

MICHIGAN CORN

BETWEEN THE ROWS

The Joint Magazine of the Corn Marketing Program of Michigan and the Michigan Corn Growers Association



GREAT LAKES CROP SUMMIT

REGISTRATION INFO INSIDE!

WINTER 2019

BETWEEN THE ROWS

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The Move Away From Leaded Gasoline

By: Jim Zook, Executive Director, Corn Marketing Program of Michigan

This article is the third in a four-part series on ethanol and liquid fuels.

The first installment covered the history of ethanol use in fuels. The second looked at the advent of leaded gasoline and the tactics used to keep it in gasoline.

As we discussed in previous articles, companies in control of putting tetraethyllead (TEL) in gasoline as an additive were able to convince governmental agencies that they knew best when it came to making the rules. With that trust came the ability of those companies to control the research, data and messaging. With this power, TEL proponents were able to use government officials to advance their business internationally.

New York state suspended the use of TEL in gasoline on the concern over the health effects. That is when the major lead companies kicked into high gear, churning out research to support the safety of the lead in gasoline. In addition to this research, a scientist named Robert Kehoe was claiming there was no other viable source of octane available. This was especially suspect because Robert Kehoe was the one who found ethanol as a great octane source when he drove a vehicle from Dayton to Indianapolis on 100% ethanol.

The government's allegiance was already known when a competing auto company, Lilliputian Deppe Motors, drafted a letter

to the secretary of the interior Huber Work, questioning whether the Bureau of Mines existed to the benefit public health and protection of life and health or for the benefit of Ford, the G.M. Corporation, Standard Oil and other oil companies. Government agencies continued this protection of TEL and never fulfilled their obligations to the public. The Surgeon General never lobbied Congress to pay for human health impact studies, but rather relied on the results that were underwritten by lead industry trade associations. This practice continued for the next 40 years.

Over the next 40 years, TEL was used in nearly 90 percent of gasoline worldwide. The lead industry used U.S. health officials support as a way to convince people and agencies abroad that it was safe for their countries. This continued until 1962 when suddenly GM and Standard Oil dumped their Ethyl Corporation. They sold the company and the manufacturing rights to the Albemarle Paper Manufacturing Company of Richmond, Virginia. No one knew why it was sold at the time. The companies patents had expired in 1947 and there were other manufacturers of TEL like Nalco, PPG and Houston Chemical.

The true fall of TEL started in 1969 with a scientist named Dr. Clair Patterson, a geochemist at the California Institute of

Technology. The scientific community had its hardest evidence yet that the high lead levels in industrial lands were man-made and endemic, not naturally occurring like Kehoe wanted people to believe. Dr. Patterson's paper earned him a visit from the ethyl corporation which, in her words, "tried to buy [her] out through research support that would yield results favorable to their cause." He did not join their cause, but rather predicted and lectured on the demise of their TEL operations. This led to his longstanding contracts with the Public Health Services and the American Petroleum Institute not being renewed. This then led to members of the board of trustees of the California Institute of Technology to lean on his department chair to fire him. There was an allegation that Ethyl Corporation was going to endow a chair at the college.

This study then was the start of the legal battle for those believed to be conspirators in delaying the development and use of devices to control air pollution from cars based on secret agreements. There were four auto companies and seven manufacturers of trucks and cabs that were listed by the Justice Department. This was the beginning of unleaded gasoline, development of the catalytic converter and ultimately cleaner air.



Corn Marketing Program of Michigan **2019 Highlights**

The Corn Marketing Program of Michigan works all year to educate consumers, grow markets, fund important research and promote the corn industry in Michigan. Here are a few of the highlights from the past year.



January – Hosted the Great Lakes Crop Summit

February – Used misleading Superbowl commercial as an opportunity to educate consumers about corn syrup in beer

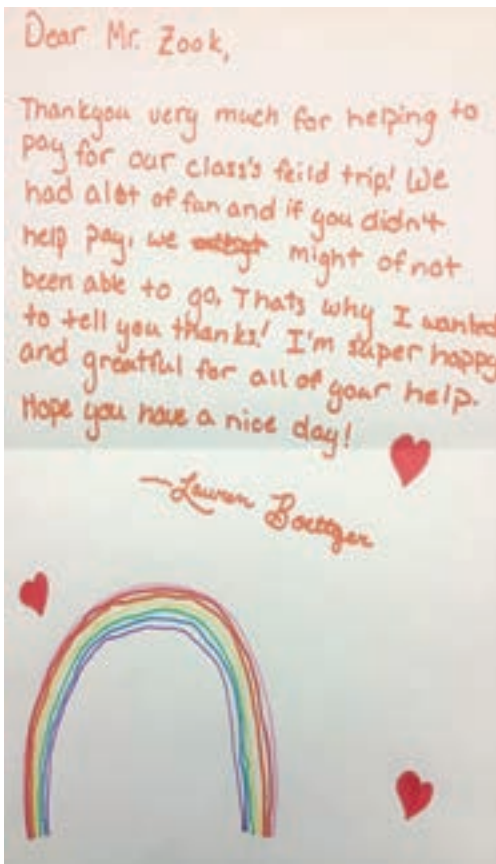
Researchers presented CMPM-funded projects at research meeting

March – MICENT Young Leaders Visit Argentina on educational mission

May – Funded school field trips to the IQHub

July – Michigan Farmers learn more about global markets at Trade School hosted by the U.S. Grains Council and National Corn Growers Association





Ran billboards and advertisements educating consumers about ethanol in marine engines

August – Between the Rows Tour and Yield Checks

September – Bay County Project Red

October – Hosted Ethanol Trade Team from Philippines, Myanmar, Pakistan, Australia and New Zealand



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Michigan Corn Growers Association 2019 Highlights

The MCGA works all year to represent you in Lansing and Washington, D.C. Here are a few of the highlights of our work over the past year.



January – Annual Meeting at the Great Lakes Crop Summit

February – Corn Congress at Commodity Classic

March – Testified on the industry in front of the Senate and House Ag Committees

April – Hosted the Farmers for Free Trade tour to call for passage of the USMCA

May – Roundtable with Dan Kildee at Star of the West





June – Clinton County Annual Meeting

July – Corn Congress and lobbying on the Hill in Washington, D.C.

August – Annual MCGA Golf Outings

September – Corn Boil on the Capitol Lawn

October – EPA Testimony on small refinery waivers

November – Harvest Ride Alongs



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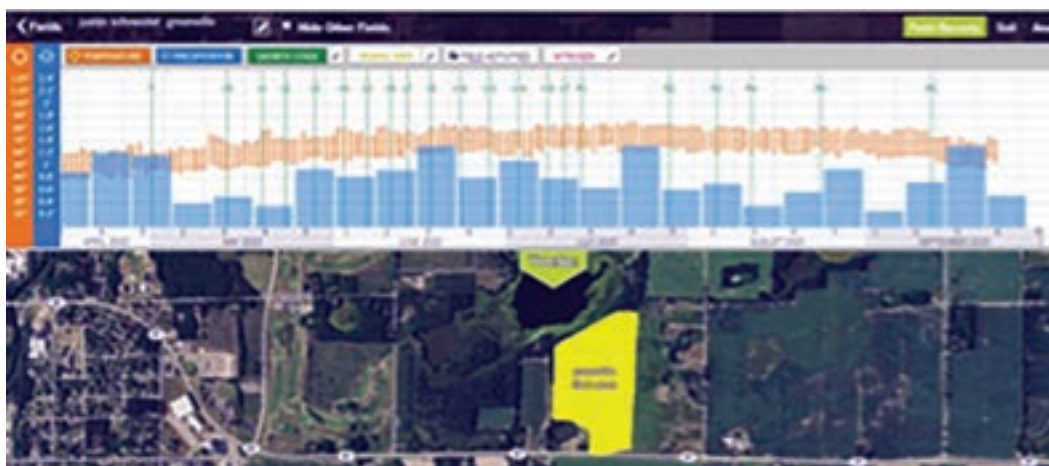
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Put Your Data To Work

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When you work with LG Seeds®, you get a team of local experts committed to growing your bottom line and providing advice customized for the success of your entire operation. The new LG Seeds is committed to helping growers yield bigger, better results. Your LG Seeds team will help you get results by analyzing last year's data and planning for next year's success.

Now that the 2019 harvest is starting to wrap up, it is time to start making a field-by-field plan for 2020. Yield data is a great place to start when it comes to making product decisions. But, it's important to look at the factors that went into that yield. When you're evaluating side by side or strip plots, evaluate yield by soil type, population, fungicides, and different fertility zones if possible. When I do a side by side on my own farm, I evaluate all these variables and more to see if one hybrid responds differently. All this data available, beyond yield, provides valuable insight to how products perform in different environments and under different management styles.

Taking season-long notes is another way to evaluate product performance. Throughout the growing season I take notes on emergence, vigor, plant health and stalk quality. These notes are just as important as yield because every operation is different and, in some instances, agronomic qualities can trump yield. Understanding the agronomic qualities

of a product can help get the right product on the right acre in your field-by-field plan.

Creating a field-by-field plan is simple with platforms like Advantage Acre® that offer forecasting for future planning. In Advantage Acre, a grower can see temperature and rainfall predictions up to 11 months in advance. Advantage Acre then combines the weather information with what it knows about LG Seeds hybrids and develops a model to predict when a hybrid or variety will hit each growth stage. Features like this are valuable when it comes to making decisions maturity and planting decisions.

You can maximize your ROI by creating a field-by-field plan in the winter, taking notes during the growing season and

analyzing harvest data. Ready to get down to business? Connect with your LG Seeds team of local experts at LGSeeds.com or by calling 989.737.5408 to find a teammate near you.

SCHOLARSHIP

Michigan Corn Growers Association

Eligibility

?

- Members of MCGA or their children (student associate members included)
- Ages 17-25
- Enrolled in post-secondary education for Fall 2020

Due Date

✉

- Friday, February 7, 2020
- Must be received by the Michigan Corn Office via US mail or email no later than 4:30 pm
- Visit micorn.org for more information and to receive the application

Requirements

✓

- Completed Application (includes career plans and an essay)
- Two letters of recommendation
- Resume
- Copy of most recent transcript

GLCS 2020



REGISTRATION IS OPEN

January 29-30, 2020

Soaring Eagle Casino and Resort | Mt. Pleasant, MI

www.GreatLakesCropSummit.com



Joe Bastardi
WeatherBELL Analytics

KEYNOTE SPEAKERS



Denton Cinquegrana
OPIS (Oil Price Information Service)

B R O U G H T T O Y O U B Y



Tuesday, January 28, 2020				
7:30 - 9 p.m.	Reception for all attendees and speakers <i>Sponsored by Great Lakes Crop Summit and Farm Bureau</i>			
Wednesday, January 29, 2020				
8:00 a.m.	Registration, Exhibit Area Open, Hot Breakfast - <i>Sponsored by Zeeland Farm Services, Inc.</i>			
9:00 a.m.	Keynote Speaker 2020 Vision on Weather and Climate Joe Bastardi, Chief Forecaster at WeatherBELL Analytics			
10:30 a.m.	Exhibit Area Open			
11:15 a.m.	Exhibit Area Open and Lunch - <i>Sponsored by Nutrien Ag Solutions</i>			
	Saginaw Room	Swan Creek Room	Black River Room	Ojibway Room
1:30 p.m.	Michigan experience with ultra-early planted soybeans: A farmer panel John Burk, Lee Thelen, Curtis VanVorst	Farm business structure: Growth and transition to the next generation through profit center development Chris Barron, Ag View Solutions	How crop insurance can work for you in an increasingly risky world Tara Smith, Michael Torrey Associates, LLC	It's okay to not be okay Jeff Ditzenberger, Farmer <i>Sponsored by Wilbur-Ellis</i>
2:30 p.m.	Cover crops in practice: A farmer panel Don Morse, Rich D'Arcy, John Burk	Comparing methods from industry and university to forecast yield and nitrogen fertilizer management in corn Dr. Bruno Basso, Michigan State University	A crop insurance DC update: threats and opportunities Tara Smith, Michael Torrey Associates, LLC	Take action on compaction! Peter Johnson, Ontario Compaction Team (repeat session)
3:30 p.m.	Room Being Reset for Annual Meetings	The business of equipment: Equipment utilization and efficiency Chris Barron, Ag View Solutions	Take action on compaction! Peter Johnson, Ontario Compaction Team (repeat session)	Tar spot management in 2020 and beyond Dr. Marty Chilvers, Michigan State University
4:30 - 7 p.m.	Exhibit Area Open			
4:30 - 5:30 p.m.	Michigan Soybean Association & Michigan Corn Growers Association Annual Meetings <i>Saginaw Room</i>			
5 - 6 p.m.	GreenStone Farm Credit Services Connect Reception - Exhibit Hall			
6 - 7 p.m.	Buffet Dinner - Ice Cream Social - <i>Sponsored by PNC Bank</i> - Exhibit Hall			
8 p.m.	Reception - <i>Sponsored by BASF</i>			

Thursday, January 30, 2020				
7:30 a.m.	Exhibit Area Open, Hot Breakfast - Sponsored by SoybeanPremiums.org			
8:15 a.m.	<p><u>Keynote Speaker</u></p> <p>The Future of E15 & Other Fuel Fear Factors Denton Cinquegrana, OPIS (Oil Price Information Service)</p>			
	Saginaw Room	Swan Creek Room	Black River Room	Ojibway Room
9:15 a.m.	<p>Crop fertility, understanding the basics to drive informed decisions</p> <p>TC Huffman, Corteva</p> <p><i>Sponsored by Pioneer</i></p>	<p>Impact of China's field crop production and consumer demand on Michigan producers</p> <p>Paul Burke, USSEC</p>	<p>Ag transportation in the electronic age</p> <p>Craig Anderson, Michigan Farm Bureau</p>	<p>A presentation of the film, SILO, followed by a discussion on grain bin safety</p>
10:15 a.m.	<p>Understanding, responding, and managing farm stress</p> <p>Eric Karbowski, Michigan State University Extension</p> <p><i>Sponsored by Wilbur-Ellis</i></p>	<p>Let technology improve profitability</p> <p>Jeremy Wilson, EFC Systems</p> <p><i>Sponsored by Bader & Sons, Co.</i></p>	<p>2019 soybean checkoff research highlights</p>	<p>Wayne Bauer, Emergency Services Rescue Training</p> <p><i>Sponsored by Michigan Ag Commodities</i></p>
11:05 a.m.	<p>Exhibit Area Open, Buffet Lunch & Master Farmer Awards – Exhibit Hall</p> <p><i>Master Farmer Awards sponsored by Michigan Farmer, Michigan Agricultural Commodities, Wilbur-Ellis, Brownfield Ag News, Corn Marketing Program of Michigan, Michigan Soybean Promotion Committee, Michigan Wheat Program and Carhartt, Inc.</i></p>			
12:45 p.m.	<p>2019 corn checkoff research highlights</p>	<p>Success in diversifying the farm operation: A farmer panel</p> <p>Abby Carpenter, Bryan Heffron, Allyson Maxwell</p>	<p>Weed disasters from 2019 will impact future management</p> <p>Dr. Christy Sprague and Dr. Erin Burns, Michigan State University</p>	<p>Maximizing wheat yield with precision planting and agronomic management</p> <p>Dr. Manni Singh, Michigan State University</p>
1:45 p.m.	<p>Emerging weed problems in winter wheat</p> <p>Dr. Christy Sprague, Michigan State University</p>	<p>Streamflow depletion caused by crop irrigation</p> <p>Todd Feenstra, Tritium, INC.</p>	<p>Research partnerships for soil health: Preliminary insights from farms implementing soil health practices over a multi-year period</p> <p>John Stewart, Soil Health Partnership</p>	<p>International demand for Michigan soybeans in the 2020's</p> <p>Paul Burke, USSEC</p>
2:30 p.m.	Adjourn			



2020 Great Lakes Crop Summit Registration

Space is limited, so register by Jan. 7, 2020 to guarantee your spot. Walk-ins are not guaranteed a space. You may also register online at www.GreatLakesCropSummit.com or by phone at (888) 323-6601.

Please make copies if necessary & return all forms together.

Name: _____

Farm/Company Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ Email: _____

Special Dietary Needs: _____

Please check the options that describe you (You may select more than one)

☐ Farmer ☐ Farm Employee ☐ Agribusiness ☐ Student ☐ Other _____

The Great Lakes Crop Summit (GLCS) will use your email address to provide updates related to your registration. By registering for the conference, you agree that GLCS may share your registration information with sponsors and exhibitors of GLCS 2020. If you do not wish to have your email address shared with sponsors and exhibitors, please indicate in the box below.

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Attendee #2

Name: _____

Farm/Company Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ Email: _____

Special Dietary Needs: _____

Please check the options that describe you (You may select more than one)

☐ Farmer ☐ Farm Employee ☐ Agribusiness ☐ Student ☐ Other _____

The Great Lakes Crop Summit (GLCS) will use your email address to provide updates related to your registration. By registering for the conference, you agree that GLCS may share your registration information with sponsors and exhibitors of GLCS 2020. If you do not wish to have your email address shared with sponsors and exhibitors, please indicate in the box below.

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REGISTRATION FEES

	Early	Late After Jan. 8	Number of People	Total
First Attendee (Both Days)	\$150	\$175	1	\$ _____
Additional Attendees (Both Days)	\$125	\$150	_____	\$ _____
Student - Wednesday (ID required at check-in)	\$50	\$50	_____	\$ _____
Student - Thursday (ID required at check-in)	\$50	\$50	_____	\$ _____
Total Number of People & Fees:			_____	\$ _____

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Return registration form with check, made payable to Great Lakes Crop Summit, or credit card information to:
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Overseas Buyers Visit Michigan Ethanol Value Chain As Part Of Global Ethanol Summit

Twenty-five high-level government officials and ethanol decision makers from the Philippines, Myanmar, Pakistan, Australia and New Zealand traveled to Michigan, Oct. 15-18, to better understand the U.S. ethanol production process from farm to ethanol plant.

Buyers in the delegation, led by the U.S. Grains Council (USGC), in partnership with the Corn Marketing Program of Michigan, came to the state after spending time in Washington, D.C. at the Global Ethanol Summit. That event, including 400 participants jointly sponsored by the Council, Growth Energy and the Renewable Fuels Association (RFA), featured business-to-business meetings and participants learned about the benefits of expanding ethanol use.

"This impressive group of ethanol leaders are in the U.S. to learn how U.S. ethanol

contributes to meeting their biofuels goals including increasing environmental, human health and economic benefits not only in their respective countries, but around world," said Ryan LeGrand, USGC president and CEO. "Concerns about the environment, air quality and human health have led governments to find renewable contributions to transportation fuel and our hope is by learning more, these decision makers will see the United States as their partner in meeting these needs."

For the last 10 years, ethanol has been the fastest-growing U.S. agricultural export, according to the U.S. Department of Agriculture's Foreign Agricultural Service (USDA's FAS). In 2018, U.S. ethanol exports totaled more than 6.5 billion liters (1.72 billion gallons or 609 million bushels in corn equivalent), valued at \$2.7 billion. Using trade data on 47 different agricultural and ag-related product groupings tracked by USDA's FAS via

its Global Agricultural Trade System (GATS), ethanol exports grew by 18 percent per year over the past five years and 13 percent per year over the past 10 years.

In 2014, the Council began carrying out foreign market development activities in partnership with USDA's FAS, Growth Energy, the Renewable Fuels Association (RFA) and state corn organizations. While small at first, the effort has grown to a true global effort with activities in 40 different markets funded by the ethanol industry, corn growers and export promotion programs in the farm bill and administered by USDA's FAS.

During the post-Summit tour in Michigan, the delegation visited Jeff Sandborn's farm to gain a better understanding of ethanol feedstock production, NuVu Fuels, and Carbon Green BioEnergy to learn about various ethanol blends, the U.S. fuel market and how distribution works.



Representative Julie Brixie met with the Wamhoff family on their farm in East Lansing.



Representative Phil Green visited Chris Creuger and CJ and Nate Bednarski for a harvest ride along in Unionville.



Representative Mark Huizenga visiting Kruithoff farms in Kent City.



Herb and Ken Zahm hosted Representative Luke Meerman on their farm in Marne.



Representative Rodney Wakeman visited Don Morse's farm in Birch Run.



Representative Jim Haadsma rode along at Mark Halbert's farm in Battle Creek.

MCGA Gives Michigan Lawmakers Firsthand Look at Farming Challenges

Each year, the Michigan Corn Growers Association hosts a series of harvest ride along events on farms across the state. These events pair a lawmaker with a local farmer for a ride in the combine during harvest. It's an opportunity for farmers to build relationships with local lawmakers, and share information about the challenges and opportunities they see for our industry. Most of our lawmakers don't come from farming backgrounds, and it's beneficial for them to see firsthand what it's like on a modern farm – from the challenges of managing a family business, to the advanced technology that farmers are employing in their day-to-day operations. If you would like to host a future ride along, please email Penni Sweeney at psweeney@micorn.org.




MCGA Makes Strong Push on Ethanol as EPA Comment Period Wraps Up

This October, the Michigan Corn Growers Association (MCGA) partnered with Michigan's ethanol industry to make a final push for comments to be submitted to the Environmental Protection Agency (EPA) surrounding the Renewable Fuel Standard. The comments called on EPA to follow the law and accurately account for expected refinery waivers in the 2020 Renewable Fuel Standard (RFS) volume rule. In a series of full-page ads in the Detroit Free Press and Detroit News, MCGA made the following statement: "EPA Waivers Siphon Money from Family Farmers to Big Oil Companies: Exempting big oil companies from their lawful requirements under the Renewable Fuel Standard lowers prices for corn farmers and raises profits for oil companies. That's exactly what EPA's proposal on ethanol does right now. President Trump says he stands with farmers. His EPA does not."

The statement was in response to an EPA proposal that would account for waivers based on Department of Energy's (DOE) recommendations, rather than the actual gallons waived by EPA. The proposal is half of what the President committed to in an October 4th deal with farmers.

At an October 30th hearing hosted by EPA in Ypsilanti, corn farmers and members of the ethanol industry testified about the importance of the RFS and the damage caused by the granting of these so-called "small refinery waivers" to some of the largest oil companies.


"We were excited when President Trump announced a plan on October 4th to restore those waived gallons and make the RFS whole again, as required under the law," said Chris Creguer, MCGA board member and farmer from Unionville. "Unfortunately, that excitement was short lived. The proposal put forth by EPA on October 15 falls well short of what was promised. We're calling on EPA to follow the law and keep the RFS whole by redistributing waived gallons based on the history of actual gallons waived."




EPA Waivers Siphon Money from Family Farmers to Big Oil Companies

Exempting big oil companies from their lawful requirements under the Renewable Fuel Standard lowers prices for corn farmers and raises profits for oil companies. That's exactly what EPA's proposal on ethanol does right now. President Trump says he stands with farmers. His EPA does not.

Visit MCGA.com and tell EPA to support Michigan's corn farmers and honor the President's deal on ethanol.



This message is brought to you by the Michigan Corn Growers Association and the Michigan Ethanol Industry.





Between the Rows Recap & Harvest Update

By: Claire White, Outreach Manager at Michigan Corn

In August and September, we hosted our fifth annual Between the Rows Tour. This tour allows us to showcase what we have been working on over the year as well as giving a yield projection updated based on our crop tour. The staff, volunteers and a few FFA chapters spent the beginning of August out in the fields completing yield checks across the state of Michigan. This year we completed over 370 yield checks. The average yield that we found for the state was 150.5 bu/acre. Visit our website to see the county averages at www.micorn.org.

Now that the crop tour has been completed and harvest is well underway, we are shifting our focus to completing harvest and planning for what 2020 is looking like. Comparing actual harvest outcomes to the predictions made during our “Between the Rows” is difficult at

this time as harvest has been very slow. We have seen a lot of the early planted crop come off, however there has been a hold up with the weather, again.

We have been hearing a lot about the wet conditions in the fields, which has been making it difficult to get into the fields but also has been slowing natural dry down in the fields. This has also impacted soybeans this year as some farmers were drying beans in their dryers. The additional dry down costs are going to be an issue that needs to be monitored closely. It will also play into monitoring stored corn as coring the bin may need to be done sooner than usual.

Looking ahead to 2020 it is hard to tell what is going to happen. With the difficult weather we have had this year we anticipate a small amount of the corn crop will be left standing in the

fields. Due to soil moisture, we anticipate more compaction than normal. Compaction is an issue that is going to carry over into 2020 and may cause some growers to manage the ground differently in the spring. With the anticipated crop left in the field that will also carry over into 2020 to complete harvest.

We want to thank the Coopersville FFA Chapter, Montague FFA Chapter, Olivet FFA Chapter and the Ovid-Elsie FFA Chapter for assisting us with yield checks. We want to thank AgroExpo, Blu Sky Farms, D&J Taylor Farms, JLJ Parr Farms, Helena Farms, Heasley Seeds, Ackerman Brothers Farm and Smolinski Green Acres Inc. for hosting our tour.

If you are interested in hosting the tour in 2020 please contact Claire White at 517-668-2676 or cwhite@micorn.org.



Figure 1: Harvestable buffer strips utilizing a grass forage mixture. Paul Gross, MSUE.

Cover Crops And Phosphorus: A Consideration For Nutrient Management plans

Authors: Monica Jean, Sarah Fronczak and Kristin Poley

Winter is a great time to consider changes to your nutrient management plans for the upcoming season. Cover crops can be used to enhance your nutrient management plan in addition to providing erosion control, increased water holding capacity, and the addition of organic matter. Certain varieties, especially those noted for nitrogen scavenging, can aid in nitrogen loss mitigation, but can they serve in a similar way to prevent phosphorus loss?

Phosphorus loading contributes to eutrophication in all types of waterbodies and to the increase of harmful algal blooms, which is a large increase in the density of algae that is capable of producing toxins. These toxins can damage the liver, nervous system, kidneys, and skin of humans and animals that come into contact with the toxin. The algae most commonly found to produce the toxins of concern is *Microcystis*, a blue-green algae that is capable of moving through the water in large colonies. Research demonstrates that algae blooms occur when levels of dissolved phosphorus in water bodies increase. Sources of dissolved phosphorus can include sewage treatment systems, animal manure, and commercial fertilizers.

Our cropping systems in Michigan, with tile drainage, are more vulnerable to phosphorus loss. There is also possible loss of phosphorus in fields through macropores and preferential flow. Thinking critically about your nutrient management plan can help protect your fields from the economic loss of nutrients leaving the field and the resulting environmental impact.

One of the ways that researchers are exploring the retention of phosphorus is by observing the behavior of different sources of phosphorus fertilizers. Steve Safferman, MSU Engineering Associate Professor, has shown that mineral fertilizers (MAP and DAP) were statistically similar in both the degree of soil phosphorus retention and sub-surface phosphorus loss through simulated tile drains. However, the phosphorus in organic fertilizers (dairy and swine manure) was bound to the soil at a higher degree and less likely to show up in the tile drain. In light of this research, let's consider what role cover crops can play in this system to improve our options or timeframe to retain dissolved phosphorus.

Cover crops can help phosphorus conservation by taking up and storing nutrients for the primary crop. Maltais-Landry (2015) found that a wheat cover crop residue took up 20% to 40% of phosphorus in the soil and 8% to 22% were utilized in the following crop. Kleinman et al. (2005) found that a cover crop reduced 36% of the total phosphorus runoff from an agricultural field. However, the freezing and thawing of certain cover crops (e.g. ryegrass, alfalfa, and winter wheat) may increase the release of soluble phosphorus as cellular material breaks down during such events (Bechmann et al. 2005; Elliott 2013; Riddle and Bergström 2013; Liu et al. 2014). These studies demonstrate that cover crops are efficient as short-term nutrient banks in crop fields, but they should not be relied on to remove all excess phosphorus.

Additional roles cover crops could play are improving the soils' ability to store or recycle phosphorus. Cover crops are credited for improving soil water holding capacity which could lead to phosphorus retention, however more research is needed to support this. Cover crops that can play a dual role as a forage can be harvested after the plant has taken up phosphorus. The biomass can then be fed to livestock, which recycles the phosphorus again in the following season through manure application leading to a more integrated crop/livestock system (Figure 1).

While cover crops are a great tool for farmers to consider for enhancing nutrient management plans, no single practice can prevent all phosphorus loss. Other practices that have been shown to assist in phosphorus retention are saturated buffer strips, conservation tillage, sub-surface application of phosphorus, and drainage water treatment.

How can a cover crop work for you? Just food for thought while you are thinking about your 2020 nutrient management plan.

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