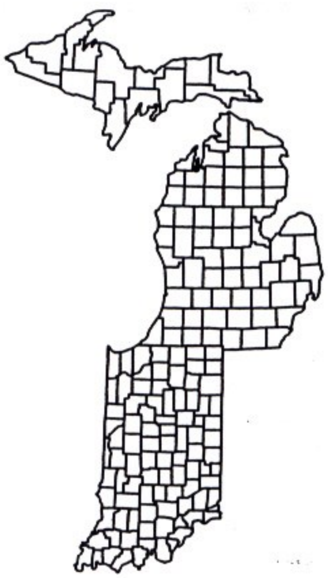
MICHIANA IRRIGATION ASSOCIATION

MICHIGAN-INDIANA IRRIGATION NEWSLETTER

May 2020

52540 Lawrence Rd
Leonidas, MI 49066



Greetings,

If you received this letter, you are somehow involved with irrigation. Since you have read this far it shows you are interested in irrigation. That is why we would like your involvement, membership, and input with the Michiana Irrigation Association (MIA).

The MIA was formed in 1980 as a nonprofit professional organization. The primary objectives:

A. To promote:
   1. The development, proper use, management and acceptance of irrigation equipment practices.
   2. Educational activities and materials related to efficient irrigation.
   3. Water and soil conservation and more economical crop production through the use of irrigation.

B. To acquaint public and private sectors with developments in the irrigation industry, as well as the part the industry occupies in both the economy and the development of the nation.

C. To counsel with industry leaders and others on desirable legislative changes which affect the irrigation industry and irrigators.

D. To advise government regarding irrigation-related areas that affect, either directly or indirectly, the public and the irrigation industry.

If you have questions about what Michigan Irrigation Association does, don't hesitate to reach out to one of the current members. Following is list of current board members with their e-mail address:

- Joel Annable joel.annable@peerlessmidwest.com
- Todd Feenstra todd@tritiuminc.net
- Tom Frank tfrank70@comcast.net
- Justin Gentz gbfarms@live.com
- Brian McKenzie mckenziehighlander@msn.com
- Mike Morehouse mmore@maplenet.net
- Doug Pedler dpedler@maisco.net
- Ben Russell ben@pmcafarms.com
- Jeremy Walker walkerprecisionag@gmail.com

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Indiana Regulatory Programs Reminder for Irrigators

The Indiana Department of Natural Resources (DNR) would like to remind irrigators about the following regulatory programs that might be applicable to their operations within the State of Indiana. Additional information regarding each program is available on the DNR, Division of Water website at https://www.in.gov/dnr/water/ or by contacting Mark Basch or Allison Mann of the DNR, Division of Water at mbasch@dnr.in.gov or almann@dnr.in.gov, respectively.

Significant Water Withdrawal Registration and Water Use Reporting (IC 14-25-7-15) All Significant Water Withdrawal Facilities (SWWF) are required to register with the DNR and report water use annually. A SWWF is defined as a facility that, in the aggregate from all sources and by all methods, has the capability of withdrawing more than 100,000 gallons of ground water, surface water, or ground and surface water combined in one day. Annual water use reporting began in 1985, and is required to be submitted by April 1 for the previous year. Approximately 4200 SWWFs are currently registered with DNR with 2.15 trillion gallons of water withdrawals reported in 2018.

Emergency Regulation of Ground Water Rights (IC 14-25-4; Rule 312 IAC 12) Small capacity well owners are protected against the impacts of a SWWF if the pumping substantially lowers groundwater levels, resulting in the failure of small capacity well. If and investigation conducted by the DNR reveals that a SWWF has caused a domestic well failure, the SWWF owner must provide “timely and reasonable compensation” to the small capacity well owner by either restoring their well to its original capacity or providing them with an alternate supply of potable water. The law also provides DNR the ability to restrict SWWF pumping if it is believed to be exceeding the recharge capability of the source aquifer.

Emergency Regulation of Surface Water Rights (IC 14-25-5; Rule 312 IAC 11.5) Owners of freshwater lakes (10 acre surface area or greater) are protected against “significant environmental harm” resulting from a lowering of the lake level due to nearby groundwater or surface water withdrawals by a SWWF. The law may restrict the quantity of water withdrawn by the SWWF or provide for the restoration of the normal water level of the freshwater lake in order to prevent significant environmental harm to the lake or adjacent property.

Water Well Driller and Pump Installer Licensing (IC 25-39; Rule 312 IAC 13) Water wells and water well pumping equipment are to be installed or repaired by licensed Indiana water well drillers and pump installers in accordance with the construction standards set forth in Rule 312 IAC 13. Approximately 820 well drillers and pump installers are currently licensed and about 10,000 water well records are submitted to the DNR annually. More than 420,000 water well records are currently on file and available for public review on the DNR water well viewer.

Great Lakes_St. Lawrence River Basin Water Resources Compact (IC 14-25-15; Rule 312 IAC 6.3) The Great Lakes Compact is legally binding among the eight Great Lakes States and details how Indiana manages its water supply within the Great Lakes Drainage Basin. The DNR regulates withdrawals and diversions of water within the basin and permits are required for water withdrawals exceeding 1 million gallons-per-day (MGD) averaged over a 90 day period. Great Lakes Regional Body approval is required for all diversions of water from the Great Lakes Basin.

Flood Control Act (IC 14-28-1) Formal approval under the Flood Control Act from the DNR, Division of Water is required for any proposal to construct, excavate, or fill in or on the floodway of a stream or other flowing waterbody which has a drainage area greater than one square mile. This law would apply to the installation of water wells or permanent water intake equipment within the floodway of a regulated stream.

The Necessity of Date in Modeling

The primary reason groundwater models are used to regulate water resources is the simple fact that the collection of field data is so expensive. It is much more affordable to design and use models from a desk than it is to spend the time and expenses required to conduct the necessary field work. We tend to mine data from state-wide databases and to use assumptions and statistics to improve our “model fit”.

Data collection is hard, expensive, and time-consuming. It is expensive to drill and construct monitoring wells. It is difficult to get access to private property at the locations where data is needed. Field work to retrieve the data from the well and stream gage networks is time-consuming and field work never goes smoothly. The real world tends to throw unexpected curves at us. A cow pulled the monitoring equipment from one of our wells. We found it on the other side of the field. Twice.

But, the data collection efforts are well worth the expense and the effort. The data is what verifies the models. The data is what tells us whether we are on the right track with our predictions. If the model predictions do not fit the data measurements, it is obvious which one is wrong. Models can certainly be used to tell us where the data collection is needed. But the data is needed to tell us whether or not our model predictions are valid and reasonable.

The principle of Occam’s Razor should be applied to groundwater modeling. We should be building simpler models with the minimum number of variables. Such models are much easier to test and verify with field data. We should have a thorough understanding of the area we are modeling and we should apply common sense and professional judgment to ensure our models are representative and reasonable. Knowing and communicating the limitations of our models is just as important as sharing the model predictions. None of the above comes without extensive field experience.

Just as critical is overcoming our natural biases in order to understand what the data and the models reveal to us about the natural environment. Irrigators tend to focus on this year's crop and think in terms of average rainfall and water levels. Regulators tend to focus on worst-case scenarios that may occur once every 5-10 years and tend to use very conservative models. The general public simply tends to view crop irrigation as problematic. All of us tend to view models and data in the light of our bias.

The graph below represents 6 years of continuous water level data collected from a 47-foot deep monitoring well near the Fawn River in St. Joseph County. The data shows:

1. An overall rise in groundwater levels of nearly 2 feet from 2013 to 2019.
2. A consistent annual variation of nearly 2 feet in the groundwater level.
3. A weekly variation of 2 inches to 6 inches throughout the year.
4. Groundwater levels respond quickly to rainfall events.
5. A sudden and sharp drop in groundwater levels each spring that corresponds to the start of the growing season in May or April.

To me the graph shows a stable groundwater system that varies from week-to-week and year-to-year within well-defined limits. I also see a groundwater system with a long-term, upward trend in water levels. But the important question is – what do you see?

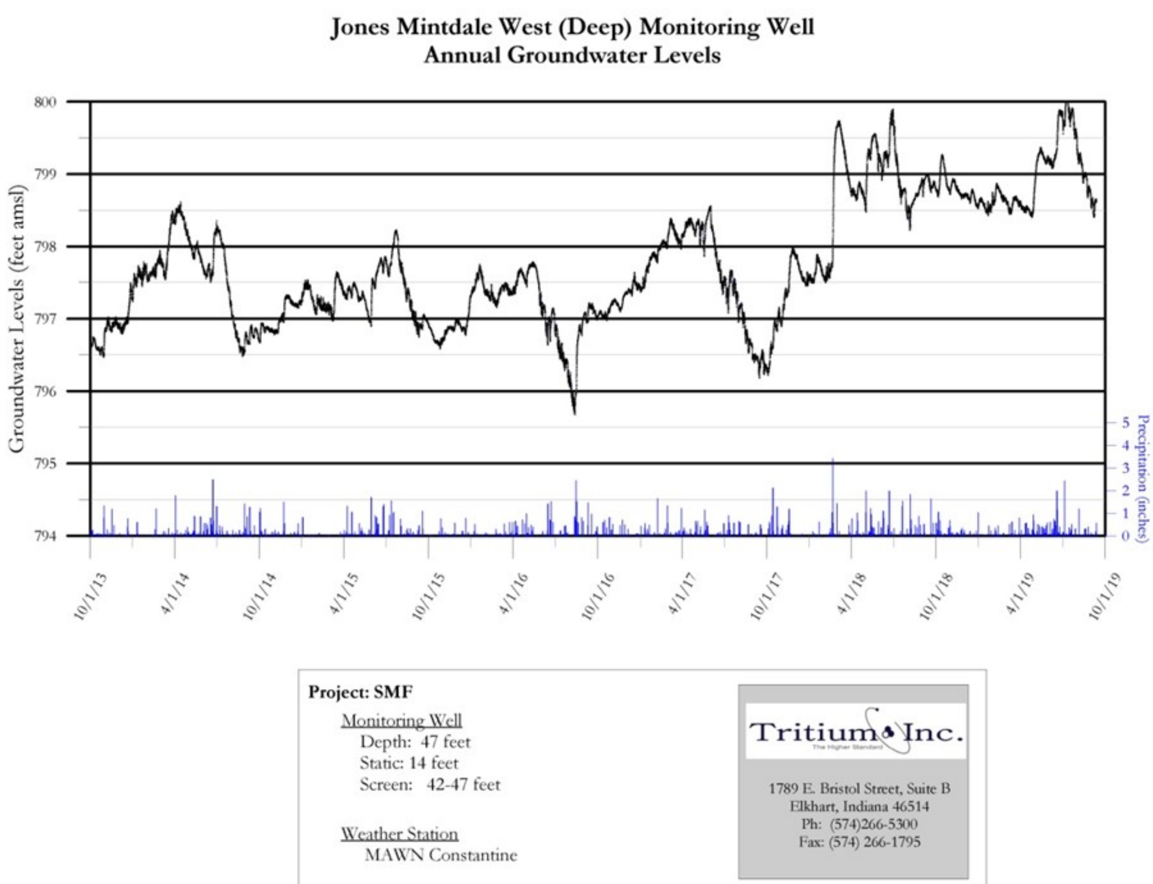

Figure. Six years of continuous groundwater level and precipitation data near the Fawn River in St. Joseph County, Michigan.

Irrigation Management to Reduce Cost and Foliar Disease

Dr. Marty Chilvers - Michigan State University and Dr. Darcy Telenko - Purdue University

A number of foliar diseases can impact corn production in both Indiana and Michigan. They included gray leaf spot, northern corn leaf blight, southern rust and now tar spot. Environmental conditions, particularly moisture, during the growing season will play a big role in the risk of foliar disease development in a field. Irrigation can confound this. Therefore we want to review some of the factors you should consider when making disease management decisions. These include understanding the disease triangle, water management and leaf wetness influence on foliar disease, factors to consider when to apply a fungicide, and finally a review of what we've learned so far on how to best manage tar spot.

Disease triangle

There are three parts to the disease triangle which influence the amount of disease that will develop in a crop canopy. These include the presence of a 1) virulent pathogen, 2) susceptible host, and 3) favorable environmental conditions (Fig 1 a). Each plant disease has its own set of individualized factors that contribute to the disease triangle and determine the risk and impact on yield. For example, tar spot of corn – the pathogen, *Phyllachora maydis*, may either overwinter on diseased tissue (pathogen is present in a field) or move with weather systems. Figure 1 gives an example of how if the pathogen, host or environment factor becomes unfavorable then the amount of disease that will develop is decreased. Factors such as reduced initial inoculum (Fig1-B), host resistance (Fig1-C) or lack of leaf moisture (environment) (Fig 1-D) all can lead to the decreased risk of foliar diseases. And if one or more factors are combined risk can further be decreased (Fig 1-E).

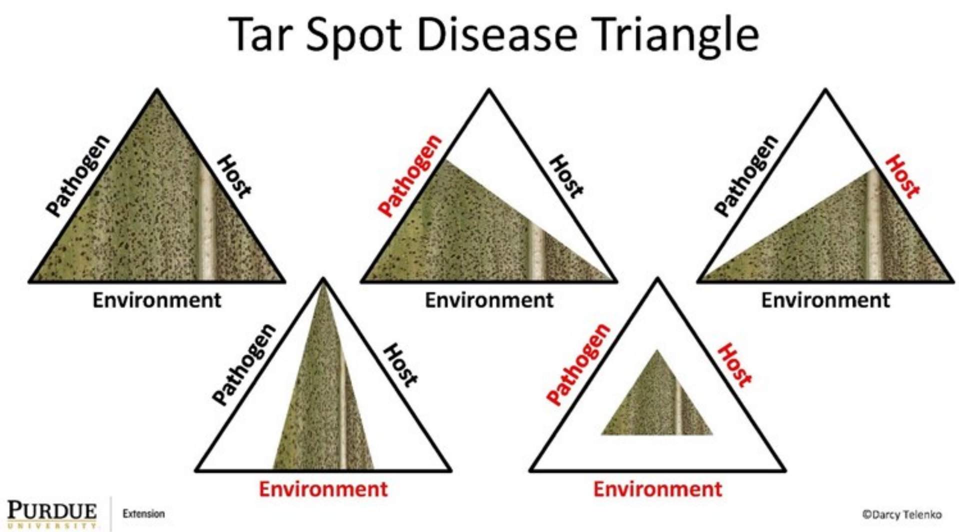

Figure 1. Tar spot disease triangle showing how A. the pathogen, host and environment can influence the amount of disease that may develop in crop canopy. B. Reduced disease potential if initial pathogen inoculum is decreased in a field. C. Reduced disease potential if host plant has improved resistance to the pathogen. D. Reduced disease risk if environmental conditions are not favorable for disease development. E. Reduced disease risk if all three factors are minimized.

Water management and leaf wetness

Leaf wetness is a major driver of disease development. Fungal diseases require moisture to produce spores and to infect the plant. Differences between years in rainfall patterns often drive disease onset and severity. For example, most of the great lakes region saw regular rainfall during the 2018 growing season this resulted in early onset of tar spot and a significant epidemic. Compare that with 2019, which saw a much slower onset and build up of tar spot, due in large part to the dry late July and August that was experienced in the region. Irrigation obviously provides additional leaf wetness events that can drive diseases including tar spot. In 2018, we had multiple accounts of irrigation contributing to disease development and driving 50bu/A yield losses, as compared to non-irrigated sections. Conversely we had an interesting example in 2019, where it was clear that irrigation was driving tar spot disease, however due to the much drier growing season, irrigation was necessary to maximize yield potential. In addition, we have several anecdotes of frequent light irrigation events driving tar spot development. Producers should try to minimize leaf wetness by avoiding frequent light irrigation and watering appropriately. Work is also currently being conducted to examine the impact of the timing of irrigation and how this might be manipulated to minimize leaf wetness. For example to maximize disease pressure in our fungicide disease screening trials, we may irrigate in the early evening hours to try and promote a prolonged leaf wetness throughout the night.

Decision making for applying a fungicide

Fungicides are a great tool to have in your disease management toolbox. They can be effective at reducing disease and protecting yield, but there are a number of factors that should be considered before pulling the trigger.

1. **Disease risk in the field** – is there a history of a particular disease causing a problem? What was the previous crop?
2. **Current disease activity** – while scouting is the disease active in the lower canopy, is there indications that the disease is spreading (ex. southern rust tracking map https://corn.ipmpipe.org/southerncornrust/)
3. **Weather conditions** – will there be favorable environmental conditions for the disease to continue to develop? Is there a lot of rain and moisture to encourage many of our foliar diseases? Are there tools that can help predict risk?
4. **Return on investment** – will the yield protected by a fungicide cover additional costs of the application?

Okay you've made the decision that you want to apply a fungicide - now what?

The Corn Disease Working Group has developed ratings for how well fungicides control major diseases of corn in the United States. This table is annually updated based on field testing of products. We pulled some of the information for reference in Table 1. The full document is found in the resources section on the Crop Protection Network website (https://cropprotectionnetwork.org/resources/publications)

We highly recommend leaving check strips to determine your ROI from fungicide applications, the results might be surprising.

Managing tar spot

Tar spot is a disease of corn previously reported in Central and Latin America. In 2015 tar spot was found for the first time in the US, in the states of Indiana and Illinois. Since then a significant epidemic was observed in 2018, with continued spread in 2019, the disease has now been confirmed in nine states including Florida.

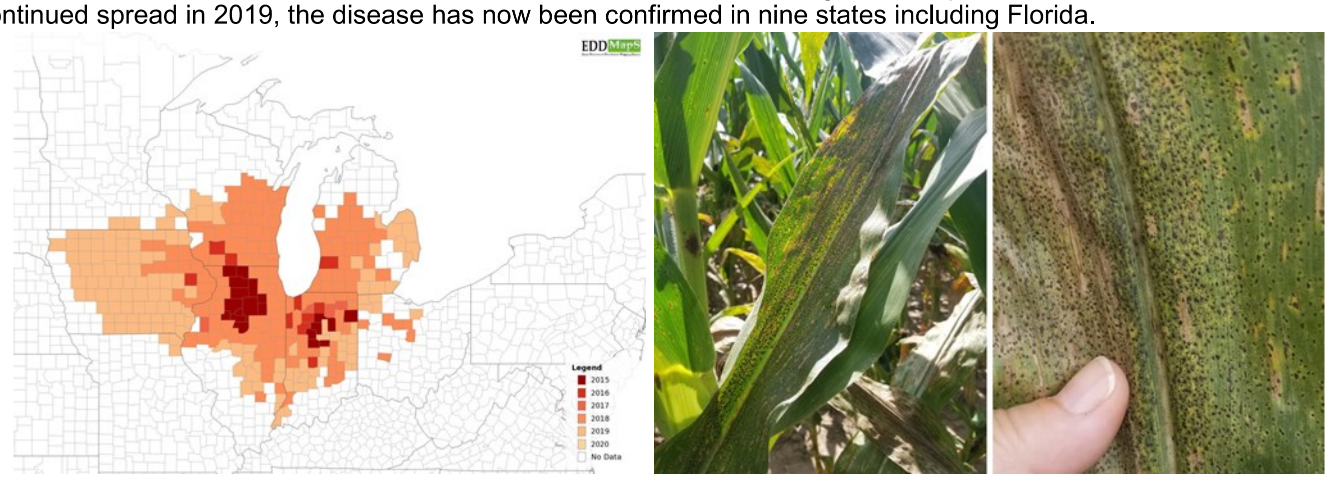

Figure 2. Tar spot spread by year from 2015 until 2019 and tar spot symptoms on corn leaf.

Image credits: EddMaps https://maps.eddmaps.org/ and Darcy Telenko.

As the name suggests the disease appears and feels like flecks of black tar on the leaves, which cannot be rubbed off the leaf. These small (1/16”) black spots are the fungal fruiting structure, which are capable of releasing spores to infect new corn plants. The fungus *Phyllachora maydis* is the only pathogen associated with this disease that has been confirmed in the US. In Mexico, an additional fungal species is suspected of causing fish-eye symptoms, which is seen as dead leaf material around the black spots. We see the fish-eye symptoms in the US, however, to date, we have not found any secondary species associated with these symptoms. In fields with severe disease the corn will often appear frosted, will senesce early and may lodge. Aside from the impact on grain yield and test weight we have also observed the impact of this disease on silage quality. When severe the disease results in corn that is too dry for silage production, and it reduces silage quality by reducing the digestible component and energy value of the feed. Thankfully, there are no associated mycotoxins with this disease. A challenging aspect of tar spot is the rapid progression of disease. In some fields the first signs of disease were observed in early July, with widespread symptoms at the start of August that led to complete senescence at the field level by early September.

As with the management of any disease, the selection of hybrids with good disease resistance packages is essential. However, as tar spot is so new to North America none of our material has previously been screened and bred for this disease. An assessment was made on the impact of tar spot on corn hybrids which can be found here: https://cropprotectionnetwork.org/resources/features/how-tar-spot-of-corn-impacted-hybrid-yields-during-the-2018-midwest-epidemic. It was found that no hybrids were immune; however, there were differences with some hybrids being more resistant than others. With every 10% increase in tar spot severity we noted a 5 bu/A yield loss. Additional screening of hybrids and inbreds will be necessary to identify and incorporate sources of resistance into available hybrid varieties. It is recommended that farmers talk to their seed salespeople for any updates. With little information it would be best to spread risk by planting a few different hybrids. Planting corn on corn may increase the risk of developing tar spot, however even fields under a soybean-corn rotation have been significantly impacted, most likely as the spores are readily dispersed on the wind and capable of moving some significant distance.

Although fungicides help in managing tar spot do not expect 100% control. Fungicide timing is critical for maximizing tar spot disease management. At this point we will have to see what weather conditions and disease pressure is like in 2020. The pathogen is capable of overwintering on infested residue, so in areas where the disease is becoming established there will be a greater availability of disease inoculum to initiate disease. Scouting fields will be essential to stay ahead of this disease. In some situations, it may make economic sense to make two fungicide applications, or possibly hold that VT/R1 application to slightly later in the season. We are working with collaborators to develop fungicide spray forecasting models.

In order to track tar spot this coming season we would like to hear from you. Especially if you observe tar spot in counties that have not been confirmed to date, please send a picture of diseased leaves to us directly at email: chilvers@msu.edu, dtelenko@purdue.edu or Twitter: @MartinChilvers1, @DTelenko

For more information on tar spot and other diseases see www.cropprotectionnetwork.org

Table 1. Fungicide Efficacy for Gray Leaf Spot, Northern Corn Leaf Blight, Southern Rust and Tar Spot (adapted from fungicide efficacy for control of corn diseases. CPN-2011-W) https://crop-protection-network.s3.amazonaws.com/publications/fungicide-efficacy-for-control-of-corn-diseases-filename-2020-03-18-150007.pdf)

See table next page

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Class	Active ingredient (%)	Trade Name	Rate/A	Gray Leaf Spot	Northern Corn Leaf Blight	Southern Rust	Tar Spot1	Harvest Re-
QoI Strobilurins Group 11	azoxystrobin 22.9%	Quadris 2.08SC® multiple generics	6.0-15.5	E	G	VG	NL	7 days
	pyraclostrobin 23.6%	Headline 2.09EC/SC®	6.0-12.0	E	VG	VG	NL	7 days
	picoxystrobin 22.5%	Aproach 2.08SC®	3.0-12.0	F-VG	VG	G	NL	7 days
DMI Triazoles Group 3	propiconazole 41.8%	Tilt 3.6EC® multiple generics	2.0-4.0	G	G	F	NL	30 days
	prothioconazole 41.0%	Proline 480SC®	5.7	U	VG	G	NL	14 days
	tebuconazole 38.7%	Folicur 3.6F® multiple generics	4.0-6.0	U	VG	F	NL	36 days
	tetraconazole 20.5%	Domark 230ME®	4.0-6.0	E	VG	G	NL	R3 (milk)
Mixed Modes of Action	Azoxystrobin 13.5% propiconazole 11.7%	Quilt Xcel 2.2SE® multiple generics	10.5-14.0	E	VG	VG	G-VG	30 days
	benzovindiflupyr 2.9% azoxystrobin 10.5% propiconazole 11.9%	Trivapro 2.21SE®	13.7	E	VG	E	G-VG	30 days
	cyproconazole 7.17% picoxystrobin 17.94%	Aproach Prima 2.34SC®	3.4-6.8	E	VG	G	G-VG	30 days
	flutriafol 19.3 % fluoxastrobin 14.84%	Fortix 3.22SC® Preemptor 3.22SC®	4.0 -6.0	E	VG-E	VG	NL	R4 (dough)
	flutriafol 26.47% bixafen 15.55%	Lucento	3.0-5.5	VG-E	VG	VG	G-VG	R4
	prothioconazole 16.0% trifloxystrobin 13.7%	Delaro 325SC®	8.0-12.0	E	VG	VG	G-VG	14 days
	pydiflumetofen 7.0% azoxystrobin 9.3% propiconazole 11.6%	Miravis Neo 2.5SE®	13.7	E	VG-E	VG	G-VG	30 days
	pyraclostrobin 28.58% fluxapyroxad 14.33%	Priaxor 4.17SC®	4.0-8.0	VG	VG-E	VG	U	21 days
	pyraclostrobin 13.6% metconazole 5.1%	Headline AMP 1.68SC®	10.0-14.4	E	VG	G	G-VG	20 days
	trifloxystrobin 32.3% prothioconazole 10.8%	Stratego YLD 4.18SC ®	4.0-5.0	E	VG	G	NL	14 days
	tetraconazole 7.48% azoxystrobin 9.35%	Affiance 1.5SC®	10.0-14.0	G-VG	G-VG	G	G	7 days
	Flutriafol 18.63% Azoxystrobin 25.30%	TopGuard EQ	5.0-7.0	VG	G	U	G-VG	45 days
	Mefentrifluconazole 17.56% Pyraclostrobin 17.56%	Veltyma	7.0-10.0	VG-E	VG-E	VG	G-VG	21 days
	Mefentrifluconazole 11.61% Pyraclostrobin 15.49% Fluxapyroxad 7.74%	Revytek	8.0-15.0	VG-E	VG-E	VG	G-VG	21 days

1Fungicide application timing is extremely important and needs to be made near the onset of the tar spot symptoms. Efficacy ratings based on limited site locations from 2018 and 2019. A 2ee label is available for several fungicides for control of tar spot, however, efficacy data are limited. Check 2ee labels carefully, as not all products have 2ee labels in all states. 2Harvest restrictions are listed for field corn harvested for grain. Restrictions may vary for other types of corn (sweet, seed, or popcorn, etc.), and corn for other uses such as forage or fodder. This information is provided only as a guide. It is the applicator's legal responsibility to read and follow all current label directions. Reference in this publication to any specific commercial product is for general information only, and does not constitute an endorsement or recommendation by the CDWG. Individuals using such products assume responsibility for their use in accordance with current directions of the manufacturer. Members or participants in the CDWG assume no liability resulting from the use of these products.

Improving Irrigation Management to Increase Return on Investment

Efficient irrigation management provides benefits such as saving freshwater and energy, reducing nutrient leaching, increasing crop yield and grain quality, and maximizing return on investments. Investments made each year to irrigate a crop include the costs of energy, labor, and maintenance and repair of the system. Properly managed irrigation can significantly increase yield over dryland farming, ensuring return on these investments. Irrigation systems are an additional investment cost, the design and expense for equipment maintenance and energy usage should be carefully reviewed to maximize profit. Areas that have the potential to reduce irrigation costs are discussed below.

Only Apply Water That Will Increase Return on Investments - Over the years, technology has been developed to assist in irrigation water management. Soil moisture sensors have been used to improve the water and fertilizer use efficiency, which can increase crop production. Sensors provide greater insight into water needs and can inform better management through precise irrigation scheduling. In addition to the water savings, the use of soil moisture sensors can reduce nitrate leaching (loss of nitrogen fertilizer) below the root zone.

Apply Ideal Irrigation Volume – Water should be provided to at least the top half of the root mass and should not be irrigated below the root zone. Find the crop's root system development on the Michigan State University (MSU) Irrigation website (https://www.egr.msu.edu/bae/water/irrigation/crops-root-system-development).

Use the Biggest Irrigation Applications Possible While Avoiding Runoff - To make the best use of irrigation water, producers should try to provide 4 or 5 days worth of crop water use per application, typically 1 to 1.25 inches at peak water use periods. These larger irrigation applications increase the amount of effective water available to the crop by reducing the water lost by evaporation in the crop canopy and on the soil surface. Irrigators with center pivots that apply water faster than the water can infiltrate into the soil should use smaller applications (less than 0.5 inches) to avoid runoff. Find infiltration rates for soil types on the MSU Irrigation website (https://www.egr.msu.edu/bae/water/irrigation/soil-infiltration-rate).

Optimize Late Season Irrigation - Lack of water in the late season can result in low test-weight corn and undersized soybean in uppermost pods. Applying irrigation until the crop reaches maturity is important to maintain or increase the quantity and quality of the crop.

Evaluate the Irrigation System - Some practices that can save water, energy, and cost for irrigation systems follow. Evaluation of irrigation system uniformity is critical. The area affected by non-uniform irrigation applications will become much larger with increasing the number of irrigation applications. The irrigation system should be periodically inspected for clogged nozzles and emitters, leaky pipelines, and riser gaskets among other components. Read the pressure gauge at the center pivot regularly to identify a potential problem with the system.

Choose the Right Sprinkler Package – The considerations for selecting the sprinkler include most uniform, greatest wetted area and pressure required, easily updated nozzle package, greatest tolerance of pressure change, sprinkler spacing, chemigation, and pressure regulation.

Use Fertigation or Split Nitrogen Application to Maximize Your Return - Irrigated production has the advantage of fertigation as an option in nitrogen (N) management. Fertigation is the process of applying fertilizer through irrigation water. From a management standpoint, fertigation allows producers the opportunity to evaluate crop stands, N losses due to wet conditions or heavy rains, and current market conditions to adjust their N management plan to meet crop needs, maximize profitability, or do both. The closer the N fertilizer is applied to the time of peak crop need, the lower the potential for N loss, and the greater the return for your N investment.

Maintain Irrigation Equipment to Minimize Expensive Repairs - Irrigation technicians and service providers agree that preventative maintenance and precautionary startup procedures can help avoid future costly repairs.

Please find detailed information on improving irrigation management to increase return on investment in the Michigan State University Extension Bulletin *Efficient Irrigation Management With Center Pivot Systems (E3439)*

(https://www.canr.msu.edu/irrigation/upoads/files/E3439_Efficient-Irrigation-Management-with-Center-Pivot-Systems.pdf).

Potato Update

Approximately 70% of the potatoes grown in Michigan are for potato chip production and demand in the chip market is remaining strong at this time. Chip processors are running near capacity to keep up with consumer demand across the nation. Michigan potato growers are in a unique position compared to other states to weather the current challenges. The vast majority of potatoes grown in Michigan are used for chip processing and retail fresh market which helps insulate the industry from some of the impact other states are now facing, mainly food service demand. The greatest impact of the Coronavirus (COVID-19) pandemic has been felt in the foodservice sector where demand for frozen fries and fresh potatoes has fallen sharply.

The Michigan Potato Industry Commission (MPIC) reports Michigan potato growers have experienced record fresh potato and chip potato sales amid the Coronavirus (COVID-19) pandemic. During the initial few weeks of the implemented social distancing measures in Governor Whitmer's Executive Order consumers flocked to grocery stores to stock up on essential items including potatoes, leaving them in short supply. Realizing the unprecedented challenges the industry was facing, the Michigan Potato Industry Commission worked with local retailers and Michigan growers to help keep up with demand to get potatoes on store shelves. Logistics were a major issue in the beginning and MPIC worked to help connect packers without potatoes to growers facing challenges getting their potatoes packed. "It's was like Easter, Thanksgiving, and Christmas all at once" reported one Michigan fresh potato grower regarding the initial demand. A number of growers and packers across the state were working 18-hour days, 7 days a week to keep the supply of spuds moving. Fresh storages are projected to reach their end in the upcoming weeks, but growers are confident they will be able meet retail demand.

In addition to the unprecedented retail demand, area food banks are in desperate need of potatoes. Michigan food banks are currently operating at four times their normal capacity and are experiencing significant trouble securing food to meet the increased demand. In April, the Michigan Potato Industry Commission donated a truckload of potatoes (approximately $5,000 worth) to the Michigan Food Bank Council on behalf of the industry and in May, helped to raise over $5,000 from various industry professionals to donate a second truckload to be distributed to those in need across the state. Potatoes are a key produce item for the state's regional food banks with over 4 million pounds of potatoes purchased in 2019. The longstanding relationship between the Michigan Potato Industry and Food Bank Council of Michigan has been critical during the COVID-19 crisis to help meet the increased demand across the state.

Is Your Center Pivot Chemigation Ready?

Many irrigators are considering applying a fungicide through their center pivots but not all irrigation systems can provide low enough volume with uniform application or have the required safety equipment for chemigation.

Irrigated production has the advantage of chemigation as an option for disease control. Chemigation is the process of applying chemicals through irrigation water. The most commonly added chemical to irrigation water is liquid 28% nitrogen. However, with the correct design and safety equipment installed, many irrigation systems can effectively apply fungicides and insecticides. The limiting factors are:

The system must be able to uniformly apply less than 0.2", ideally 0.1"

The system must have the required safety equipment installed

From a management standpoint, chemigation allows producers the opportunity to evaluate crop disease levels and weather conditions and then apply needed chemicals with irrigation equipment at optimum times. The challenge with this is that applications through chemigation have an extremely high amount of carrier. Aerial application may use 4-7 gallons per acre and ground application equipment may use 10-20 gallons per acre but a one-inch irrigation application uses 27,154 gallons per acre. Coverage by irrigation is excellent but keeping the concentration of pesticide in the foliage high enough to be effective can be problematic.

A corn crop at tassel stage can hold 0.07-0.10 of an inch of water in the foliage and on the soil surface. If the pesticide used is only effective when on the leaf surface, application needs to be a tenth of inch or less. Many irrigation systems are not capable of these low volumes, depending on their design. Irrigation sprinkler packages specifically for chemigation are designed for applications of 0.07".

The smallest application rate that a center pivot is capable of is found on the application chart at the 100% setting. If your system applies 0.20" at 100% setting, only about half of your product will stay on the leaves. In order to achieve in system that is capable of lower rates of application, a higher gear ratio of the drive system and a lower water supply volume compared to the coverage area may be needed.

It is also important to know that the system applies water uniformly across the field. Center pivot systems with good design and repair will have a uniformity co-efficient approaching 95%. Many systems have a uniformity co-efficient in the 70-75% range, which will allow the misapplication of a quarter of the water and pesticide going through them. Information on evaluating irrigation system uniformity is available through the MSU Irrigation web page https://www.canr.msu.edu/irrigation/.

The EPA requires any pesticide that is applied through irrigation systems must have a chemigation label or a section within the label outlining the chemigation procedure for application and restrictions. Many of the common fungicides used for foliar crop diseases have chemigation labels. The chemigation label represents a three-way agreement between the EPA, the registrant and the applicator for the safe and effective use of the product for the diseases listed when used in the manor prescribed.

The inherent risk of injecting chemicals into a water system dictates the need for backflow protection. Both Indiana and Michigan have resource protection rules that require the use of chemigation valves for the protection of both surface and ground water sources. Chemigation valves create an air gap in the pipeline downstream from the pump when the pump is shut down. The air gap breaks the suction created by water retreating back to groundwater or surface water sources. Chemigation valves for most irrigation applications are available from local irrigation dealers for less than $700. Installation cost is much less at the time of the pump installation and should be included in almost all of new irrigation pumping installations. If your water source is a municipal water system or if the same well provides water for human consumption, a Reduce Pressure Zone Valve (RPZ) will be required. See your state well code for details.

Irrigators wishing to chemigate will also need an injection pump and an injection check valve. A positive displacement injection pump meters the pesticide into the water flow consistently without being affected by supply tank fullness or irrigation pressure changes. The chemigation injection check valve mixes the chemical into the water and prevents back flow of irrigation water into the chemical storage tank. The chemical storage tank and supply hose need to be compatible with the chemicals being used and sized for the application. The high-pressure hose between the injection pump and the irrigation line needs to be rated at least 60 psi higher than the system's operating pressure.

Many pesticide chemigation labels also require irrigation system interlocks between the irrigation water pump, the chemical injection pump, and the center pivot. Interlocks are designed to shut off all the components of the system if any one of the three stops. This reduces the chance of misapplications. Some labels also include an electronic shut off valve between the chemical supply tank and the injection pump.

Detailed information on injection pumps, backflow protection, safety interlocks and procedures for calibrating an injection system is available in Michigan State University Extension bulletin E-2099, "Using Chemigation Safely and Effectively."

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Mark your calendars: The Annual Meeting of the Michiana Irrigation Association is planned for December 11, 2020 at the Blue Gate Garden