of the following year. Payments to FSA farmer numbers enrolled in ARC-IC are individual to the farm and cannot be estimated on a county wide basis. Noteworthy, the 2018 Farm Bill blends ARC-CO yields across county lines based on share of acres enrolled by that FSA Farm in each county.

Yields

Historical yields (2013-2017) for ARC-CO are provided by FSA. The 2019 program year is the first-year historical yields were trend adjusted, as the 2014 Farm Bill used reported yields in the historical benchmark calculation. County yields used in this article for ARC-CO are author calculations using 2019 Risk Management Association (RMA) area yields weighted by irrigation practice. A previous article explains these yield estimates (Brown, 2020). County yields may differ from these estimates, as FSA reserves the right to adjust ARC-CO yields.

For the PLC program, the national payment rate per bushel is multiplied by the individual FSA farm yield on file. Producers have the option to update their FSA farm yields by commodity for program year 2020 and any future years or programs using these values up to September 30, 2020. More information on PLC Yield Updates can be found in the OSU Farm Bill Handbook. For program year 2019, PLC yields match FSA farm yields used under the 2014 Farm Bill.

National Prices

National MYA prices are not official for the 2019/20 marketing year for all commodities. Wheat has a marketing year that runs June 1- May 31, whereas corn and soybean have marketing years that run September 1- August 31. National MYA prices are calculated by multiplying the monthly commodity price received by producers and the percent of the crop estimated to have been marketed that month. The national MYA is often

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higher than producer prices in areas with relatively weak basis values and lower than producer prices in areas with relatively strong basis values. The estimated MYA prices used in this report are calculated by using National Agriculture Statistics Service reported prices for months available: June through May on Wheat and September through June for corn and soybeans. Futures prices with a national average basis adjustment are used for July and August in the case of corn and soybeans. All months are then multiplied by a 5-year average marketing weight. The estimated national MYA prices used for ARC and PLC are included in Table 1.

The 2018 Farm Bill created commodity specific effective reference prices building on the reference prices congressionally set in the 2014 Farm Bill. Effective reference prices for program year 2019 are included in Table 1.

Table 1. 2019 Effective Reference Prices and Estimated 2019-20 Market Year Average Prices

	2018 Statutory Reference Price	2019 Effective Reference Price	2019/20 Market Year Average Price	PLC Payment Rate ($/bu.)
Corn	$3.70/bu.	$3.70/bu.	$3.58/bu.	$0.12/bu.
Soybeans	$8.40/bu.	$8.40/bu.	$8.60/bu.	$0.00/bu.
Wheat	$5.50/bu.	$5.50/bu.	$4.61/bu.	$0.89/bu.

2019 Corn ARC-CO and PLC Estimates

Figures 1, 2, 3, and 4 illustrate estimated corn ARC-CO and PLC payment rates per county. The payment rates listed have been adjusted to pay out on 100% of a producer's eligible base acres. Without the adjustment, producers would need to multiply their eligible base acres by 85%. Payments have also been reduced by an anticipated government sequestration of 6.8%.

Illustrated in Figure 1 are the rates for Ohio ARC-CO corn payments for those counties with no separation in irrigation practices. As mentioned earlier, some counties have both an irrigated and nonirrigated ARC-CO program. Four Ohio counties have both an irrigated and nonirrigated corn program: Champaign, Pickaway, Ross, and Williams. The payment rates for these counties by irrigated and nonirrigated yields are illustrated in Figures 2 and 3, respectively. Thirty Ohio counties are expected to trigger ARC-CO corn payments with an average payment of $33/eligible corn base acre with a range of $0-$66 per acre.

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Figure 1. Ohio Estimated 2019 ARC-CO Corn Payments for All Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)

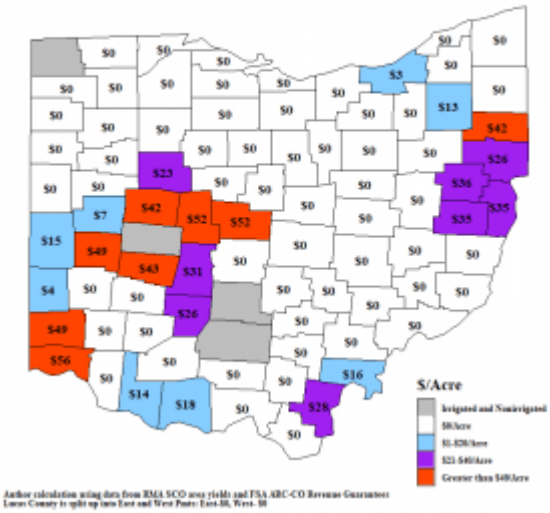

Figure 2. Ohio Estimated 2019 ARC-CO Corn Payments for Irrigated Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)

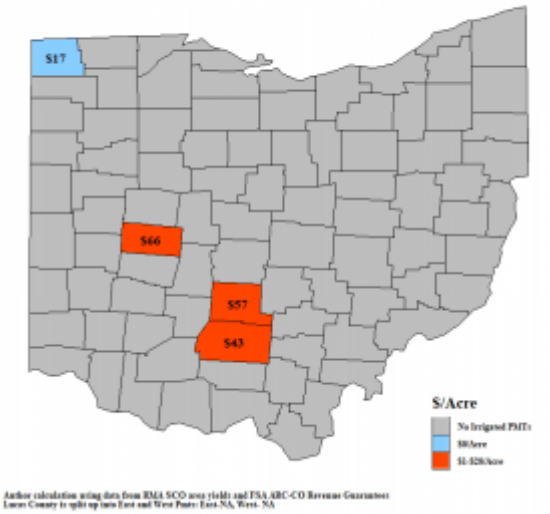

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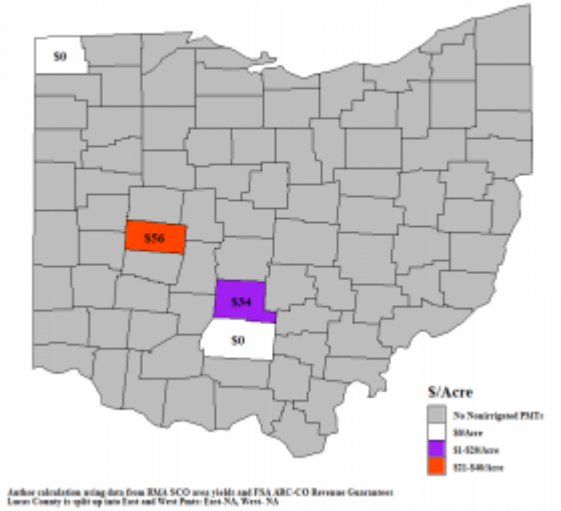
Figure 3. Ohio Estimated 2019 ARC-CO Corn Payments for Nonirrigated Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)



Ohio corn PLC estimated rates per county are illustrated in Figure 4. As a reminder PLC rates are sensitive to the MYA price as every $0.05 per bushel change in the MYA price translates to $8-$10 per acre. PLC rates are multiplied by the FSA farm yield instead of the county average yield used by the author. County average yields are meant to represent all farms in a county but will be low for some farm numbers and higher for others. With an estimated $0.12 per bushel payment triggered across the country, most Ohio producers should see a payment between $8-$13 per acre payments, a much smaller range in payments compared to ARC-CO. Ohio corn participation rates between ARC and PLC are not known, but 76% of producers nationwide elected PLC for program year 2019. University decision tools ubiquitously forecasted large 2020 program year PLC payments with few expecting 2019 program year payments. Reduction in ethanol production due to COVID-19 lowered the 2019/20 MYA price and increased the probability of PLC payments.

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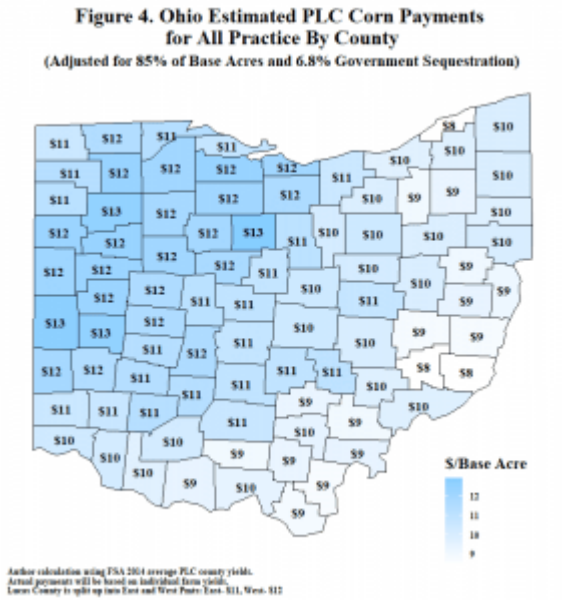

2019 Soybean ARC-CO and PLC Estimates

Figures 5, 6, 7, and 8 illustrate estimated soybean ARC-CO and PLC payment rates per county. Like corn, payments have been adjusted to apply on 100% of base acres and a 6.8% sequestration.

Illustrated in Figure 5 are the rates for Ohio ARC-CO soybean payments for those counties with no separation in irrigation practices. Eleven Ohio counties have both an irrigated and nonirrigated soybean program: Allen, Auglaize, Champaign, Hardin, Putnam, Seneca, Shelby, Union, Ver Wert, Williams, and Wyandot, represented in grey. The payment rates for these counties by irrigated and nonirrigated yields are illustrated in Figures 6 and 7, respectively. Fifty Ohio counties are expected to trigger ARC-CO soybean payments. Of those counties triggering payments, the average payment is $26/eligible base acre with a range of $0-$48. Three counties (Belmont, Monroe and Noble) did not have sufficient yield data or base acres enrolled in ARC-CO.

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Figure 5. Ohio Estimated 2019 ARC-CO Soybean Payments for All Practices By County
(Adjusted for 85% of base acres and 6.8% government sequestration)

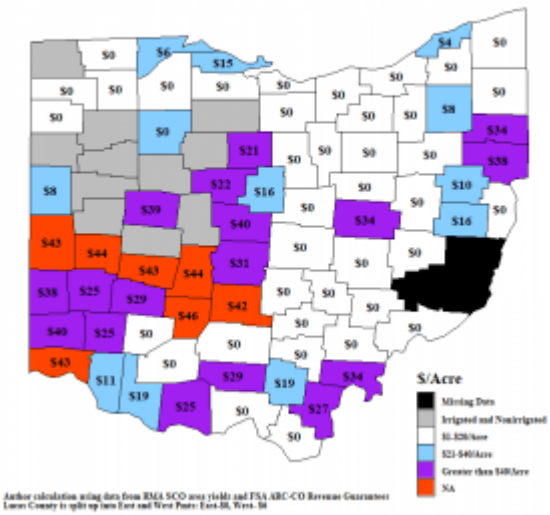

Figure 6. Ohio Estimated 2019 ARC-CO Soybean Payments for Irrigated Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)

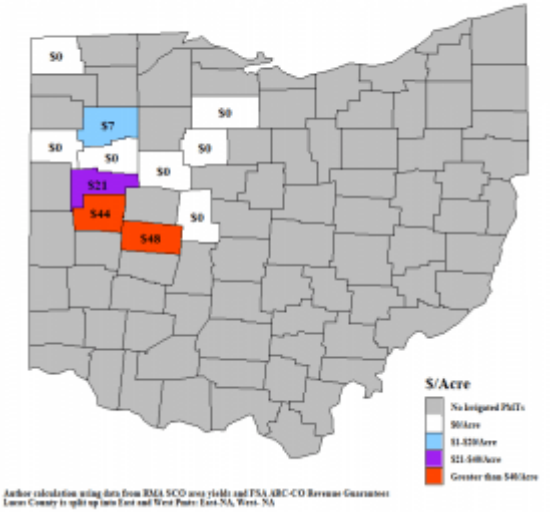

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Figure 7. Ohio Estimated 2019 ARC-CO Soybean Payments for Nonirrigated Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)

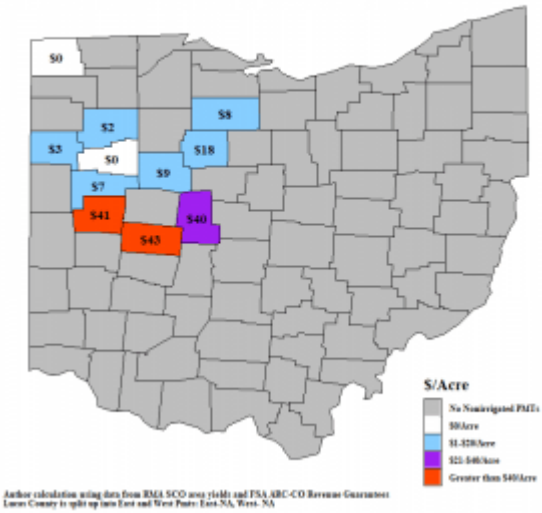

Figure 8. Ohio Estimated PLC Soybean Payments for All Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)

It is not likely soybeans will trigger a PLC payment in program year 2019. With an effective reference price of $8.40, the current forecasted MYA price of $8.60 is $0.20 above the required threshold. This will not be surprising to many producers as 14% of soybean base acres were enrolled in PLC, whereas 86% were enrolled in either ARC-CO or ARC-IC. During the Farm Bill election period, university decision tools did not forecast PLC payments in 2019 and only a small change of payments for program year 2020. Anecdotally, producers

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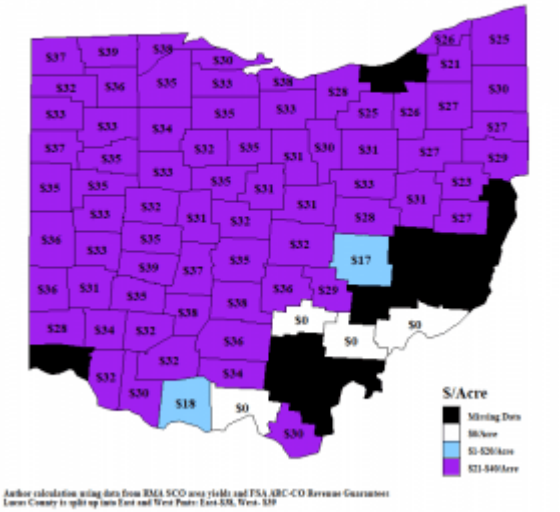
expressed a greater likelihood their county yields would come in lower than the historical benchmark for ARC-CO compared to the MYA falling below the effective reference price.

2019 Wheat ARC-CO and PLC Estimates

Figures 9 and 10 illustrate estimated wheat ARC-CO and PLC payment rates per county, respectively. Like corn and soybeans, payments have been adjusted to apply on 100% of base acres and a 6.8% sequestration.

Illustrated in Figure 9 are the rates for Ohio ARC-CO wheat payments. There are no Ohio counties that have both an irrigated and nonirrigated ARC-CO wheat program. County yields are weighted based on the share of irrigated and nonirrigated insured aces to create a yield for all practices. Seventy-three Ohio counties are expected to trigger ARC-CO wheat payments. Of those counties triggering payments, the average payment is $32/eligible base acre with a range of $0-$40. Twelve Ohio counties (represented in black) have missing yield data or do not have enrolled base acres of wheat for program year 2020.

Figure 9. Ohio Estimated 2019 ARC-CO Wheat Payments for All Practice By County
(Adjusted for 85% of base acres and 6.8% government sequestration)



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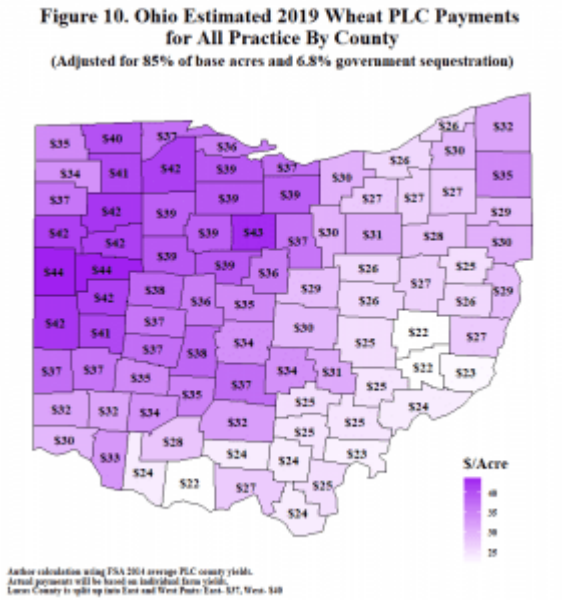

Figure 10 illustrates the estimated wheat PLC county payment rates. Given that the marketing year for wheat has concluded, it is all but certain the national MYA wheat price will fall below the effective reference price of $5.50 per bushel. The estimates used in this report estimate a national MYA price of $4.61/bushel while the World Agricultural Outlook Board in the August World Agricultural Supply and Demand Estimates forecast a MYA price of $4.58 per bushel. A $0.03 per bushel difference amounts to roughly a $1.60 per acre payment difference. The estimates for wheat payments between ARC-CO and PLC are similar in size. University decision aides forecasted a large PLC payment for program year 2019 and potentially for program year 2020. While there was the possibility wheat would trigger ARC-CO payments it was not as large as the probability for PLC. Nationwide 93% of producer chose PLC for eligible wheat base acres vs 7% for ARC.

Conclusion

This article estimates county level Agricultural Risk Coverage and Price Loss Coverage payment rates for program year 2019, which are expected to be announced by the Farm Service Agency later in calendar year 2020. These estimates are calculated using Risk Management Agency area yields and forecasted market year average prices in August of 2020.

- Yields and prices may differ from these assumptions, but these estimates should provide producers with an idea of cash flow from 2018 Farm Bill authorized programs.
- Farms with acres in multiple counties will have a blended ARC-CO yield for all enrolled acres within a specific commodity and FSA farm number. The entire data file with historical benchmarks is posted at go.osu.edu/farmbill2019

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- National participation rates show producers favored PLC for corn and wheat, but ARC for soybean base acres.
- County corn payments are higher for ARC-CO than PLC, but not all counties are expected to trigger an ARC-CO payment. For program year 2019, all county units are expected to trigger a PLC payment while thirty county units out of ninety-three are expected to trigger ARC-CO payments.
- No county unit is expected to trigger a PLC soybean payment while fifty out of one hundred are expected to trigger ARC-CO payments.
- Wheat payment frequency and size are approximately the same between ARC-CO and PLC, but the majority of wheat base acres are enrolled in PLC.
- As a reminder, enrollment for the 2021 program year starts October 1, 2020 and ends March 15, 2020.

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Genomes published for major agricultural weeds

Date: August 27, 2020
Source: University of Illinois College of Agricultural, Consumer and Environmental Sciences

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Representing some of the most troublesome agricultural weeds, waterhemp, smooth pigweed, and Palmer amaranth impact crop production systems across the U.S. and elsewhere with ripple effects felt by economies worldwide. In a landmark study, scientists have published the most comprehensive genome information to date for all three species, marking a new era of scientific discovery toward potential solutions.

"These genome assemblies will greatly foster further research on these difficult weed species, including better understanding the ways in which they evade damage from herbicides," says Pat Tranel, professor and associate head of the Department of Crop Sciences at the University of Illinois and co-author on the *Genome Biology and Evolution* study.

Draft genomes had already been published for waterhemp and Palmer amaranth, but techniques used in the *Genome Biology and Evolution* study provide a much clearer and richer picture of the species' gene sequences, a requisite for many genomic studies.

All three genomes were assembled using advanced long-read sequencing, which maintains the integrity and continuity of the genome similar to the way large puzzle pieces provide a clearer picture of the whole than small pieces. In Palmer amaranth, an additional sequencing technology (chromatin conformation capture sequencing) was used to further order pieces of the genome that were assembled using the long-read information.

"The goal of any genome assembly is to reveal the complete arrangement of genes in the genome, broken into chromosome-sized fragments. Unfortunately, until recently, quality genome assemblies have been very labor intensive and expensive. The previously published draft genomes for these species reported the genome broken into thousands of pieces, while the assemblies we report are down to hundreds. The vast majority of the sequence is now assembled into very large fragments," says Jacob Montgomery, a graduate student working with Tranel and first author on the study.

To further improve the assembly of the genomes for waterhemp and smooth pigweed, the team used an innovative approach known as trio binning, developed in cattle. Not only had this technique never before been fully utilized in plants, it had also not been used with parents from different species.

In normal reproduction, male and female parents each contribute one copy of every gene to their offspring. In this case, offspring are diploid, meaning they have two copies of every gene. In the study, the team created hybrid offspring from two separate species: waterhemp and smooth pigweed. These offspring are still diploid, but the trio binning technique allowed the researchers to pull apart and isolate the two copies from each parent species, resulting in haploid (single copy) genomes for each.

"This approach resolved a problem in the previous waterhemp genome assembly. When parent alleles (copies of each gene) are very different from each other, as is often the case in outcrossing species such as waterhemp, the genome assembly program interprets them to be different genes," Tranel says. "With only one allele from each species, we were able to obtain a much cleaner assembly of their gene sequences."

Detlef Weigel, director of the Max Planck Institute for Developmental Biology and co-author on the study, adds, "I am a big fan of the new advanced sequencing techniques, but even though they should theoretically be sufficient to sort out the arrangement of genes, in practice they are not. This is where genetics can help out, using

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information on whether genes were inherited from mom or dad. This allowed us to assign each gene to either a maternal or paternal chromosome."

The researchers specifically chose waterhemp as the male parent in the smooth pigweed × waterhemp cross because the previously published waterhemp genome was from a female plant. Tranel is pursuing research to understand the genetic basis for maleness and femaleness in waterhemp and Palmer amaranth, with potential applications toward introducing female sterility as a future control method.

"The genomes of the male waterhemp and Palmer amaranth already have enabled my group to make rapid progress on identifying the potential genes that could be responsible for the determination of sex (male or female) in both species," Tranel says.

Importantly, the genomes for all three species could start to chip away at the problem of herbicide resistance in these weeds. More and more, scientists are uncovering evidence of non-target-site or metabolic resistance in waterhemp and Palmer amaranth, allowing the weeds to detoxify herbicides before they can cause damage. Unfortunately, it is usually very difficult to determine which specific enzyme, among hundreds, is responsible for detoxifying the herbicide.

Now, researchers will essentially be able to sort through a list to find the culprit with the hope of either knocking out the enzyme responsible or modifying the herbicide molecule to evade detoxification.

"Innovation is essential for the future of agriculture. We at BASF are working continuously on improving our products and services including sustainable solutions for the management of herbicide-resistant weeds. We want to better understand the amaranth biochemical resistance mechanisms in order to offer farmers new products and solutions for optimal control of key weeds," says Jens Lerchl, head of early biology research on herbicides at BASF and study co-author. Lerchl coordinated the Palmer amaranth genome work with KeyGene/Wageningen - The Netherlands.

"The area of genome sequencing is highly dynamic. That is why BASF chose KeyGene as the partner for both latest sequencing technology and bioinformatics. Together with the expertise of the University of Illinois and Max Planck Society, we were able to compare genomes and address specific biological topics," Lerchl says. In addition to collaborating on this research, BASF is also a founding member of the International Weed Genomics Consortium, led by Colorado State University aiming at the sequencing and analysis of ten high priority key weeds.

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