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To improve and advocate for the Michigan soybean industry.**

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President's Letter



Hello everyone! I wanted to take this opportunity to introduce myself. My name is Heather Feuerstein and I am the newly elected president of the Michigan Soybean Association. My husband Greg, a fifth-generation farmer, and I have been together for 20 years. We raise soybeans, corn, wheat and cattle on our farm in Belding. We also have a 6-year-old son Oliver and a 3-year-old daughter Eleanor. We have so much fun raising them on the farm and are so grateful to be able to do so.

My husband is one of the best men I know, and I attribute so much of who he is to being a farmer. He is the reason I decided to serve on the MSA board. We had so many conversations that started with “I wish people knew...,” or “Why don’t people understand why we do things they way we do...”

I may not drive the tractors or run the combine that often, but I am good at connecting with people. So, I decided my contribution could include helping tell the story of agriculture and sharing the stories of the farmers that help feed the world. That way, when our children are ready, this legacy will be here for them.

In 2021, we are facing uncertain times, much like we did in 2020. I know that farmers will weather the storm like all other obstacles we face. We will plant the seed, spread the fertilizer, harvest the crop and feed the livestock. We will get the job done. It certainly helps that we are seeing commodity prices come back around!

As we move through 2021, please reach out to me, or any of us with MSA, to discuss any issues, thoughts or concerns that you would like us to help with. Thank you, and I look forward to continuing to serve Michigan soybean farmers in my new role as president.

Heather Feuerstein, MSA President

Executive Update



Who remembers Bobby McFerrin? I will bet the millennials out there don't know who I am talking about, but I would wager there are still a good number of readers who can sing his most well-known song. Simple but great – *Don't Worry, Be Happy!* Admittedly, there were many things that caused us worry in 2020. However, I try to focus on the Be Happy part of the song.

Michigan Soybean has so much excitement and happiness to share in 2021. If you have not yet heard, there are a lot of changes coming to the Michigan Soybean Committee (MSC) and the Michigan Soybean Association (MSA). First, the name of one organization has changed slightly. MSC dropped the word promotion from their name. The organization does so much more than just promote soybeans. While promotion and outreach remain one of our key focus areas, we also work on market development and production research. Shortening the name allows us to dispel the myth that we only work with promotion efforts.

We have a new look for both organizations as well. Throughout this magazine, you will see our new logos for both MSC and MSA. You may have also seen some recent mailings with the new logos. We wanted a new, fresh and updated feel for both organizations that also portrayed the partnership between MSA and MSC. The logos have a similar feel, font and design. We can identify the Michigan state capital building in the MSA soybean and the green checkmark in the MSC soybean. MSA and MSC have had, and will continue to have, different roles but complimentary missions as partner organizations. These new logos help illustrate that sentiment.

As if a name change and new logos weren't enough, we are also moving our office! The soybean office has been located in Frankenmuth for decades. However, our space was not conducive for use by the board, nor did it foster collaboration with other ag organizations. Of course, the state capital in Lansing is the hotspot for Michigan legislative activity and a vast majority of other agricultural commodity organizations are based around the Lansing area. Because of those opportunities for legislative and regulatory advocacy, collaboration with fellow ag groups and being more centrally located for our farmers, we are moving to St. Johns, MI. We will be moving into the AgroLiquid Corporate Headquarters but will be maintaining our own space within their beautiful facility. The team at AgroLiquid have been amazingly welcoming and are equally excited to have us join them. Many of you know this facility is routinely used for agricultural conferences and offers the IQ Hub for agricultural education as well. We will be planning an open house event for all our soybean farmers and stakeholders to visit the new office location sometime in the future, when we are able to gather safely.

"In every life we have some trouble. But when you worry you make it double. Don't worry, be happy," said McFerrin. All of us at Michigan Soybean are excited about our recent changes and the positive outlook for the coming year.

Janna Fritz, Chief Executive Officer
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The MOST IMPORTANT MSA membership benefit: Having a voice in Lansing and Washington, D.C.!





Policy Priorities for Soy in the Biden Administration

Blair Shipp, State Policy Communications Coordinator, American Soybean Association

As 2021 ushers in a new Administration and new Congress, the American Soybean Association (ASA) and our farmer-leaders are already hitting the ground running, albeit virtually, to maintain longstanding and establish new relationships on Capitol Hill. Even before the end of 2020, ASA pursued the opportunity to meet with key members of President-elect Biden's transition team to introduce ASA and offer the support of the organization and its members as a resource - and to identify soy priority issues for the coming months. The team also met with outgoing leaders in D.C. to assist with moving soy priorities forward smoothly in the coming weeks.

In late December, ASA shared a note of congratulations to President-elect Biden and Vice President-elect Harris that included the top three policy areas that were priorities for U.S. soy growers: 1) farm economy, 2) markets and 3) transportation and infrastructure.

Farm Economy

Soybean growers support a strong farm economy and tools that enhance crop production. In this policy area, ASA is looking forward to working with the new Administration on solutions to alleviate the disruptions stemming from the COVID-19 pandemic, including vaccinating essential agricultural and food safety workers and providing resources and relief to those affected by the pandemic.

In addition to COVID-related programs such as USDA's Coronavirus Food Assistance Programs, ASA supports effective, affordable risk management tools that provide farmers and their lenders the confidence to finance crop production and the access to biotechnology, plant breeding innovation, and crop protection to produce an abundant, quality crop.

ASA shares the incoming Administration's focus on sustainability and climate change and looks forward to collaborating to develop solutions that ensure long-term economic and environmental viability for soybean growers.

Markets

International trade is one of the U.S. soybean industry pillars, as more than 50 percent of soybeans grown in the United States are exported to foreign

markets. Access to existing markets, new markets and international food aid markets is critical for U.S. soybean growers.

After turbulent markets for the last couple of years, 2020 ended strong for U.S. soybean exports with a surge of Chinese purchases in the fall that lasted through the end of the year. Now that the markets are getting stronger, ASA supports the continuing implementation of the U.S.-China Phase 1 Agreement and seeks to establish a long-term solution that includes tariff relief and a return to market-driven exports. ASA continues to encourage the Administration to look to multilateral free trade agreements to maximize the U.S.'s strategic position in the global economy. These include continuing work on free trade agreements such as those with the UK and Kenya and looking to new agreements with the EU, India and other significant soy and livestock-importing countries.

Another significant market for U.S. soy is biodiesel, which uses around 8 billion pounds of soy oil each year. ASA would like to see the Biden Administration uphold the Renewable Fuel Standard (RFS), including increasing annual volumes for biodiesel and advanced biofuels and securing implementation of a mechanism for the Environmental Protection Agency small refinery exemptions.

Transportation and Infrastructure

ASA supports improvements to physical connectivity through waterways infrastructure and surface transportation infrastructure. Now that the 116th Congress reauthorized and the President signed into law the 2020 Water Resources Development Act with the Inland Waterways Trust Fund's cost-share adjustment, ASA looks forward to working with the Biden Administration and Congress to support increased federal investment in inland waterways projects. However, much like the aging locks and dams on the inland waterways system, aging roads and bridges hinder soybean growers' ability to move their products to market in a cost-effective manner. ASA supports policy that will ensure that rural surface transportation projects receive equitable federal funding to improve safety and efficiency along the roads and bridges required to bring product to market.



Another highlighted policy priority for U.S. soy growers is access to reliable high-speed internet. Rural broadband access is critical to support grower’s ability to farm, find markets for and transport soybeans as agriculture becomes an increasingly more technology-driven sector. ASA strongly encourages the Administration and Congress to help close the digital divide and improve accessibility for rural communities.



Cabinet Nominations

In December, President-elect Biden began announcing his nominations for cabinet positions, with nominees of keen interest to agriculture. For Secretary of Agriculture, ASA was pleased with the nomination of Tom Vilsack, the former Iowa governor who served as Secretary of Agriculture for eight years during the Obama Administration. As ASA acknowledged to media, we welcome the news of a qualified, knowledgeable candidate to lead USDA in 2021—and one who is from a large soybean-producing state. Vilsack would bring significant experience for both soy and agriculture at large, and would hit the ground running in his new “old” position.

For the United States Trade Representative (USTR) lead, Biden has nominated Katherine Tai. Tai is a top trade lawyer for the House Ways and Means Committee and former chief counsel on China trade enforcement at the Office of the U.S. Trade Representative during the Obama Administration. ASA also supports Michael Regan’s nomination for Administrator of the Environmental Protection Agency and appreciates his record of being a fair and effective regulator in North Carolina. ASA supports swift Senate confirmations of these nominees.

Shift in the Senate and Committee Leadership

The Senate run-off elections in Georgia on Jan. 5 brought closure to the nation’s long-awaited question, “Who will hold the Senate majority?” Democratic challengers Raphael Warnock and Jon Ossoff defeated the Republican incumbents,

Senators David Perdue and Kelly Loeffler, splitting the Senate makeup to 50 Republicans and 50 Democrats. Because Vice President-elect Kamala Harris will control the tiebreaking vote the Democrats will assume the majority in the Senate and leadership will pass from Mitch McConnell (R-KY) to Chuck Schumer (D-NY). Committee leadership will also shift from Republicans to Democrats.

In the Senate Agriculture Committee, the gavel will pass from Chairman Pat Roberts (R-KS), who just left office, to Michigan’s own Debbie Stabenow (D). Senator John Boozman (R-AR) will step into the committee’s lead Republican role as its ranking member.

Senator Stabenow has already pledged to lead efforts as chair “to create a voluntary climate exchange and climate policy for farmers and ranchers.” In an August meeting, her staff described her view of a successful climate policy as producer-led, voluntary and bipartisan. ASA supported her bipartisan Growing Climate Solutions Act last year, and we look forward to working with the new chairperson as climate discussions proceed in 2021. ASA has worked closely with Senator Stabenow in the past, including when she was Chair of the Senate Agriculture Committee from 2011-2015, working to develop and pass the 2014 Farm Bill.

In the House, the defeat of incumbent and House Agriculture Committee Chairman Collin Peterson, a strong supporter of soy, opened the door for new committee leadership. On Dec. 4, Rep. David Scott (D-GA) was chosen by the full House Democratic Caucus as Chairman of the House Ag Committee. Scott has served on the committee since 2002 and will be the first African American chair. Rep. Glenn “G.T.” Thompson (R-PA) will serve as ranking Republican member, succeeding Rep. Mike Conaway (R-TX), who is retiring from Congress.

As the country transitions to a new Administration and other leadership changes, ASA encourages farmer-leaders to continue to push the importance of sound farm policy with incumbents and new legislators alike to keep American growing. ASA’s policy team is here to facilitate best measures for all of us, at the state and national level, to advocate for soy. ■





2020 Michigan Soybean Association Yield Contest Winners

The Michigan Soybean Association (MSA) is excited to announce the winners of the 2020 Soybean Yield Contest. 2020 is the first year MSA has facilitated the contest. It was facilitated for 14 years prior by the Michigan Soybean Committee (MSC).

This year there were 58 entries from soybean farmers in 14 different counties in Michigan. Winners were announced Wednesday, December 16, 2020 during MSA’s 47th Annual Meeting of Members.

The contest was sponsored by MSC, Asgrow, Dairyland Seed, Dyna Gro, Golden Harvest, Pioneer Seed, LG Seed, Mycogen, DF Seeds, Credenz and Rupp Seeds.

Don Stall’s winning entry in the Late Maturity Non-Irrigated category (134.75 bushels per acre) is also the highest yield ever entered in the contest. Congratulations to Don on this outstanding achievement!

The winners will each receive a plaque and a \$1,000 cash prize. Winners are also being featured on the MSA Facebook page - visit our page to learn more about them. Congratulations to this year’s winners!

Category	Winner	County	Yield
Late Maturity Non-Irrigated	Don Stall	Eaton	134.75 bu/A
Late Maturity Irrigated	Randy Cuthbert	Cass	93.85 bu/A
Mid Maturity Non-Irrigated	David Eickholt	Saginaw	97.15 bu/A
Mid Maturity Irrigated	Ron Hoeksma	Barry	85.90 bu/A
Early Maturity	Steve Koroleski	Huron	72.44 bu/A
Non-GMO	Luke Gentz	St. Joseph	94.61 bu/A

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MSA Annual Meeting Recap

The Michigan Soybean Association Board of Directors held their 47th Annual Meeting of Members virtually on December 16, 2020. In addition to regular business conducted during the meeting, members also heard remarks from Sen. Debbie Stabenow, Michigan Department of Agriculture and Rural Development Dir. Gary McDowell and American Soybean Association CEO Steve Censky.

During the meeting, results of the MSA election were announced. Gary Parr of Charlotte (District 2) and Heather Feuerstein of Belding (At-Large) were each re-elected for a third term. In District 5, Allison Morse of Birch Run was elected to the board. She succeeds Dan Keenan of Merrill who termed off after serving for nine years.

Allison works on her family farm and seed sales business with her father, Don. She earned a bachelor's degree from Western Michigan University and is a graduate of the 2019-2020 Corteva Agriscience Young Leader Program. She believes it is important for young farmers to have a voice in the agriculture industry. She indicated, "There is a lot of misguided information about farming and that makes it so much more important to act and be heard."

The MSA board and staff would like to thank Dan Keenan for his service and leadership over the past nine years, including his year spent as president of the organization. His willingness to serve as a voice for Michigan soybean farmers made an impact on the soybean industry, not only in Michigan, but in Washington, D.C. as well.



Dan Keenan



Gary Parr



Heather Feuerstein



Allison Morse

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White Mold Management Begins in the Spring

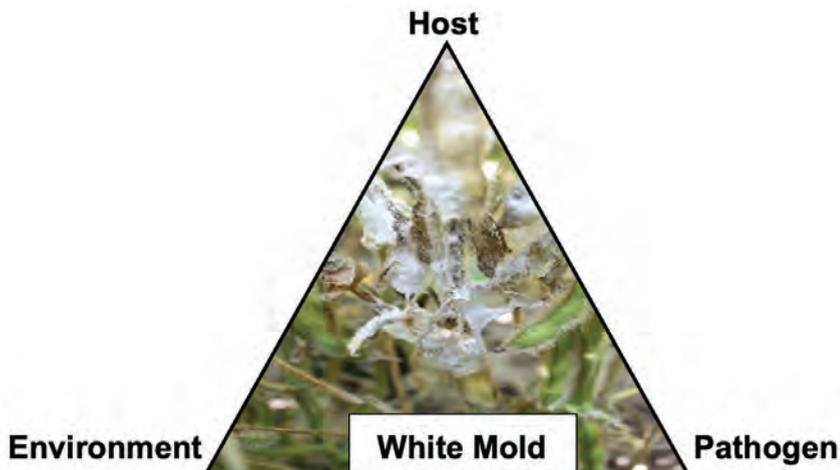
Mike Staton, MSU Extension Soybean Educator, Dr. Martin Chilvers, MSU Field Crop Pathologist

Soybean producers should use an integrated approach to white mold management, and some of the most effective practices are implemented in the spring. This article discusses these practices and offers specific recommendations. An overarching concept to keep in mind when deciding which practices to implement is to select practices which have been proven to reduce white mold when it occurs but will not reduce yields significantly if environmental conditions don't favor white mold.

When managing white mold, it is helpful to understand principles of the disease triangle. White mold disease only occurs when all three factors come together: a susceptible host, presence of the pathogen and favorable weather conditions. By altering components of the triangle, we can influence disease development.

Variety Selection

Varieties vary significantly in their susceptibility to white mold and planting the most resistant varieties in fields prone to white mold is a key management practice. All seed company catalogs provide relative white mold ratings for the varieties they offer. These ratings provide valuable information when comparing varieties from a given seed company. However, they are less useful for comparing white mold tolerance between varieties from different companies. Selecting varieties that resist lodging and have a narrower canopy width can also reduce white mold incidence and severity. Planting varieties from a range of maturity groups



may help some fields avoid severe white mold infestations by staggering the susceptible flowering period. We saw this in 2014 where early maturing varieties tended to avoid white mold infection and development.

Planting Rate

Reducing planting rates can be an effective tactic for reducing white mold. We saw this in two on-farm planting rate trials conducted in Michigan (Table 1). Reduced planting rates will decrease the potential for lodging and plant-to-plant spread of the disease. Consider reducing planting rates to end up with a harvest stand of 80,000 to 100,000 plants per acre in 30-inch rows when planting into fields having a high potential to develop white mold. There are many factors that determine final plant stands such as soybean germination and emergence that producers need to account for when reducing planting rates. Emerson Nafziger and Dennis Bowman at the University of Illinois developed an excellent soybean planting rate calculator. The calculator allows users to fine-tune planting rates by

Table 1. Soybean planting rate effects on yield and income at the two locations infested with white mold

Planting rate	Yield (bushels per acre)		Income (\$ per acre)	
	2015 Sanilac	2018 Saginaw	2015 Sanilac	*2018 Saginaw
80,000	63.2 a	66.2 a	\$622	\$653
100,000	61.1 b	66.5 a	\$591	\$648
130,000	61.5 b	64.3 a	\$582	\$612
160,000	57.9 c	61.2 b	\$531	\$565
LSD _{0.10}	1.7	2.4		

*Using 2020 figures for seed cost (\$62.00/ 140,000 seed unit) and market price (\$10.40 per bushel).

entering the final stand they want to achieve and adjusting germination and emergence percentages for seed quality and planting conditions. The calculator is available online at <http://www.cropsci.uiuc.edu/seeding/index.html>.

Row Spacing

Wide rows (greater than 20 inches) can decrease white mold but may not always lead to a yield increase. On-farm trials conducted in Michigan have shown that 30-inch rows reduce soybean yields by approximately two bushels per acre when compared to 15-inch rows.

Nutrient Management

Applications of nitrogen fertilizers or manure have been shown to increase early plant growth and canopy closure, creating favorable conditions for the development of white mold. Therefore, nitrogen fertilizer and manure applications should be avoided in fields having a history of white mold. Nitrogen fertilizer applications to soybeans are rarely profitable, making this the easiest practice to implement.

Cover Crops

The use of small grain cover crops (like oats, wheat, or cereal rye) grown with soybean can stimulate sclerotia germination, apothecia emergence and spore release before soybean blossoms appear. This can potentially lower white mold incidence and protect yield. Crimping and rolling a cereal rye cover crop has also been shown to reduce white mold incidence. Cover crops will alter the environment so manage them carefully.

Biological Control

Producers may also consider applying a biological control product such as Contans to fields having a history of severe white mold. This product contains *Coniothyrium minitans*, a naturally occurring fungus that attacks and degrades sclerotia in the soil. The product should be incorporated into the soil as uniformly as possible to a depth of two inches at least three months prior to initial soybean bloom. It is important to note that Contans will attack and degrade the sclerotia only when in contact with white mold sclerotia. Tillage operations deeper than two inches should be avoided following an application of Contans to prevent redistributing viable sclerotia into the top two inches where they can germinate and infect your soybean crop.

Remember, the most effective white mold strategies incorporate a variety of tactics and many of the most effective tactics are implemented prior to or at planting. ■



white mold apothecia



white mold sclerotia



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Michigan Soybean Committee Financial Report

October 1, 2019 - September 30, 2020

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Less:	
50% Transfer to USB	\$1,610,708
State of Origin Transfers	22,850
Net Assessments	\$1,722,163
Other Income	78,056
	<u>\$1,800,219</u>

Expenses Paid

Production	\$1,124,304
Market Development	448,342
Outreach	260,816
Administration	138,536
Contract Services	23,0468
Total Expenses Paid	<u>\$1,995,466</u>

FY20 PROGRAM DISBURSEMENT



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- Promotion of Biodiesel and Biobased Products
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- Soy Transportation Coalition
- Soybean Genetic Marketing
- U.S. Soybean Export Council
- Virtual Trade Shows
- World Initiative for Soy in Human Health

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- Legislator Lunch and Learn Events
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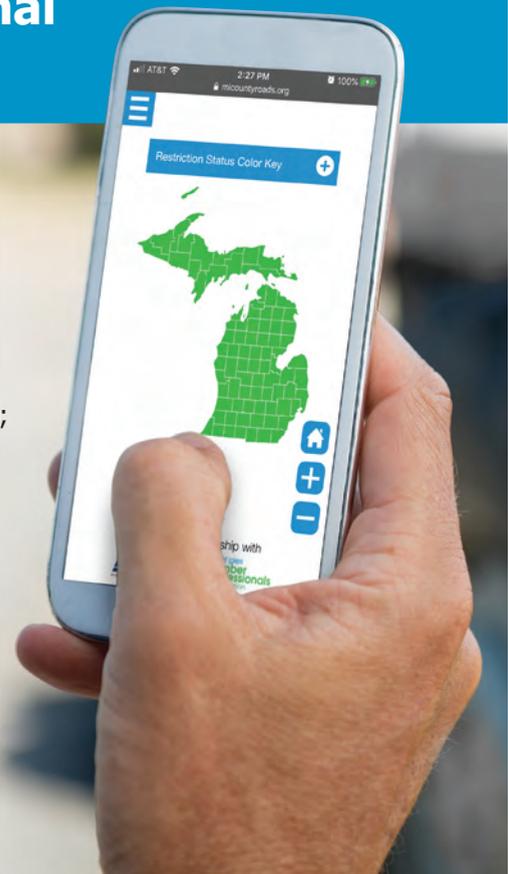


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Herbicide-Resistant Weed Research: What have we learned after 10 years?

DR. CHRISTY SPRAGUE, PROFESSOR AND WEED EXTENSION SPECIALIST, MICHIGAN STATE UNIVERSITY

Palmer amaranth, waterhemp and horseweed!! Mention any one of these three weed species to a Michigan soybean farmer and you will hear a collective groan. The presence of any one of these in Michigan fields can reduce soybean yield from 35 to 50 percent, even when all other weeds are controlled. Extended emergence patterns, rapid growth and the ability to produce tremendous amounts of seed, and in the case of horseweed, long distance seed dispersal by wind are all characteristics that make each one of these weeds a nightmare for Michigan farmers. In addition to these biological characteristics, herbicide resistance profiles that are associated with each one of these weeds leads to difficulties with management and higher weed management costs.

The Michigan Soybean Committee (MSC) has been a strong supporter of Michigan State University research to identify, characterize and define management strategies for herbicide-resistant, in particular glyphosate- and multiple-resistant, weeds in Michigan soybean fields. Since the first report of glyphosate-resistant horseweed in Michigan in 2007, the MSC has provided funding assistance for Michigan soybean farmers to submit samples for screening of glyphosate-resistant weeds. These screening efforts have not only confirmed and characterized different glyphosate- and multiple-resistant weed

species but have also tracked the spread and distribution of these weeds across Michigan. Each year reports of these efforts are posted on the MSU Plant & Pest Diagnostic website (<https://www.canr.msu.edu/pestid/>).

In addition to these screening efforts, the MSC has provided funding to research various management strategies for three of Michigan's most troublesome herbicide-resistant weeds - Palmer amaranth, waterhemp and horseweed. While research into new management strategies is ongoing, below are highlights and key findings from the different research projects on understanding the biology and management of these weeds.

Palmer amaranth

Palmer amaranth was first identified in a southwest Michigan soybean field in the fall of 2010. After its discovery, we quickly confirmed that it was not only resistant to the Group 2 (ALS-inhibiting) herbicides, but also showed a 20-fold level of resistance to glyphosate (Group 9). This was first report of Palmer amaranth ever being identified in Michigan and was the greatest level of glyphosate-resistance that we had confirmed in a Michigan weed sample. This was of great concern since Palmer amaranth had been reported as the most economically devastating weed in southern U.S. cropping systems. Over the next six years, with MSC funding and other leveraged funds, we were able to learn



Palmer amaranth

more about the biology of Palmer amaranth in Michigan, and the effectiveness of various soil-applied (PRE) and postemergence (POST) herbicides on Palmer amaranth control. Additionally, we worked on developing weed management strategies that would be most beneficial in controlling Palmer amaranth in Michigan soybean, not only just relying on herbicides, but also determining if other cultural practices, such as cover crops and planting soybeans in narrow rows, would help.

Since the initial discovery of Palmer amaranth in Michigan, additional herbicide resistances have been identified in new populations. While the majority of Michigan's Palmer amaranth populations are resistant to the Group 2 (ALS-inhibitors) and Group 9 (glyphosate) herbicides, several populations have been confirmed to be resistant to three different herbicide sites of action: Group 2, Group 5 (i.e., atrazine and metribuzin) and Group 9 herbicides. Additionally, in 2018 a Palmer amaranth population was identified as having resistance

to glyphosate (Group 9) and the Group 14 (PPO inhibitors) herbicides. Postemergence Group 14 soybean herbicides include: Cadet, Cobra, Flexstar, and Ultra Blazer. Resistance to these herbicides ultimately affects control in non-GMO and Roundup Ready soybean systems. Most of our Palmer amaranth research efforts have focused on the Group 2 and 9 and the Group 2, 5 and 9 resistant populations.

Key findings: In Michigan soils, Palmer amaranth seed mortality ranged from 53 percent to 90 percent after 12 months and was 9 percent greater than the seed mortality of the native pigweed, Powell amaranth. Palmer amaranth emergence was also later and extended longer throughout the growing season as compared with Powell amaranth, and in Michigan generally occurs from the second week of May through the first week in September. Once emerged, Palmer amaranth growth can occur rapidly. In the growth chamber, Palmer amaranth reached 6-inches tall in 22 days at 77° F day/68° F night temperatures but was much slower under lower temperatures. The emergence and growth characteristics of Palmer amaranth emphasize the importance that two-pass weed control programs and timely POST herbicide applications will have on Palmer amaranth management, while also emphasizing that the longevity of Palmer amaranth seed in a northern climate like Michigan may be shorter than other native pigweeds.

We also learned that an integrated approach with multiple herbicide applications is required for season-long management of Palmer amaranth. These multiple applications will include soil-

applied herbicides, postemergence herbicides and postemergence herbicide tank-mixtures with a residual herbicide. Of the soil-applied PRE herbicides, Valor (flumioxazin)-based programs provided the highest and most consistent Palmer amaranth control, until 21-28 days after treatment. Authority (sulfentrazone)-based herbicides with rates equivalent to at least 8 fl oz/A of Spartan were the next most consistent. In order to provide season-long Palmer amaranth control, the use of a POST herbicide was required. Of the Group 14 herbicides, Flexstar (fomesafen) was the most consistent, however Palmer amaranth needed to be less than 3-inches tall. Liberty (glufosinate)- or Enlist (2,4-D choline)-based programs, or a registered dicamba product (i.e., Engenia or XtendiMax) that can be used with their respective herbicide-resistant soybean traits were also effective. In general, lower control is observed when POST herbicides are applied to Palmer amaranth greater than 6-inches tall. The addition of a Group 15 residual herbicide (i.e., Dual II Magnum, Warrant, Outlook, or Zidua) to the POST herbicide helps control of late-emerging Palmer amaranth and does not influence the activity of the postemergence herbicide.

We also found that planting soybeans in narrow rows aids in preventing late-season Palmer amaranth emergence. However, planting a cereal rye cover crop and terminating that cover crop prior to planting did not provide enough cover crop biomass to effectively suppress late-emerging Palmer amaranth in Michigan. The use of a PRE followed by a POST herbicide program with a residual herbicide and planting

soybean in narrow rows has been the most effective control strategy for Palmer amaranth.

Waterhemp

Waterhemp has many similarities to Palmer amaranth. They are both diecious (separate male and female plants) pigweed species with similar emergence patterns, growth rates and herbicide susceptibility. However, as the distribution of Palmer amaranth in Michigan has remained stable, waterhemp's distribution has increased exponentially over the last three years, making waterhemp one of the top weed issues that Michigan soybean farmers face. Similar to Palmer amaranth, resistance to the Group 2 and Group 9 (glyphosate) herbicides can be found in almost all waterhemp populations identified in Michigan. Additionally, Group 14 and Group 5-resistant populations have recently been identified. These resistance issues, as well as new resistances identified in surrounding states, makes management of waterhemp a high priority to Michigan soybean farmers. As waterhemp issues became more prevalent we shifted our research focus from Palmer amaranth to waterhemp in 2017. Most of our waterhemp research has focused on developing weed control strategies using new herbicide-resistant soybean traits, including examining the effectiveness of both PRE and POST herbicides, and also determining if POST herbicide tank-mixtures are antagonistic or synergistic. Additionally, we have been trying to understand if tillage intensity could influence the overall populations of waterhemp in newly identified fields.

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Key findings: In a field with a newly identified population of waterhemp, fall moldboard plowing reduced the number of waterhemp seeds in the upper 2-inches of the soil compared with shallow spring tillage and no-tillage treatments. Moldboard plowing also reduced total waterhemp emergence the following season under high waterhemp populations, but not under low populations. However, regardless of population level, waterhemp emergence was earlier and more uniform following a fall moldboard plow. This earlier, more uniform emergence pattern may be beneficial in timing postemergence herbicide applications. If a fall moldboard plow is used, seeds should be left buried and the soil should not be deeply disturbed for four years for seed degradation.

Similar to Palmer amaranth control strategies, management of waterhemp needs to focus on starting clean, using an effective soil-applied PRE herbicide, and using an effective POST herbicide application. The addition of a residual Group 15 herbicide with the POST herbicide application is beneficial particularly in early-planted soybean. Planting one of the new herbicide-resistant soybean traits will help in designing an effective management strategy, by making sure that there is at least one effective herbicide site of action for POST waterhemp control. A POST only herbicide program should not be used to manage waterhemp.

Planting Enlist E3 or XtendFlex soybean provides



Figure 1. The importance of a PRE followed by POST waterhemp control program. Waterhemp control with (left) and without (right) an effective PRE herbicide, 21 days after a POST Liberty application.

growers the option to use two effective herbicide sites of action postemergence. For example, applying a combination of Liberty + Enlist One POST following an effective PRE herbicide in Enlist E3 soybean had been more consistent than applying Liberty alone POST following the same effective PRE. For more in-depth recommendations on the management of Palmer amaranth and waterhemp, consult the factsheet titled Multiple-resistant Palmer amaranth & waterhemp in Michigan: Keys to management in soybean, corn, and alfalfa on pages 217-221 of the 2021 MSU Weed Control Guide for Field Crops or at www.msuweeds.com.

Horseweed (a.k.a. marestail)

Over the past five years, horseweed has quickly become the #1 weed problem for Michigan soybean farmers. Traditionally considered a no-till or reduced-tillage weed, horseweed has become more of an issue in all tillage systems due to its season-long emergence. Additionally, almost all populations of

horseweed are resistant to the Group 2 and Group 9 (glyphosate) herbicides, leaving no effective postemergence herbicide options available for control in Roundup Ready or non-GMO soybean. In the fall of 2016, we started to examine multiple strategies for horseweed management. These strategies have focused on evaluating effective fall and spring burndown herbicide options for control. Comparing various PRE soil-applied herbicides for residual horseweed control and examining various weed control programs in different herbicide-resistant soybean trait packages for season-long horseweed control. Over the past three years we have also examined how we may be able to use cereal cover crops and more recently soybean row widths to help in the overall management of horseweed.

Key findings: In order to effectively control horseweed, three main steps need to be followed. First, established and emerging horseweed plants need

to be controlled prior to planting. They can be uprooted by tillage or controlled with an effective burndown herbicide application. There are several herbicides that can be effectively used in this application, and more options are available with some of the newer herbicide-resistant soybean traits (i.e., Enlist E3, RR2 Xtend, or XtendFlex). The burndown program is best applied when horseweed is in the rosette stage and needs to be applied prior to horseweed being 4-inches tall. As horseweed gets taller the effectiveness of the burndown herbicide program decreases. In some cases, it may take up to two burndown applications (i.e., fall followed by spring) to control horseweed prior to planting, depending on the horseweed population and size. The second most important step is to include a preemergence residual herbicide with the effective burndown herbicide treatment or after tillage. The residual herbicide needs to contain an “effective” herbicide site of action group to control horseweed. The two most effective residual site of action groups we have for managing horseweed are the Group 5 herbicide Metribuzin, which is

most effective, or the Group 14 herbicides, Valor (flumioxazin) or Authority (sulfentrazone) based products. There are several premixtures that contain one or both of these herbicide groups. Because these residual herbicides may not provide season-long horseweed control and horseweed can emerge after soybeans are planted, planting LibertyLink, LibertyLink GT 27, Roundup Ready 2 Xtend, XtendFlex or Enlist E3 soybeans provides growers effective postemergence herbicide options for horseweed control.

Cover crops and horseweed suppression

One other aspect that we have examined for horseweed management is the use of the fall-seeded cover crops, cereal rye and winter wheat. In the first two years of this research at three locations, we found that planting cereal rye or winter wheat at 60 or 120 lbs/A in the fall and terminating in the spring, either one week prior to or one week after planting (‘Planting Green’) reduced horseweed biomass up to 70 percent at cover crop termination and 33 percent five weeks

after soybean planting. Cereal rye provided the most cover crop biomass. If we delayed cover crop termination by Planting Green cover crop biomass was also higher, horseweed biomass was reduced and soybean yields were improved compared with early terminated covers.

This year we observed that Planting Green into cereal rye and planting soybeans in narrow rows (7.5- or 15-inches) provided horseweed suppression through to harvest. While this suppression is not adequate for complete management of horseweed, the use of an effective POST herbicide application after the early terminated cereal rye or Planting Green resulted in complete horseweed control compared with the no cover treatments. While we are still working on refining these strategies, we have found that integrating cereal cover crops with narrow row soybeans in addition to an effective herbicide program can provide additional early and late season horseweed control, that may ultimately assist in reducing the selection pressure of herbicides on horseweed that can lead to the further development of herbicide resistances.



Figure 2. Horseweed pressure in soybean at the time of POST herbicide application in no cover (left), cereal rye terminated early (middle), and cereal rye terminated Planting Green (right).

For more detailed information on the management of horseweed in soybeans, see the factsheet Controlling Horseweed (Marestail) on page 222 of the 2021 MSU Weed Control Guide for Field Crops or at www.msuweeds.com. ■



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Michigan Soybean On-Farm Research Program Thanks Ned Birkey and Dan Rajzer

.....



“The only constant in life is change.”

Ned Birkey and Dan Rajzer have made a great impact on our Michigan Soybean On-Farm Research Program over the years. Their knowledge and experience in Michigan field crop production has provided many benefits, not only to the farms they worked with, but also to all Michigan soybean growers who were able to use the results of the trials they worked on. We wish Dan and Ned the very best in their retirement and thank them for their work over the years.

Mitigate Risks in Early Planted Soybeans

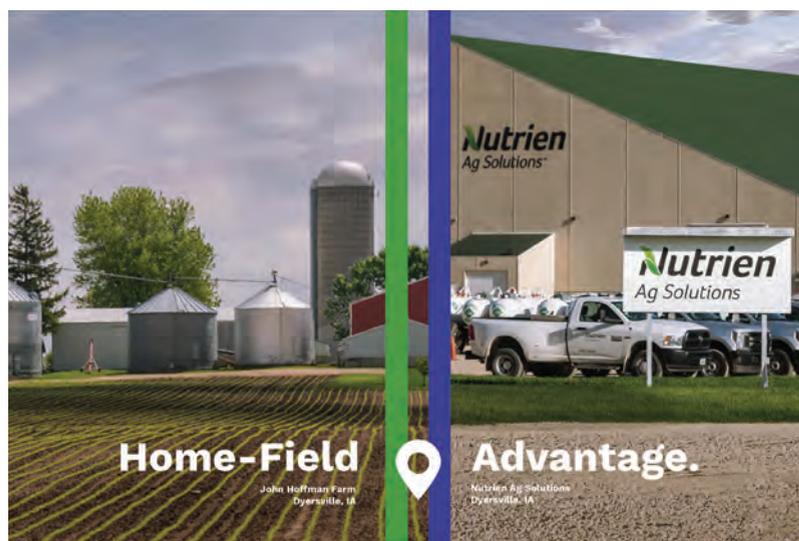
MIKE STATION, MSU EXTENSION SOYBEAN EDUCATOR AND HORST BOHNER, SOYBEAN SPECIALIST, ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

Some soybean producers in Michigan are experimenting with ultra-early planting dates (late-March to mid-April) with positive results. To date, research trials have not shown a consistent yield benefit to planting this early when compared to planting during the last week of April or the first week of May. We saw this in three replicated on-farm trials conducted in Michigan in 2019 and 2020 where ultra-early planting increased yield by 6.5 bushels per acre at one location but didn't affect yield at two other sites planted before April 15. Given these results, the main benefit of this practice is that it enables producers to extend the planting window by taking advantage of good soil and weather conditions that might occur in early to mid-April. Planting soybeans ultra-early does carry some risk. We discuss the risks associated with ultra-early planting and how to mitigate them in this article.

Imbibitional Chilling Injury (ICI):

This condition occurs when the soybean seed imbibes very cold water in the first 12 to 24 hours after planting. Rainfall events occurring within 24 hours of planting favor ICI. This is likely because a cold rain immediately following planting shocks the seedling with a rapid intake of cold water. Cool soil temperatures can prevail without causing significant chilling injury if the seed quality is good, and the soil is not saturated. Visible symptoms of ICI include uneven emergence and dead tissue on the exterior of the cotyledons. Management practices that will reduce the potential for ICI include the following:

- Plant in the early afternoon to allow soils to warm up.
- Avoid planting when rain is imminent within 24 hours after planting. The heavy rain events that occurred in April and early May 2017 adversely affected soybean germination and emergence in many early-planted fields in 2017.
- Plant high-quality seed having intact seed coats that are free of wrinkles or growth cracks.
- Avoid planting seed having low initial moisture content.



Seedling Diseases and Poor Plant Stands:

Due to the high probability that very early planted seed will be confronted with cool and wet soils, Michigan State University Extension recommends using fungicide seed treatments when planting early. Select fungicides that are effective against fusarium, pythium, phytophthora and rhizoctonia. Producers should also select varieties that are resistant/tolerant to sudden death syndrome and phytophthora when planting very early. Early-planted seed is often in the ground much longer than late-planted seed,

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giving more time for diseases to invade the seedling. A good fungicide seed treatment will reduce the risk of poor plant stands.

Frost/Freeze Damage:

One of the leading risks of very early-planting is that emerged plants will be damaged by freezing temperatures as the growing point is exposed and vulnerable when the cotyledons emerge. This risk is mitigated to some degree by the fact that germination and emergence are delayed under cooler soil temperatures. Soybean tissue is also more resistant to freezing temperatures than corn tissue. Typically, temperatures must reach 29-30°F for damage to occur to emerged beans before the first trifoliolate leaves emerge. Once the first trifoliolate leaves develop, the plants become susceptible to damage from temperatures at or below 32°F. Planting in fields at higher elevations having good air drainage will reduce the risk. Removing residue from the row is a mixed bag for very early planting. It will cause the soil to warm-up sooner and promote earlier germination and emergence, which may expose the emerged plants to greater risk of frost/freeze injury.

Shortened Reproductive Period:

A less probable risk is that abnormally warm weather may occur after planting causing the plants to emerge in April. Even if the emerged plants escape frost/freeze injury, the unifoliolate leaves will sense the shorter photoperiod occurring during this time of the year, causing the plants to flower significantly earlier than normal and potentially shortening the reproductive period. Planting the latest maturing varieties that are adapted to the area will reduce the impact of this outcome.

Reduced yield from plants maturing too early in the fall:

If the first part of summer is dry, early planted fields may mature too rapidly in the fall, missing the benefit of late season rains. Late summer rains can significantly increase yield unless the plant is already past the R6 growth stage. The best way to mitigate this problem is to plant varieties that are the latest maturing variety adapted for your area. Planting early maturing varieties very early in the spring may actually reduce yields.

...continued on page 25.



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Bean Leaf Beetles (BLB):

The potential for damage from bean leaf beetles is increased by early planting as the beetles congregate in the earliest emerging soybean fields in a given area. Watch for BLB feeding and apply an insecticide if damage exceeds the treatment threshold (50 percent defoliation on seedlings).

Federal Crop Insurance:

Planting soybeans prior to the Risk Management Agency’s (RMA) earliest planting dates listed in Figure 1 will make you ineligible for replant coverage (if you carry yield protection except for CAT, or revenue protection). However, your harvest guarantee and prevent plant coverage is not adversely affected when planting before the earliest planting date. Under the federal crop insurance program, payment for replant on soybeans is calculated as 3 bushels x projected price = payment per acre.

Ultra-early soybean planting offers potential benefits but also poses risks. Public and private research trials will be conducted again in 2021 to assess this practice. Producers that want to

experiment with ultra-early planting should take the recommended steps mentioned in this article to help reduce these risks. ■

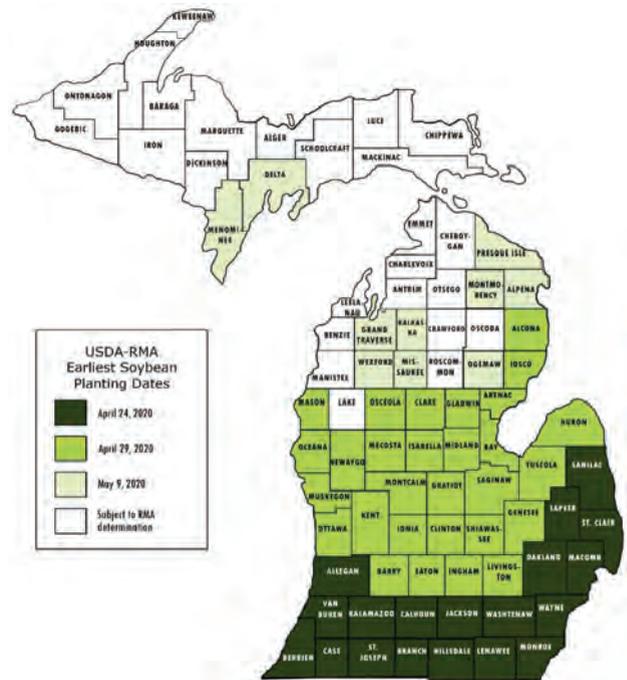


Figure 1. RMA earliest planting dates for soybeans



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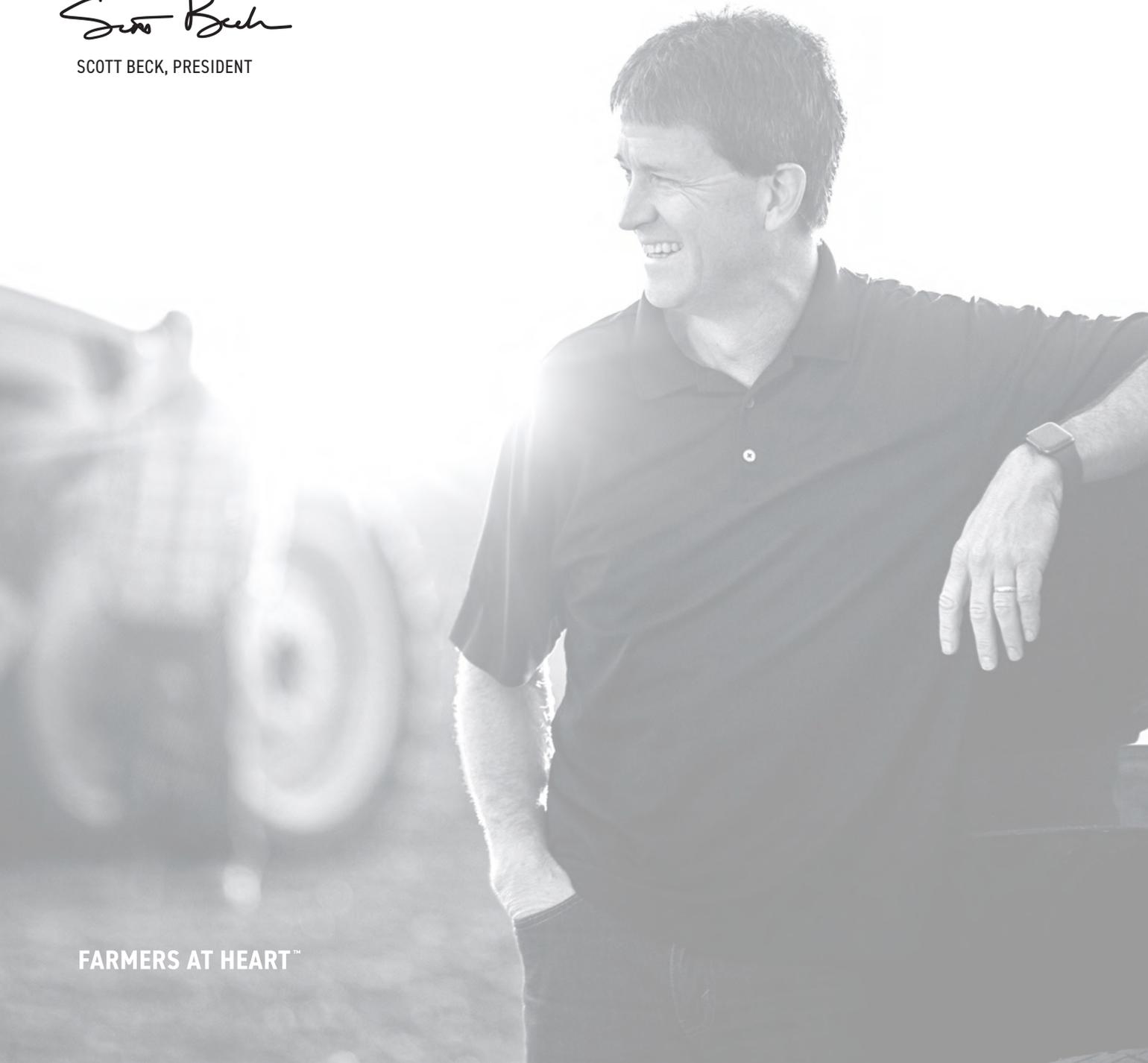
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2020 On-Farm Research Takeaways

MIKE STATON, MSU EXTENSION SOYBEAN EDUCATOR

The Michigan Soybean On-Farm Research program evaluated 13 projects in 70 on-farm research trials in 2020. The information gleaned from these trials may inform some of the decisions you make as you prepare to plant and purchase crop inputs. Take-away messages from four of the trials are summarized in this article. The full publication with complete results from all 13 trials can be viewed online at <http://bit.ly/2020onfarm>.

Planting Date:

Early planting dates were compared to normal planting dates at 11 locations from 2019 to 2020. Early planting increased soybean yield by an average of 5.5 bushels per acre at three of the 11 sites. However, planting date did not affect soybean yield at the other eight sites. These results support the recommendation for planting soybeans early as they demonstrate the potential for producing higher yields without significantly increasing the risk of experiencing yield reductions. This information should increase producers' confidence in planting soybeans earlier and help manage weather risk in the spring by extending the planting window.

Planting Rates:

We have conducted 58 planting rates trials from 2015 to 2020 comparing four planting rates (80,000, 100,000, 130,000 and 160,000 seeds per acre). When all 58 sites were combined, the yields from the highest two planting rates were nearly identical and they beat the 100,000 seeds per acre planting rate by one bushel per acre and the 80,000 rate by only 2.8 bushels per acre. The 100,000 seeds per acre planting rate generated the most income while the 160,000 rate produced the least income. The lowest planting rates reduced white mold incidence and increased net income by \$80.00 per acre at two sites.

Saltro® Seed Treatment:

We evaluated the performance of Saltro, a relatively new seed treatment from Syngenta

that targets sudden death syndrome (SDS), at two locations in Calhoun County in 2020. Saltro increased yields by an average of 3.8 bushels per acre and increased net income by \$26 per acre. Both sites had a history of SDS and the foliar symptoms of SDS were visible in the trials.

NDemand® 88 (foliar fertilizer):

We evaluated NDemand 88, a foliar fertilizer (10-8-8-2) from Wilbur Ellis in 2020. Two treatments (post-emergence herbicide(s) mixed with NDemand 88 vs. the same post-emergence herbicide(s) applied without NDemand 88) were compared. The one quart per acre application rate of NDemand 88 increased yield and income at one location and when all 10 sites were combined and analyzed. ■



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Ed Cagney Elected President of NCSRP

Ed Cagney, a farmer from Scotts, MI was elected president of the North Central Soybean Research Program during their most recent board meeting. Ed is no stranger to the NCSRP board, as he has represented Michigan since 2007. During his involvement in NCSRP, he has served as secretary-treasurer and president. Ed grows soybeans, corn, hay, seed corn and green beans for a cannery on a 4,000-acre farm near Kalamazoo, which has been in his family for 151 years. He and his wife, Schelle, have been married for more than 30 years.

NCSRP serves as a bridge between state and national soybean organizations and funds basic and applied soybean research programs that are highly collaborative and

uniquely appropriate in addressing soybean production, profitability and environmental sustainability for growers across the North Central region. NCSRP also works to share research results with soybean growers that they can utilize on their own farms. Learn more about NCSRP at <https://ncsrp.com>.

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Michigan Soybean Welcomes New Outreach Specialist

The Michigan Soybean Committee (MSC) is excited to announce that Katlin Fusilier has been hired as the new Outreach Specialist for both MSC and MSA. Katlin earned her bachelor's in science from Michigan State University with a major in Crop and Soil Sciences and a minor in Horticulture in 2017. She then earned her master's in Crop and Soil Science from MSU in 2019. Since earning her master's degree, Katlin worked as a Research Aide at MSU managing projects focusing on applied crop research in corn and soybeans including variable rate seeding, planting date decisions and variety selection. Through these experiences, Katlin realized that her passion within the agriculture industry lies in communication and outreach to farmers and consumers.

Katlin's passion for agriculture grew while attending MSU, where she had the opportunity to be exposed to the industry for the first time. She is currently a member of Washtenaw County Farm Bureau and enjoys helping others learn about agriculture for the first time through outreach activities.

Katlin will be working on a variety of communication and outreach programs for many of Michigan Soybean's key audiences including farmers, legislators, regulators, students, consumers and more. The board and staff of the Michigan Soybean Committee and Michigan Soybean Association are excited to have Katlin join the team and use her background and skills to help further grow the Michigan soybean industry!



CONGRATULATIONS!

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March is Grain Elevator

The soybean checkoff is assessed at the rate of one-half of 1 percent (.005) of the net market price of soybeans sold by the producer to the first purchaser.

Checkoff assessments collected by Michigan first purchasers must be remitted to the Michigan Soybean Committee. The funds are used for production research, market development and outreach efforts on behalf of Michigan's 13,000+ soybean farmers.

Thank you to the first purchasers who collect the checkoff each month!

Allegan

Moline Coop, Moline
Peaceful Road Farm Products, Inc., Hopkins

MAC, Middleton
Shaffer Farms, Alma
ZFS LLC, Ithaca

Arenac

The Andersons - ABG, Standish
Turner Bean & Grain, Turner

Hillsdale

Litchfield Grain Co., Litchfield
Prattville Fertilizer & Grain, Inc., Pittsford
The Andersons, Reading
Waldron Grain & Fuel Co., Waldron

Bay

ADM Edible Bean Specialties, Inc., Pinconning
Gavilon, Bay City
Ittner Bean & Grain Inc., Auburn
The Andersons, Auburn

Huron

Cooperative Elevator Co., Pigeon
Cooperative Elevator Co., Ruth
Cooperative Elevator Co., Sebawaing
Farmer's Coop Grain Co., Kinde
Star of the West Milling Co., Bad Axe

Calhoun

Citizens, LLC, Battle Creek
Hoffman Ag Service LTD, Marshall
Voyces Elevator Inc., East Leroy

Ingham

ADM Grain Co., Webberville
Cremer Farm Center, Williamston
DF Seeds, LLC, Dansville
Jorgensen Farm Elevator, Williamston
MAC, Lansing

Cass

Community Mills Inc., Cassopolis

Clinton

Mathews Elevator, Fowler
Ovid Elevator Company, Ovid
Westphalia Milling Co., Westphalia

Ionia

Caledonia Farmers Elevator, Lake Odessa
Gallagher Farms, Belding
Musgrove Grain LLC, Lake Odessa

Eaton

ADM Grain Co., Grand Ledge
Citizens LLC, Charlotte
Eaton Farm Bureau Coop, Charlotte

Isabella

Brown Milling, Inc., Mt. Pleasant
Hauck Seed Farm, Mt. Pleasant

Gratiot

Hirschman Grain LLC, Ithaca
MAC, Breckenridge

Jackson

Commodity Exchange Inc., Grass Lake
Springport Elevator Inc., Springport

Appreciation Month!

Kalamazoo

Battle Creek Farm Bureau Assn., Climax

Kent

Caledonia Farmer's Elevator, Caledonia

Lenawee

Kimerer Farms, Britton

MAC, Blissfield

MAC, Jasper

Penn Acres, Clinton

Witt Seed Farm, Jasper

Livingston

M & W Seeds, Eaton Rapids

Macomb

Armada Grain Co., Armada

Esper Grain LLC, Lenox

Mason

Acres Cooperative, Scottville

Midland

Simons, E. R. Co., Coleman

Monroe

ADM Grain Co., Ottawa Lake

Ida Farmer's Co-op, Ida

Masserant's Feed & Grain, Newport

Maybe Farmers Inc, Maybe

Ottawa Lake Coop, Ottawa Lake

Newaygo

Ceres Solutions, Fremont

MAC, Newaygo

Ottawa

Farmer's Coop Elevator, Hudsonville

Ionia Grain, Ionia

Ionia Grain, LLC, Allendale

Zeeland Farm Service Inc., Zeeland

Saginaw

Freeland Bean & Grain, Freeland

Gavilon, Carrollton

Gavilon, Zilwaukee

Great Lakes Grain and Transportation, Bay City

Star of the West Milling Co., Frankenmuth

Star of the West Milling Co., Gera

The Andersons, Oakley

The Andersons, Hemlock

Sanilac

ADM Grain Co., Snover

MAC, Brown City

MAC, Marlette

Shiawassee

Durand Feed & Grain, Durand

Harvest Mills Inc., Durand

Morning Star Grain LLC, Lennon

Zmitko Farms, Owosso

St. Clair

Star of the West Milling Co., Emmet

Stop Loss Trading LLC, Port Huron

Vogelsberg Grain Co., Yale

Wittstock Bros., Allenton

St. Joseph

The Andersons, White Pigeon

Tuscola

ADM Edible Bean Specialties, Inc., Reese

Bierlein Seed Inc., Reese

Cooperative Elevator Co., Akron

Harrington Seeds Inc., Reese

Millington Elevator & Supply, Millington

Quality Roasting LLC, Reese

Star of the West Milling Co., Fairgrove

Star of the West Milling Co., Gilford

Star of the West Milling Co., Reese

Star of the West Milling Co., Richville

Vita Plus, Gagetown

Van Buren

Cargill, Decatur

Washtenaw

American Soy Products Inc., Saline

Marion, John Inc., Saline

Vershum R & Sons Inc., Milan



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