

Growing Montana

FALL 2021



**MABF
SCHOLARSHIP
WINNERS**

**MABA/MGEA
ANNUAL
CONVENTION**

**OPTICAL
SPOT SPRAYING
& AI SCOUTING**

A Publication of
MONTANA AGRICULTURAL BUSINESS ASSOCIATION

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MABA OBJECTIVES:

- To encourage the proper use of all pesticides, plant food, seeds and other agricultural products.
- To promote educational programs to bring together those who are associated with the aforementioned practices and uses.
- To provide a means for an exchange of information and ideas among persons associated with agricultural business.
- To encourage and support research and educational programs.
- To cooperate with local, state, regional and national agencies, both public and private, in the solution of problems and/or in the proposal of legislation relating to all such practices.
- To sponsor desirable laws and law changes that would be beneficial to the Association and its members.
- To serve as a clearing house for the legislative requests of various organizations regarding programs affecting the Association.



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A Message from the President

Wow – time flies when you work in the never-dull, ever-changing Ag Business industry! I feel like 2021 has blown by. Many of us were able to get back into face-to-face interaction with customers and business partners following the peak of the pandemic – and what a difference that makes.

2021 wasn't without its challenges though. Widespread drought through much of Montana and beyond coupled with transportation challenges, extreme farm input price increases, and supply chain issues only seemed to amplify one thing for everyone – risk. I understand the stress this can cause on you and your business, so please take some time to unplug and recharge before getting to the burn-out stage. As we continue forward into unprecedented times, I urge you to reach out to MABA with anything that concerns you and see if there's a way we can help.

On a lighter note, Phase 2 of the Great Montana Ag Rally (MABA's Golf Tournament and Golf Event) was a great success! The feedback from that 2-day event in August was all positive – it's a nice mid-point in the year to gather as an industry in a more casual setting. And of course, raise money for the Montana Ag Business Foundation to distribute to various Ag Youth groups throughout the state. Lots of laughs were had and I think everyone is ready to gather again at the January Convention for official business!

Your current MABA Board is an excellent mix of leaders who care about the future of our industry. Here's a few of the accomplishments made this past year:

- Updating our Articles of Incorporation and By-Laws to fit the modern era of Ag Business;
- Updating the website and improving internal processes for tracking membership resulting in better communications with more than one contact per member location;
- Proactively reaching out to the Fertilizer Advisory Committee and MSU College of Ag (including the Montana Ag Experiment Stations) to better partner and utilize the excellent resources and input our members can provide;
- Providing continuing education to our members through digital



Luke Dighans

President

*Montana Agricultural
Business Association*

President continued on page 14

2021 MABF Scholarship Winners

At the Montana Agribusiness Foundation (MABF) we encourage and support the legends of tomorrow. We strive to provide scholarships to the next generation of Montana agriculturalist. These scholarships are designed to aid students in achieving their educational goals and to help them prepare for their future and the future of Montana agriculture. The students below are the recipients of the 2021 MABF scholarship. Please help us in congratulating and encouraging them in their future endeavors.



1. Ann Killen | 2. Derik DeFrance | 3. Haley Droogsma

Go like and follow our Facebook page to stay up to date with our current happenings. Please email us at mta-gribusnessfoundation@gmail.com with any questions about our foundation or about the process to donate. If you are interested in being a part of the MABF please send an email to us to get started. Thank you for your continued support of our Montana youth.

Sincerely,
Nichole Drake, MABF President ■

Welcome To Our New Members!

In 2021, MABA added five new memberships! Please join me in welcoming our new members:

Sul4R-Plus, LLC	Sustaining Membership
Itafos Conda, LLC	Sustaining Membership
Novozymes	Sustaining Membership
Agriculture Consulting Services of Montana	Standard Membership
Montana Renewables	Standard Membership
Lockton Companies	Affiliate Membership

Thanks for your support! We look forward to working with you all. ■



2022 MABA/MGEA Annual Convention & Trade Show

JANUARY 26-28, 2022 – HERITAGE INN, GREAT FALLS, MT

Let's get together!!!

The Annual MABA/MGEA Convention - "Growing Together" – will provide a great opportunity for MABA members to learn, share experiences, and collaborate with colleagues. If you've never been to the convention, you should certainly make plans to attend this year's event. The event is host to professional speakers from across North America and over 500 attendees that are active in Agricultural Business in Montana.

Here's what you can expect at the "Growing Together" conference:

- Certified Crop Advisor (CCA) Points;
- MT Department of Agriculture Points;
- Over 60 vendors participating in the trade show;
- Outstanding speakers;
- Information pertinent to your businesses and employees.

MABA takes the needs of its membership very seriously and it is for this reason that the MABA ensures that there are Certified Crop Advisor (CCA) and Department of Agriculture points available for all the sessions!

The "Growing Together" agenda includes discussions on Seed Treat Application; Disease of the Year (Not Covid); Row Crop Disease Control; Crazy Weather Patterns; Confined Space/Engulfment training; Biologicals and Soil Health; Cover Crops; Soil and Tissue Sample Test Interpretation; Vertebrate Pest Management; Carbon Credit Markets; Seed Placed Fertilizer; Residual Herbicide Damage; Micronutrients in Pulses and Oilseeds; Range and Pasture Update; and Canola Variety Trials.

The MABA Annual Convention also provides an exciting opportunity for new agriculture professionals through a meet and greet and luncheon. During the luncheon there will be an opportunity for veterans and new professionals to share challenges, concerns, opportunities and to create relationships to further build the professionalism of our industry. The New Agriculture Professionals Meet and Greet is scheduled for Thursday, January 27 at Noon.

The annual convention is a great opportunity for leaders in the Montana Agricultural Business Community to come together and share ideas, solutions, and challenges.

Thursday evening presents an opportunity to support Montana's youth agricultural programs. Each year, MABA and MGEA select an entity to receive the profits from the Thursday night social and auction. This year the proceeds will go to Montana FFA Foundation and Montana 4H Foundation to support our endowed scholarships with those organizations. Team Never Quit Speaker, John Tiegen, will be speaking at the auction. Please see his article on page 38.

The MABA/MGEA Annual Convention brings together friends and acquaintances from across the state and country and provides a significant opportunity for networking. The breakout sessions are appropriate for management as well as employees and we look forward to seeing all of you in Great Falls in January!

To sign up to be a sponsor, vendor or to register for the "Growing Together" Convention please go to the www.mtagbiz.org website and click on the Convention banner or contact the office at mabamgea@gmail.com and we will get you all set up! ■

Pesticide Recertification and Profession Training Opportunities

Wednesday morning of the MABA/MGEA Annual Convention and Trade Show is set aside for the Pesticide Recertification Workshop. The 2022 agenda does not disappoint and includes expert speakers and discussions related to Seed Treat Application; Disease of the Year (Not Covid); and Row Crop Disease Control. CCA and Department of Agriculture points will be offered for this event.





2022 MABA-MGEA CONVENTION SPONSOR / VENDOR CONTRACT



Company _____

Name for Badge _____ Phone _____

Address _____ Fax _____

City, State, Zip _____ Email _____

MABA and MGEA will provide night security on Tuesday and Wednesday evenings from 10pm to 6am, but assume no liability for damage to or loss of exhibitors' property or for any losses in case of inability to provide exhibit space due to fire, earthquake, storm, riot, strike, civil insurrection or war.

TRADE SHOW

Sub-Total \$ _____

Booths are \$450 if paid **by** Nov. 15, 2021; \$500 if paid **after** Nov. 15, 2021

Please reserve our same booth(s) space

We would like a different booth space. The booth numbers that I would prefer(written in order of priority) are:

We are a new exhibitor. (With this layout, all booths get excellent traffic. We try to place space between competitors.) The booth numbers that I would prefer (written in order of priority) are:

SPONSORSHIP

Sub-Total \$ _____

Sponsorship options are first-come, first-served. Options are listed on convention information handout.

The option numbers that I would prefer (written in order of priority) are:

Registration is included for one person with each booth or sponsorship.

ADDITIONAL REGISTRATIONS

Sub-Total \$ _____

For additional individuals, please enclose \$105/person if they are attending the convention only or \$135/person if they are attending both the convention and the pesticide workshop and list their names below.

Name(s)

City

Please check if additional persons are attending and write those names on a list and attach to this form.

CONTRIBUTION TO AUCTION

Sub-Total \$ _____

Donation to Montana Agricultural Business Foundation

Sub-Total \$ _____

TOTAL \$ _____

Online Payment is preferred at www.mtagbiz.org or

Check Enclosed Check will be sent from my company headquarters

Other

Charge to VISA Mastercard or American Express

Number: _____ Exp. Date: _____

Name on card: _____ Address: _____

Zip Code: _____ 3 or 4 digit code _____

Signature: _____

MAIL TO: MABA-MGEA Convention • PO Box 7325 • Helena, MT 59604
EMAIL: mabamgea@gmail.com • **SIGN UP ONLINE:** WWW.MTAGBIZ.ORG



growing TOGETHER



2022 MABA – MGEA Convention & Pesticide Workshop

Heritage Inn – Great Falls, Montana

January 26 – January 28, 2022

Detailed agenda/registration online at:

www.mtagbiz.org

PESTICIDE RECERTIFICATION AGRONOMIC WORKSHOP:

- Seed Treat Applications Do's and Don'ts
- Disease of the Year
- Row Crop Disease Control

JOINT SESSIONS:

- Crazy Weather
- Confined Space/Engulfment Training
- Control of Commensal Rodents on the Farm & Ranch

GRAIN SESSIONS:

- OSHA Update
- Labor Economics

- BNSF Update
- New Varieties
- PNW Panel

AGRONOMY SESSIONS:

- Biologicals and Soil Health
- Cover Crop Opportunities
- Soil & Tissue Sample Test Interpretation
- Carbon Credit Market
- Seed Placed Fertilizer
- Residual Herbicide Damage
- Micronutrients in Pulses and Oilseeds
- Range and Pasture Update
- Canola Variety Trials



REGISTER ONLINE AT WWW.MTAGBIZ.ORG

or send your registration to:

MABA/MGEA Annual Convention
PO Box 7325 • Helena, MT 59604

406.227.3523 (o) • 406.227.3745 (f)
406.439.2215 (c)



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facebook.com/MontanaAgriculturalBusinessAssociation



**Montana Agricultural Business Association
 Montana Grain Elevator Association
 Convention Registration
 January 26, 2022 – January 28, 2022
 Heritage Inn, Great Falls, MT (406-761-1900)**



Company _____
 Contact _____ Phone _____
 Address _____ Fax _____
 City, State, Zip _____ Email _____

Refund Policy: A full refund will be given if the request is received in writing by fax, mail, or email at least one week before the convention begins. Beginning Monday of the convention week, no refund will be given except under unusual circumstances such as medical emergencies or death.

Late Registration: Registration received after January 10th 2022 will be assessed the late registration fee.

Option 1: Convention AND Pesticide Workshop – \$160/person (\$170 after Jan. 10, 2022)

Name	Address	Fee
_____	_____	_____
_____	_____	_____
Please Enter Total (attach additional sheets as necessary)		Sub-Total \$ _____

Option 2: Pesticide Workshop Only \$60/person (\$70 after Jan. 10, 2022)

Name	Address	Fee
_____	_____	_____
_____	_____	_____
Please Enter Total (attach additional sheets as necessary)		Sub-Total \$ _____

Option 3: Convention Only \$130/person (\$140 after Jan. 10, 2022)

Name	Address	Fee
_____	_____	_____
_____	_____	_____
Please Enter Total (attach additional sheets as necessary)		Sub-Total \$ _____

Additional Purchases or Contributions – Meals are included with your registration.

Montana Ag Business Foundation Cash Donation	\$ _____
Silent Auction Cash Donation	\$ _____
Additional Wednesday Lunch Tickets (\$15 each)	\$ _____
Additional Thursday Lunch Tickets (\$15 each)	\$ _____
Additional Thursday Night Key Note Speaker and Dinner Tickets (\$50 each)	\$ _____
	Sub-Total \$ _____

Total of registration package and additional items TOTAL \$ _____

On Line registration is preferred at www.MTAGBIZ.ORG

Credit Card Payment:

Charge to Visa _____ Master Card _____ or American Express _____

Number: _____ Exp. Date _____

Name on card: _____ Address: _____

Zip Code: _____ 3 or 4 digit code _____ Signature _____

Please return to MABA/MGEA Convention, PO Box 7325, Helena, MT 59604/Email:mabamgea@gmail.com/Questions:
 Call Krista 406.439.2215(c)/REGISTER ONLINE AT WWW.MTAGBIZ.ORG



Participate in the Future of YOUR Association

The MABA/MGEA Annual Convention brings an opportunity for members to reconnect with colleagues as well as gain a better understanding and knowledge of the vast issues facing our industries. One of the most important agenda items that is often overlooked by members is the Annual Meeting! MABA exists to serve the needs of its membership and it is critical that MABA membership provide feedback and guidance to the Board.

The MABA Annual Meeting will give you an opportunity to hear about the work conducted during the previous year, objectives for the upcoming years, financial health of the association, selection of board members, and a general discussion to bring everyone up to date.

Please become an ACTIVE member in YOUR association so that MABA can continue to thrive and represent Montana's agricultural businesses.



MABA ANNUAL MEETING

Wednesday, January 26, 2022 at 1:30 pm – A/B/C Rooms – Heritage Inn, Great Falls

Montana Agricultural Business Association BOARD OF DIRECTORS NOMINATION FORM

The MABA Board of Directors works diligently to represent, support, and protect Montana's agricultural businesses and all the associated issues. Active participation from MABA Membership is crucial to having a board that represents all facets of this diverse and exciting industry.

Serving on the MABA Board is a great opportunity to increase your (or a coworker's) understanding of environmental, legislative, and regulatory issues facing Montana businesses! This is a great leadership opportunity that will benefit the individual board member but also the company that they represent. Please take a minute and nominate an individual to serve a 3 year term on the MABA Board of Directors.

Name: _____

Company: _____

Phone: _____ Email: _____

Send your form to mabamgea@gmail.com or MABA, PO Box 7325, Helena, MT 59604

After receipt of the nominations from membership the MABA Nominating Committee will identify 2 for each open position and one where members will run against current board members whose 3-year terms are expiring. MABA does not have a limit on the number of terms that a board member may serve. ■

EPA Finalizes New, Stronger Safety Measures for Pesticide Paraquat

BASIC INFORMATION ON USES

Paraquat dichloride, commonly referred to as “paraquat,” is one of the most widely used herbicides in the United States. Paraquat is also often referred to as Gramoxone (a popular end-use product). It is an important tool for the control of weeds in many agricultural and non-agricultural settings. It is also used for desiccation of crops, like cotton, prior to harvest.



There are no homeowner uses and no products registered for application in residential areas.

All paraquat products registered for use in the United States are Restricted Use Pesticides (RUPs) that may only be used by trained certified applicators.

USING PARAQUAT DICHLORIDE PRODUCTS SAFELY

If you, your child or anyone else comes in contact with paraquat, seek medical assistance immediately. Ingestion of paraquat can be fatal, and dermal or eye contact can have serious lasting effects.

To prevent severe injury and/or death from paraquat ingestion, all paraquat products must:

- Be used only by a certified applicator. Unlike most other restricted-use products, paraquat may not be used by persons working under the supervision of a certified applicator;
- Never be transferred to a food, drink or any other container. New packaging requirements will help to prevent this from occurring;
- Always be kept secured to prevent access by children and/or other unauthorized persons;

- Never be stored in or around residential dwellings;
- Never be used around home gardens, schools, recreational parks, golf courses or playgrounds.

To prevent severe injury and/or death from skin or eye exposure to paraquat:

- Follow label instructions;
- Use the required personal protective equipment specified on the product label.

HUMAN HEALTH

Paraquat is highly toxic. One small sip can be fatal and there is no antidote.

Illegally transferring paraquat to beverage containers and later mistaking it for a drink has resulted in the accidental ingestion of the pesticide and causes approximately 1-2 deaths per year. New packaging requirements and other risk mitigation measures required by EPA in 2016 and implemented between 2017 and 2020, are expected to minimize the illegal transfer of paraquat to beverage containers. Incidents also suggest that paraquat is corrosive to the skin and eyes.

In the 2019 draft human health risk assessment, EPA found no dietary risks of concern associated with paraquat when it is used according to the label instructions. The draft risk assessment identified potential risks to workers who mix, load, and apply paraquat or enter treated fields after application. New worker exposure data generated by the Agricultural Handler Exposure Task Force became available after completion of the 2019 assessment and has been incorporated into an addendum. The Agency also identified potential risks from spray drift to bystanders at the edge of the field. To address risks associated with paraquat use, EPA required restricted entry intervals (REIs) for crops, additional personal protective equipment (PPE) as well as other mea-



tures, which can be found below in the Registration Review section.

EPA evaluated hundreds of studies, including published toxicity and epidemiology literature on paraquat exposure and adverse health outcomes, including Parkinson's Disease. There are many studies on paraquat and Parkinson's Disease that range in quality and provide conflicting results. Following EPA's 2019 literature review, an updated study of the Agricultural Health Study cohort was published in 2020 that reported no association between paraquat exposure and Parkinson's Disease. Notably, this updated study did not replicate earlier 2011 findings from AHS that were considered by EPA and suggested a potential association may exist. After a thorough review of the best available science, as required under FIFRA, EPA has not found a clear link between paraquat exposure from labeled uses and adverse health outcomes such as Parkinson's disease and cancer.

ECOLOGICAL HEALTH

The 2019 draft ecological risk assessment identified potential risk to mammals, birds, terrestrial invertebrates, terrestrial plants, and algae. To address these risks, EPA required spray drift management labeling to reduce off-target spray drift and protect non-target plants and wildlife.

As with all other herbicides, EPA is requiring registrants to update the label language for these pesticides to raise awareness of their potential effects to pollinator habitat and direct users to instructions on minimizing spray drift.

EPA ACTIONS

Actions to Prevent Accidental Ingestion and Reduce Exposure to Workers

In 2016, to minimize accidental paraquat ingestions and to reduce exposure to workers who mix, load and apply paraquat, EPA is requiring:

- Changes to the pesticide label and distribution of supplemental warning materials to

highlight the toxicity and risks associated with paraquat products;

- Restricting the use of paraquat to certified pesticide applicators only. Individuals working under the supervision of a certified applicator are prohibited from using paraquat;
- Specialized training for certified applicators who use paraquat to emphasize that the chemical should not be transferred to or stored in improper containers;
- New closed-system packaging designed to prevent transfer or removal of the pesticide except directly into proper application equipment. This will prevent spills, mixing or pouring the pesticide into other containers or other actions that could lead to paraquat exposure.

These mitigation measures are described in detail, along with implementation information in the Registration Review Docket.

REGISTRATION REVIEW

Paraquat was first registered in 1964 and completed reregistration in 1997. EPA initiated registration review for paraquat in 2011. In October 2019, EPA released the draft human health and ecological risk assessments for public comment.

In October 2020, EPA released the paraquat proposed interim decision and addendum to the paraquat draft human health risk assessment. After reviewing public comments on the proposed interim decision, EPA released the paraquat interim decision in July 2021. The interim decision for paraquat finalizes new, stronger protections to reduce exposure to paraquat. The enforceable mitigation measures include the following:

- Limit aerial applications to a maximum of 350 acres per applicator per 24-hr period for all uses except cotton desiccation;
- Require a residential area drift buffer for all aerial applications;

EPA continued on page 15

For Ag Retail, the Long and Shortage of It

As the world has largely moved on from the COVID-19 economic stoppages of 2020, many markets have been hit with severe product shortages due to supply chain disruptions.

CropLife News

Unfortunately, agriculture has not been immune to this phenomenon. Back during the beginning for the 2021 spring season, several ag retailers and their grower-customers were reporting some severe shortages of key early season products. This included such popular herbicides as glyphosate and glufosinate.

Indeed, back in April, many ag retailers started warning their grower-customers about the potential short supplies of their favorite early season products. “This year is going to be a challenge for chemical products supply,” wrote Harlan Asmus, President of Asmus Farm Supply, Rake, IA, in an April newsletter to customers. “Shortages are occurring in many brands.”

For the most part, it seems as if ag retailers were able to keep most of their grower-customers supplied with crop inputs during the spring planting season. However, the market disruptions that led to these shortages in the first place aren’t quite done just yet.

Take, for example, the state of shipping container costs. According to David Schumacher, President/CEO for HELM Agro US, Inc., his company has paid approximately \$3,000 per shipping container to get crop protection products from China to the U.S. “for forever.” But as demand for other products from China has increased as the global economy ramps back up, the cost of these shipping containers has steadily rose.

“First, it went up to \$7,000 per container,” says Schumacher. “Then, by July, we were paying \$16,500 per container. By the fall, we have been told it will cost \$20,000 per container.”

In addition to increased transportation costs, U.S. suppliers might also have to deal with the effects of the Olympic games. Although the 2020 Summer Games just ended in Japan back in August, the Winter Olympics are scheduled to take place in February 2022 in Beijing, China — less than five months away. If history is any indicator, says Schumacher, the games could hurt crop protection product production.

“The last time their country had the Olympics, China shut down a lot of factories to improve the air quality, including many chemical manufacturers,” he says. “We think this will happen again and could cause a severe supply disruption for U.S. agriculture as well.”

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Given these factors, many market watchers are already warning that crop protection prices will be on the rise for the fall 2021 and spring 2022 seasons. At a minimum, customers should expect to pay 10% to 15% more for their favorite products, with some products increasing by as much as 40% to 50% for the season.

So, for ag retailers and their grower-customers, the supply shortages/disruptions of 2020-21 will continue to linger for at least a little while longer. ■

OSfiligoj is the Editor for both CropLife and CropLife IRON magazines. He travels regularly to cover industry events and has been dedicated to the ag retail industry since he joined the staff in 2000.

MABA Fertilizer Advisory Committee Input and Feedback

Statement: MABA believes that fertilizer research specific to Montana's producers needs is critical to ensuring our ability to grow a variety of crops in a cost effective and environmentally responsible manner.

Goal: MABA is in the unique position of having members statewide who have a valuable understanding of fertilizer use and needs in their geographic area. MABA will be working with our membership to gather local and regional information and needs to share with researchers to help facilitate a more robust fertilizer research program in Montana.

REQUEST: Please take a moment to fill out the survey. Information gathered through the survey will be shared (anonymously) with MSU researchers to help inform their research plans.

PLEASE GO TO: www.mtagbiz.org and click on the Fertilizer Survey. Your input is very important and appreciated.

Question 1: What is the most essential question related to fertilizer that needs to be answered in your area?

Question 2: If you could have research conducted on any issue associated with fertilizer what would it be?

Question 3: Are you aware of any existing or previous research that needs to be more fully explored or expanded? If so, what was that research related to?

Question 4: Is there currently fertilizer research being conducted in your area? Are you aware of the results of this research? Do you have any suggestions on how to improve distribution of research results?

Question 5: Do you feel that fertilizer research is equitably distributed between dryland/irrigated, East/West, North/South, commodity? ■

President continued from page 3

means when the winter months didn't pan out for us to gather in person;

- Promoting the tools, products, services, and practices that we as an industry take pride in implementing responsibly and sustainably for the betterment of ag production and food supply.

I'll close by looking at that last bullet point a little deeper.

I've had the privilege of taking part in 4 Washington, D.C. Fly-In's during my time on the board. In fact, you'll read about the details of our last trip in Tim Tackes' column. A common theme to all these experiences were that our voice does matter. Helena is not that far away. Washington, D.C. is not even that far away. Reach out to your elected officials and remind them of who we are and why our voice is important. There are plenty of specific issues you can pick from to discuss that have been misrepresented to the public due to lack of input from Ag Professionals.

One thing during my tenure as Board President I wanted to make clear – whether we are speaking with our U.S. Senators and Representatives in D.C. or locally throughout the state with regular citizens not connected to ag – Ag Business's importance as trusted advisors, researchers, suppliers, and innovators needs to stand out. I specifically mentioned to Senator Daines, Senator Tester, and Congressman Rosendale that while farmers and ranchers are our backbone, we also need to have a seat at the table when discussing the future of agriculture.

If we don't tell our story and stand up for ourselves, who will?

Thank you for trusting me as your MABA Board President the past two years. Getting to know so many people across our state and beyond that share the same passion as I do has been outstanding. As always, reach out any time with thoughts, concerns, or suggestions. ■

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EPA continued from page 11

- Prohibit use of human flaggers;
- Prohibit pressurized handgun and backpack sprayer application methods;
- Limit the maximum application rate for alfalfa to one pound of paraquat cation per acre;
- Require enclosed cabs if area treated in 24-hour period is more than 80 acres;
- Require enclosed cabs or PF10 respirators if area treated in 24-hour period is 80 acres or less;
- Require a 7-day restricted entry interval (REI) for cotton desiccation;
- Require a 48-hour REI for all crops and uses except cotton desiccation; and
- Require mandatory spray drift management label language.

EPA uses interim decisions to finalize enforceable mitigation measures while conducting other longer-term assessments, such as an endangered species assessment.

- In addition, EPA is updating the Restricted Use Pesticide statement on paraquat labels to allow truck drivers who are not certified applicators to transport paraquat when certain conditions are met.

FOR ADDITIONAL INFORMATION GO TO:

EPA: <https://www.epa.gov/ingredients-used-pesticide-products/paraquat-dichloride#action>

Syngenta Paraquat Information Center: <https://www.syngenta.com/en/protecting-crops/products-list/paraquat> ■



**Know what's below.
Tap, Click, or Call
811 Before you dig.**

Optical Spot Spraying and AI Scouting



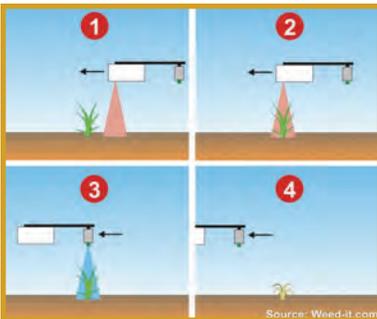
Typical prescription map for nutrients
(Source: Field Crop News)

Site-specific treatments have long been a goal in agriculture. It makes sense to provide inputs or treatments at rates that reflect the local situation. And to a large degree, those capabilities have been available for fertility and seed inputs for some time, with input zones reflecting soil types or topography.

But the sprayer world has not seen as much site-specific treatment. One reason is that pest maps are time-consuming to generate and their usefulness may be short-lived. Or

perhaps weeds are fairly ubiquitous, and it usually makes sense to treat an entire field. Another reason could be that sprays are relatively inexpensive compared to fertilizer or seed.

For spraying, we need to re-define site-specific.



Optical Spot Spray (OSS) principle (adapted from WEEDit)

While traditional zone maps (corresponding to, say soil type and/or elevation or slope position) allow unique treatments on a scale of acres, new sensors have allowed sprayers to basically leapfrog this approach and treat each square foot uniquely. These sensors identify plants directly and create an immediate treatment response.

The idea, and technology, has and been around agriculture since the early 1990s, with the Concord DetectSpray and later the Trimble WeedSeeker. For various reasons, these two never became widespread in North America, although a significant market formed in Australia and New Zealand. New cutting edge technologies are about to change this.

GREEN ON BROWN

Two main manufacturers have occupied the traditional Green on Brown Optical Spot Spraying (OSS) space, the Trimble WeedSeeker and WEEDit. Both have been available for over 10 years and are well established and proven reliable. WeedSeeker uses the Normalized Difference Vegetation Index (NDVI) principle to detect green on a non-green background. It employs one sensor per nozzle and the nozzle is either on-or off based on what the sensor detects. The WEEDit system

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is manufactured in the Netherlands by Rometron (<https://www.weed-it.com/>), and is widely adopted for use in Australia and South America. It is now making inroads into North America. The most recent version is named Quadro.

WEEDit spray booms contain sensors placed at 1 m intervals. These scan the ground ahead of the boom, identify the presence of plants, and trigger the nozzle in line with the plant. The newest Quadro sensor contains four channels so that its resolution is actually 25 cm (10 in.) wide. The boom therefore contains a nozzle every 25 cm, and this nozzle has a correspondingly narrow fan angle that treats just this space.



30 degree fan achieves approximately 8" to 10" band at target height. Boom stability is important

The detection principle is based on the quality of light that is reflected from living plant tissue compared to everything else. A red (older generation) or blue (newest generation, Quadro) light is emitted, and chlorophyll-containing plants reflect a unique wavelength that differentiates them from ground or dead plant material.

The response time of the system is very fast. Triggered by small solenoids, a sprayer travel speed of up to 15 mph is possible when the sensor looks 1 m ahead. Furthermore, the software allows the user two important controls: first, the sprayed distance before and after a detected plant can be buffered between 5 and 20 cm, resulting in a sprayed patch between 10 and 40 cm long. This could be useful when boom heights fluctuate and placement of the sprayed patch shifts accordingly. Second, the user can select from among four sensitivity settings. Higher sensitivity can detect smaller weeds but will also result in more false results.



Older generation WEEDit sensors were placed at 1 m intervals and had five channels, each covering a 20 cm band. There were 180 nozzles on a 36 m (120 ft.) boom.



WEEDit Quadro sensor

One reason the system has been successful in the southern hemisphere is the long growing season that may require multiple spray passes outside of the crop each year, and in which the weeds are relatively large at treatment time and therefore easier to detect.

Spot Spraying continued on page 18

Spot Spraying continued from page 17



Water sensitive paper can be used to show whether a target has been detected (and therefore sprayed).

In North America, the pre-seed spray window is relatively narrow and weeds may be very small or just be emerging. The risk of a miss due to

non-detection is therefore greater. Fortunately, the WEEDit system has a feature that addresses this risk.



PWM valve for WEEDit, capable of instantaneous response at 10 to 50 Hz

The solenoids that trigger an individual nozzle are pulse-width modulated (PWM).

This means that the application rate is adjusted according to travel speed via a duty cycle. And it offers an innovative capability:

The entire boom can be programmed to spray a

defined fraction of the full dose, to a maximum of 50%, as a background broadcast rate (called “Dual Mode” or “Bias”). The smallest weeds that escape detection are likely to be susceptible to this lower dose. Larger weeds are then detected and sprayed with an individual spot spray at the full dose. Dual Mode is typically set to about 25%; overall savings are less, but control is improved for those very early season situations.

A WEEDit Quadro boom can also be operated in “Cover Mode” for broadcast spraying where it functions as a full PWM system with turn compensation.

Currently, several hundred WEEDit sprayers are operating in Australia, and they’ve been available in Canada and the US since 2017. In 2019, Croplands, an Australian sprayer manufacturer owned by Nufarm, started representing WEEDit in Canada. It is available as a retrofit on existing booms, and can

be ordered with a WEEDit Millennium aluminum boom that contains mounting brackets and wiring harness channels. Savings compared to broadcast spraying range from 65 to 85%.

In early 2021, John Deere announced its entry into the Green on Brown space with See & Spray Select™. This system is built around the ExactApply nozzle body and uses RGB cameras to differentiate green plants from non-green background colors. It will be in fields in 2022 according to John Deere. Similar RGB-based systems are in development by other manufacturers. Although their performance has not been compared side by side with WEEDit or Weed-Seeker, initial specs suggest that the RGB systems are slower and are less able to detect small plants. Nonetheless, the future looks very promising.

In 2021, Hardi Australia announced a new product, called GeoSelect. This system does not have boom-mounted sensors, and instead sprays according to a prescription map developed by a drone. The advantage of this system is that the amount of herbicide needed is known in advance of spraying, and the knowledge of weed distribution in the field can allow for a more efficient coverage plan to be used. This system allows for spraying under any light condition, and adjusts for boom sway to ensure accurate placement. Drone map development is the responsibility of the applicator.

GREEN ON GREEN

Green on Green spraying, which detects weeds within a crop and differentiates them from that crop, is advancing and the earliest commercial releases are now available in Australia, offered by a partnership between Bilberry and Agrifac (WeedSmart podcast here), as well as Bilberry and Goldacres with Swarmfarm. Others, notably the SmartSprayer from Amazone in partnership with Xarvio and Bosch and Greeneye Technology are entering field testing with commercial sized units in 2021 and 2022, respectively.



Spot Spraying *continued from page 19*

resulting output then shows the plant density at each location.



Weeds in a soybean crop (courtesy of Taranis)

App-based, the agronomist or producer takes pictures of their crops and the app is able to recognize weeds, diseases, insect feeding damage, as well as nitrogen status. The app is aware of other users in the area and basically crowd-sources emerging agronomic issues as they arise, communicating them back to the user.



The Xarvio Scouting app can identify certain weeds, diseases, and insect feeding damage from pictures taken while scouting (Screenshot from Xarvio.com).

The agronomic value of this information is clearly very high. Imagine knowing the distribution of



Green-Eye Technology artificial intelligence can differentiate these ragweed plants from the pea crop. (Courtesy Green Eye Technology).

an accurate quantification of the treatment effect so

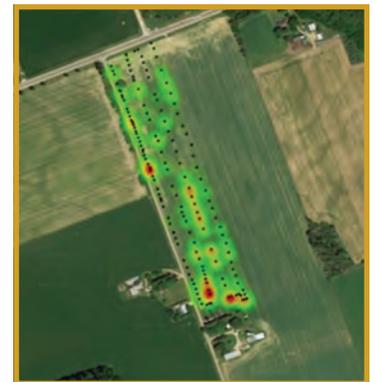
Xarvio Scouting is a product in their Field Manager line (<https://www.xarvio.com/en-CA/Scouting>).

App-based, the

agronomist or producer takes pictures of their crops and the app is able to recognize weeds, diseases, insect feeding damage, as well as nitrogen status. The app is aware of other users in the area and basically crowd-sources emerging agronomic issues as they arise, communicating them back to the user.

its value can be assessed. This level of measurement intensity was not possible before. Yield loss models for time of removal of certain weeds at certain growth stages can be applied across the entire field, and economic analyses allows follow-up treatments to be tailored to specific portions of the field.

Or imagine following specific patches of weeds over time, to monitor the effectiveness of a certain cultural practice, or be alerted to the establishment of a resistant population while it's still feasible to contain it.



Heat maps can be generated to document weed patches, and perhaps monitor their size over time. (Courtesy Green Eye Technology).

When this information is converted to a prescription map, rate and tank mix composition (or cultural controls) could be varied as necessary by zone, or weeds could, in the future, be sprayed individually. Perhaps future autonomous robots could be deployed more efficiently.



Identification of plant symptoms in canola (Courtesy of Taranis)

Development and improvement of these technologies is ongoing rapidly. Finally, we may have all the pieces that can bring site specific weed, disease, and insect management to market. ■

ABOUT TOM WOLF (NOZZLE_GUY)

Tom Wolf is based in Saskatoon, SK and has 32 years research experience in the spraying business. He obtained his BSA (1987) and M.Sc. (1991) in Plant Science at the University of Manitoba, and his Ph.D. (1996) in Agronomy from the Ohio State University. Tom focuses on practical advice that is research-based to improve the efficiency of producers.





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September 17, 2021

The Honorable Joseph R. Biden
President of the United States
1600 Pennsylvania Ave. NW
Washington, DC 20500

RE: Potential vaccine mandate and employer enforcement requirement

Dear President Biden,

I write to you on behalf of the businesses throughout rural America that serve and support America's farmers. Our member companies provide essential products and services to America's farmers and are critical infrastructure components of our nation's food supply chain. While we share your goal of putting COVID-19 behind us as soon as possible, we oppose the idea of compelling employers to enforce vaccine mandates. This opposition is not because we question the vaccines or the need to receive them – rather, our opposition comes from the likely impacts the sweeping mandate will have on an already-tight employment situation for agricultural employers. We submit that there are better ways to achieve the goal of higher vaccination rates.

Our member companies and the farmers they serve depend on innovation to continually improve production practices, and this innovation is rooted deeply in science. Depending on science validated by capable regulatory authorities in whom we have confidence is standard operating procedure for our industry. We depend on it for regulating the products and practices we use to produce the nation's food supply. With proper encouragement and incentives, this fundamental belief in science can contribute toward increasing vaccinations, and this is true throughout the agricultural industry. As evidence, a number of agricultural organization CEOs penned an open letter to our memberships which explicitly encouraged our members to get vaccinated¹.

Agricultural retailers serve farmers, and as such they are located in rural communities around the country. Right or wrong, residents in those rural communities are more likely to have lower vaccination rates. If our members are forced to apply a vaccine mandate to all of their people in these rural locations, not only will it be impossible to enforce but it will also give rise to employee turnover that will destroy the abilities of these companies to conduct business.

Some of our members are small family companies or cooperatives with fewer than 100 employees, and other members are much larger than the 100-employee threshold. These companies compete in the same trade areas. The 100-employee threshold would have one company's outlet subject to the vaccine mandate, and another company's outlet in the same

¹ https://www.agri-pulse.com/ext/resources/Newsletter-photos/2021/9-1-21/Rural_Vaccination_Letter.pdf

trade area – with similar numbers of people in its branch location - would be exempt. We've already heard from member companies who face a risk of losing their people because of the potential mandate. One member company reported they already have 10% of their positions open, and applying this mandate to them could cause them to lose another 20% of their workforce. This situation would be neither fair nor workable and is harmful to our food supply chain and rural economies.

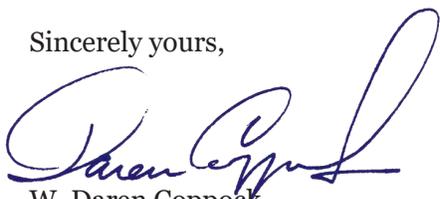
Agricultural retailers were determined by the Department of Homeland Security (DHS) to be critical infrastructure in the early days of the COVID pandemic because they provide essential products and services for the production of food. Care should be taken to not disrupt this supply chain by sending an avoidable shock through employee ranks when it is already difficult to hire and retain quality employees.

A much better approach would be to focus the efforts of the federal government on restoring the credibility and capacity of regulatory and scientific institutions, and encouraging creative voluntary employer approaches to vaccine incentives. Many companies have begun offering bonuses or access to paid sick leave for employees who are vaccinated, and at least one has instituted a health insurance surcharge for employees who decline to be vaccinated. These approaches can be custom crafted by the employer to fit their own situation and will be more successful than an inflexible federal one-size-fits-all mandate. They do not take away the free will of employees, but they do hold employees accountable for the consequences of the choices they make. This method will be much more successful.

Your Administration has an opportunity to either enable an employer-led, incentive-based approach that could lead to better vaccination rates and turning down the rhetorical heat on the issue of vaccinations; or to create a mandate that will further deepen the philosophical divides, will be impractical and harmful to implement, will exacerbate already challenging supply chain disruptions and is likely to fail in either raising vaccination rates or unifying our country. Our organization would welcome an opportunity to work with your Administration to craft a successful program. If the Administration is set on a federal mandate, applying the employee threshold per location rather than across the entire company would alleviate some of our members' concern.

We share the goal of putting COVID behind us for good. Let's work together on positive measures to make that happen without causing further damage to our economy, society or nation.

Sincerely yours,



W. Daren Coppock
President & CEO
Agricultural Retailers Association

Cc: The Honorable Martin J. Walsh, United States Secretary of Labor
The Honorable James Frederick, Acting Assistant Secretary of Labor for Occupational Safety and Health, USDOL-OSHA



The MSU Northwestern Agricultural Research Center (NWARC)

By Jessica A. Torrion

The Northwestern Agricultural Research Center (NWARC) was established by the 1947 legislature to conduct agricultural research to benefit producers in the northwestern part of the state and Montana. The NWARC has 225 acres of land area, with 188 acres tillable lands of which 140 acres are irrigated. An advisory committee comprised of farmers from Flathead, Sanders, Lake, and Lincoln counties provides input on the future direction of research and outreach activities.

Research at NWARC has always been responsive to the need of the local producers concerning market commodity prices and fluctuations. During the early years of this center's establishment, scientists conduct both livestock and crop types of research. Researchers have been focused on various crops such as cereals, oil, pulses, beans, and forages in recent years.

Varietal testing and development are among the many field experiments conducted at NWARC. This research center soil is productive. With relatively higher rainfall and our irrigation facilities, we can push the crop's genetic optimal yield potential. In most cases, when genetics perform well in this center, it also performs well in other drier parts of the state.

There are two complementary research programs at NWARC. One is the application of cropping systems agronomy into the control of biotic pressures (biotic stress). Dr. Clint Beiermann leads this program. The other program is on field crop physiology, tackling crop production's non-biotic pressure (abiotic stress). Dr. Jessica Torrion leads this program.



Listed below are ongoing or just recently completed projects:

1. Planting date experiments on winter canola, sorghum-sudangrass, and kernza;
2. Winter wheat nitrogen management;
3. P, K, and moisture regimes of various alfalfa varieties with fall dormancy 2 to 7;
4. Assessing yield and quality of warm-season forages with levels of nitrogen and moisture;
5. Herbicide options in controlling wild oats in spring wheat;
6. Yield and quality assessments of various warm- and cool-season grass forages;
7. Variety testing and development of various cereal grains and forages (barley, winter wheat, and spring wheat);
8. Hard reds and soft whites winter wheat water use productivity;
9. Hard reds and soft whites winter wheat nitrogen use at various plant densities;
10. Faba bean weed control;
11. Integrated weed and disease management in winter wheat.

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NWARC continued from page 23

Our major outreach activities include the annual summer field day and winter crop production update. For our annual reports, research updates, and contact information, please visit our website, <https://agresearch.montana.edu/nwarc/>. ■



Dr. Clint Beiermann showing winter canola planting date experiment to NWARC's farmer advisory members: Bridgette Lake-Cheff and Scott Buxbaum.



Irrigation and nutrient research of various alfalfa fall dormancy 2.0 through 7.0.



Water and nitrogen levels of various warm-season forages such as pearl millet, sudangrass, sorghum-sudan, and teff.



Research associates Daniel Porter and Jessica Pavelka analyzing spring and winter wheat seed qualities in the lab.

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Congressional Comments

U.S. SENATOR JON TESTER

I don't have to tell you that it was a tough year for Montana family farmers and ranchers – between drought and extreme weather, producers were hit hard.

That's why I've been fighting in the Senate to secure much needed USDA relief for producers across the Treasure State, and it's also why I'm fighting to make it easier for farmers and ranchers to do business in rural Montana.

Big Sky Country has been long overdue for an infrastructure upgrade, which is why I spent months negotiating a bipartisan infrastructure package with my Republican and Democratic colleagues that will create good-paying jobs, grow our economy, and help us maintain our economic advantage over China.

This legislation will make critical investments in our crumbling roads and bridges, making it easier and safer to get our goods to market.

U.S. SENATOR STEVE DAINES

Montana's family-owned ag retailers and multi-generation farm and ranch operations play an important role in not only our local economy, but our way of life. Montana ag producers and business owners shouldn't have to worry about unnecessary, burdensome and potentially devastating tax increases by the federal government, but sadly that's what the Biden administration plans to impose.

President Biden wants to eliminate what's called the step-up in basis and increase capital gains taxes, which would have a devastating effect on Montana's multi-generation operations. This could lead to job loss, liquidation, or outright closure.

Today, passing down a Montana family business to the next generation does not impose a capital gains

tax burden on the business or its new owners. Rather, the decedent's tax basis in the business is "stepped-up" to fair market value, preventing a large capital gains tax bill on the growth in the business's value. If the step up in basis were eliminated, the next generation of Montana farmers, ranchers and small business owners would be subject to devastating taxes.

It will deliver much needed resources to our water systems, including the Milk River Project, ensuring that producers have reliable access to clean water for generations to come.

And it will finally bring high speed internet to every corner of our state, allowing rural Montana to stay connected and do business from anywhere.

Montana's farmers and ranchers produce the best ag products in the world, and this infrastructure package will make it far easier for you to conduct business in and around the Treasure State. It's time for the House to pass this bill and get it to the President's desk for a signature so that we can make life a little bit easier for rural America.

In July, I led all 50 Senate Republicans in urging President Biden to abandon his effort to impose a tax increase on Montana family-owned ag business-

Congressional Comment continued on page 27



Jon Tester

*United States Senator
For the State of
Montana*



Steve Daines

*United States Senator
For the State of
Montana*

Points to Ponder

Uff Da! What a year 2021 has been, and it is not over yet. Just when you thought you had seen it all, 2021 said “Hold my beer and watch this!”. And just when you think things might straighten out and get back to some normalcy, 2022 is shaping up to be another dandy of a year. Complete with its own set of challenges. But what would the Ag industry be without challenges and uncertainty?



Tanner Hoversland

Treasurer

*Montana Agricultural
Business Association*

Over the last half-century rarely has there been a year without some form of challenge presented to our industry. We’ve seen exceptional and prolonged droughts, exorbitant inflation and interest rates, supply issues, and dramatic movement in the crop input prices. Not to mention the consolidation of manufacturers and farms, as well as the rise of alternative supply channels aimed directly to the end users.

The reason I mention these challenges is to highlight the extraordinary resiliency that the Agricultural Industry has. We have been able to pivot and parry these hurdles and turn them into opportunities rather than let them debilitate us. We have grown

stronger, leaner, and more focused on the providing our customers with the right services, products, and expertise that they demand. We have expanded our networks to collaborate with those in other industries or geographical areas that have face similar challenges and have come out the other side better than before.

Just like you the retailer, wholesaler, manufacturer, and general supplier we at MABA are ever adapting to the changing landscape that is agricultural, not only with the state but across the nation. We strive to be source that provides a connectiveness to all our members. We look forward to seeing everyone at the 2022 Convention in January and renewing that connective process. Maybe it will be the beginning of the return of “normalcy” and 2022 will be our best year yet. ■



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Congressional Comments continued from page 25

es. Making President Biden's proposed changes could force Montana farm or ranch operators to sell property or lay off employees just to cover these new tax obligations.

As your voice in the United States Senate, I will fight to protect Montana's family-owned ag operations and ensure future generations of Montanans aren't faced with devastating tax burdens imposed by the federal government.

U.S. REP. MATT ROSENDALE

As you know, Montana agriculture has battled a historic drought which has severely impacted much of the western United States.

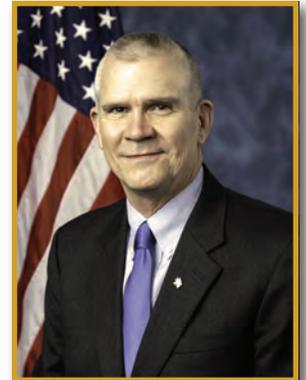
In July, I sent a letter urging Thomas Vilsack, Secretary of the U.S. Department of Agriculture to designate the entire state of Montana as a primary disaster area and provide supplemental drought relief and flexibilities to Montana farmers and ranchers.

The USDA honored part of the request, supplying many farmers and ranchers in most counties the opportunity to access extra resources and receive much needed assistance. This was a good starting point. However, Montanans needed them to do more by designating the whole state as a primary natural disaster area to provide farmers and ranchers additional resources and support.

At the time, only a portion of Montana's counties were eligible for relief. Many of the producers who suffered most were either located in counties not covered by the drought designations, experienced losses not covered by drought assistance programs, or both.

I signed a follow up letter to USDA Secretary Vilsack requesting additional drought relief and flexibilities for Montana agriculture producers located in counties that were not covered by drought designations or federal assistance programs.

As of now, all Montana counties are eligible for USDA disaster assistance programs to alleviate some of the financial impact experienced by agricultural producers suffering drought losses. ■



Matt Rosendale
US Representative
For the State of
Montana

Lessons Learned

A while back I overheard my wife and kids having a discussion as they entered the house from the garage. My wife was instructing the kids to slow down, don't race, don't push and my kids said, "yes because we could fall off and land on the concrete". This caught my attention and



Jack Yates

Vice President

*Montana Agricultural
Business Association*

I started asking why they felt a fall could happen. Simple answers from kids are sometimes so obvious as they informed me there was no railing on the garage stairs. We have lived in this house for 7 years and I feel terrible I did not make a simple railing a priority. For a kid or elderly person, a 4-foot fall to the concrete floor could cause a serious injury.

At dinner that night I thanked my kids and wife for bringing the stairs to my attention. I explained to them the importance of speaking up and being brave enough to do so. It's not easy to speak up or go against "the norm" but we need to start. It's important we make others aware of risky situations or bad ideas because it could save a life or prevent an injury.

We need to encourage our kids to speak up and recognize when something is not safe.

The next day I grabbed my son who was 11 at the time and we decided to fix this dangerous situation. We went to the hardware store and spent a fortune on the little bit of lumber needed to complete the job!! I realized not only were we fixing a current issue, but other lessons and memories would come from this activity. First, this provided a great situation for my son and I to spend quality time together. He learned some basic carpentry skills and how to use the proper tools safely. Second, I was able to educate on and provide him with the proper safety equipment. Now I know most of us never think twice about grabbing those safety glasses or ear plugs and I don't remember as a kid having the proper PPE all the time. But this needs to change and teaching our kids early about safety could save their lives or deter a life changing injury. We all want the best for our kids so why not lead by example and do the right thing.

At the end of the day, I was able to help my son build a sturdy safe railing for our family and friends. Now each time he walks by the railing I notice he reaches out and observes his work. He has pride in his work and confidence the railing will do its job. I hope I was able to instill some good habits in my son and he will carry them forward. As a family, we all learned lessons from this situation and as a family we grew stronger.

Stay safe and I look forward to seeing all of you soon! ■

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MABA Washington, DC Trip

SEPTEMBER 27-30, 2021

MABA recognizes the importance of our involvement on a state and national level. It is critical that we engage with our elected officials. These relationships foster better understanding and better support for our industry. Luke Dighans, MABA President, Krista Lee Evans, MABA Exec Director and I represented MABA on an annual trip to Washington DC from Sept 27 to Sept 30th, 2021. This was my first-time visiting DC and was the first time MABA sent delegates to Washington DC since prior to the COVID pandemic. The lingering effects of the pandemic were still very visible. Most of the buildings at the Capital were closed off to tours (which was very disappointing being my 1st time there). When we met with our state representatives, we had to be met by their staff outside the building and escorted inside to their offices. Face masks were required everywhere! It was very easy to see that our government is very polarized, divided along party lines, and not very functional right now. Far too many conversations I overheard seemed to be about blaming the other party, or their own parties' views and rarely was it focused on the American people. The 1.5 trillion transportation infrastructure bill and the reconciliation package needed to keep the government operating where the topics of most conversations. Most everyone we met with viewed the transportation infrastructure bill as a good thing for agriculture, addressing issues like water transportation, upgrading dams and locks, road and bridge improvement, and rural high-speed internet just to name a few. This bill was to be voted on the Thursday while we were in DC, but as is the case with most decisions there it was pushed out indefinitely.

The 1st full day in DC we teamed up with the Nebraska and Illinois Ag Business groups and their representatives to meet with CropLife America, The Fertilizer Institute, American Seed Trade Association, Biotechnology Innovation Organization, National Grain and Feed Association, and American Farm Bu-

reau Federation. We heard what issues these groups are fighting for on our behalf in DC and then we got to give them input on issues important to agribusiness in our states. While meeting with these national organizations, there was one message that was loud and clear – *We all need to work together to enact any kind of change!* Our local and state organizations need to work through the national organizations to have 1 unified voice that can be heard. We prepped them on the conversations we were to have with our own state representatives and got feedback from them on how to effectively have those conversations.



Tim Tackes

Board Member
Montana Agricultural
Business Association

The next day we were very fortunate to be able to meet face to face (for a surprising length of time) with Senator Daines, Senator Tester, and Congressman Rosendale. Most all our representatives understood the issues we presented to them and made us feel like they will fight for our industry on capitol hill.

We presented current topics we felt were important to the future of Ag Business in MT.

- Discussions centered around: Rapidly rising farm input cost and factors affecting it like dependence on foreign countries for inputs or at least components to make them, transportation cost, and government regulation;
- All the current talk on climate change in congress. Ag has a positive affect, but we need tools like pesticides to make things like reduced tillage and carbon banking work;
- The potential 2022 spring shortages of much

Washington, DC Trip continued on page 37



MONTANA DEPARTMENT OF **AGRICULTURE**

The Montana Department of Agriculture (MDA) Pesticide Program has been on the road this Fall facilitating in-person recertification trainings for pesticide applicators. Beginning in Glasgow in mid-September and wrapping up in Helena at the end of October, trainings were held in eight different locations across the state with upcoming webinars by the end of the year.

Trainings cover a variety of topics related to core standards of competency and specification classifications required for pesticide applicators and dealers. "We are proud of the work we've done to expand our virtual trainings and adapt to situations in light of COVID-19. Our team is glad to be able to work face-to-face with applicators across the state again this year," said Christy Clark, MDA Acting Director. "Our Pesticide Program staff have a wealth of information to share and really look forward to engaging with the Montanans they serve."

In 2020, most MDA sponsored in-person trainings were canceled due to COVID-19. MDA approves over 400 trainings for Continuing Education Credits annually. Several are sponsored by the Department, and many others are provided by industry groups and Montana State University (MSU). The Department continues to collaborate with the MSU Pesticide Education Program, providing private applicators with opportunities to earn credits through the 2021 Pest Management Tour.

MDA licensed over 7,500 applicators and dealers in 2021. Online trainings and webinars are an option for licensees to maintain their licenses, especially for

those who can't make it to in-person trainings or prefer a virtual format. A list of approved trainings is available on the MDA's course locator.

Additionally, computer-based testing is now available to pesticide applicators at facilities in Great Falls, Missoula, Bozeman, Butte, Helena, and Glendive. MDA authorized the Metro Institute Centers to host computer-based exams in April 2021. The exams allow for instant results and analysis and cost \$58 each. MDA staff will continue to proctor in-person testing and the partnership with Metro Institute has made it more convenient for many applicators to obtain their license.

"We are excited to provide Montana's applicators with a new opportunity to take their tests online," said Rory Ruffner, Pesticide Licensing, Registration & Training Program Manager at MDA. "The Department aims to provide services that are efficient and easy to use, and this new computer-based option does exactly that. The challenges of the last year have shown that our applicators are willing to utilize technology and see it as a solution that can help them succeed."

These are the categories expiring in 2021:

- Agricultural Vertebrate Pest (32)
- M-44 Sodium Cyanide (43)
- Regulatory Predator (51)
- Regulatory Rodent (54)
- Regulatory Weed (55)
- Right of Way Pest (37) ■



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PESTICIDE LICENSE TESTING LOCATIONS

Location	Counties Served	MDA Enforcement Field Staff/ Contact Information
Missoula	District 1: Deer Lodge, Granite, Mineral, Missoula, Powell, Ravalli, Silver Bow	Tonda Moon (406) 329-1346 TMoon@mt.gov
Bozeman	District 2: Beaverhead, Fergus, Gallatin, Judith Basin, Madison, Park, Sweet Grass, Wheatland	Theresa Schrum (406) 587-9067 TSchrum@mt.gov
Great Falls	District 3: Cascade, Choteau, Glacier, Hill, Liberty, Pondera, Teton, Toole	Michaela Hystad (406) 761-0655 MHystad@mt.gov
Glasgow	District 4: Blaine, Daniels, Dawson, Garfield, McCone, Petroleum, Phillips, Prairie, Richland, Roosevelt, Sheridan, Valley, Wibaux	Diana DeYoung (406) 228-9590 DDeYoung@mt.gov
Billings	District 5: Big Horn, Carbon, Carter, Custer, Fallon, Golden Valley, Musselshell, Powder River, Rosebud, Stillwater, Treasure, Yellowstone	Eric Clanton (406) 652-1917 Eric.Clanton@mt.gov
Helena	District 6: Broadwater, Jefferson, Lewis & Clark, Meagher	Matt Deaton (406) 444-5953 Matthew.Deaton@mt.gov
Kalispell	District 7: Flathead, Lake, Lincoln, Sanders	Kima Traynham (406) 257-9015 KTraynham@mt.gov
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Gene Editing Can Help Our Crops Keep Up With A Rapidly Changing World

By Innovature Staff

What do Boomers, Millennials, and Gen Zers all have in common with humans that lived thousands of years ago? Like so many things, it boils down to food and the environment.

Since the dawn of civilization, fluctuating circumstances have left us with a shared strive to make crops more hardy, reliable, and productive. Migrating to new areas, withstanding adverse environments, and feeding a growing population have always required that food sources adapt.

Today, though, we face a world that's changing at a pace never equaled before. Anthropogenic climate change is increasing both the prevalence and intensity of extreme weather patterns—droughts, heatwaves, floods—in every corner of the globe. Outbreaks of plant diseases are on the rise. And the world population is expected to hit ten billion by mid-century.

Fortunately, science continues to evolve too. And breakthroughs like gene editing can meet these challenges head on by swiftly and sustainably achieving food advancements that previously took years—even decades.

Utilizing CRISPR, and associated gene-editing tools, scientists can improve crops with the utmost precision at the molecular level. The mechanism works by removing or replacing specific genetic sequences in an organism's DNA. Rather than insert foreign genetic material, it simply accelerates the spontaneous beneficial mutations that would occur naturally over time.

Gene editing is entirely upending what's conceivable in the field of agricultural improvement.

The techniques are more cost-effective, fast, and versatile than conventional plant breeding methods. The health possibilities are endless: reduced-gluten wheat, low-fat soybeans, and more nutritious rice. As are the potential environmental benefits—crops can

be genetically altered to require less water, tolerate drought, and be more productive per square foot.

For instance, researchers at Indonesia's Bogor Agricultural University just developed semi-dwarf rice plants, which can generate higher yields than traditional varieties. A team from the Chinese Academy of Agricultural Sciences recently used CRISPR to produce a wheat strain with greater nitrogen use efficiency and production stability. And at Australia's Queensland University of Technology, researchers created a variety of banana resistant to TR4—a fungal disease that threatens one of the most widely consumed fruits.

Meanwhile, at Kenyatta University's Plant Transformation Laboratory, a scientist is currently working on CRISPR-edited maize lines that have broadened tolerance to drought and oxidative stress. And the North Carolina-based company Pairwise is pursuing seedless berry crops with year-long growing seasons.

Of course, materializing these innovations is still just half the battle—ensuring they're equitably deployed is of equal challenge and importance.

As noted in a recent *International Business Times* op-ed, a tool—even one as revolutionary as gene editing—can only truly address the world's most pressing problems if it's made accessible to *every* farmers in *every* region. And global gatherings, like the upcoming United Nations Food Systems Summit in New York, provide invaluable opportunities for stakeholders to create a framework that facilitates just that.

After all, despite all prior agronomic advances, a secure and sustainable global food supply has proved elusive. Gene editing could finally spur the food revolution we've been waiting for—so long as we don't erect barriers to its benefits. ■



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EPA Provides an Update on Pesticide Applicator Certification Plan Approvals

The EPA is providing an update on efforts to finalize review of submitted state, territory, tribal and federal agency certification programs for applicators of restricted use pesticides (RUPs).



Requiring specific training to be applied, RUPs are not available for purchase or use by the general public. The 2017 Certification of Pesticide Applicators final rule had set stronger standards for people who apply RUPs and required that states, territories, tribes and federal agencies with existing certification plans submit proposed modifications by March 4, 2020 to comply with the updated federal standards.

As specified in the rule, existing certification plans remain in effect until EPA completes its reviews and approves the proposed plan modifications, or until those plans otherwise expire on March 4, 2022, whichever is earlier. In cooperation with certification program administrators, EPA has completed 28 reviews of the 63 submitted plans from states, territories, and tribes.

EPA acknowledges the challenges certification program administrators face to bring the existing plans into compliance within the timeframes specified in the 2017 rule. Due to the impact of the COVID-19 public health emergency and the need for careful review of program-specific issues and questions, EPA is in the process of developing a rule that would extend the date by which plans must be approved and ensure existing plans can remain in place during this time-limited extension.

Prior to October 1, 2021, EPA had been unable to take any action to revise the certification rule due to a prohibition of such in the Pesticide Registration Improvement Act of 2018 (PRIA 4). Further, litigation over attempted delays to the effective date of the January 4, 2017 final rule led some certifying authorities to postpone work on revising their certification plans.

The anticipated extension would allow RUP applicators to continue to obtain the training and certifications they need to use RUPs under the existing certification plans, preventing the economic and public health consequences of widespread disruption of RUP use.

EPA will keep close contact with states, territories, tribes and other federal agencies who have a role in implementing the certification programs to provide support and guidance in meeting the regulatory deadline. EPA will also communicate any changes as soon as more information is available. ■

Sulfur is Just as Important as Nitrogen for Yield and Protein

By Clain Jones, Montana State University Extension Soil Fertility Specialist

Sulfur (S) is an often-forgotten plant nutrient. It used to be an impurity in other fertilizers and in some areas in the air from industrial sulfur dioxide emissions. Sulfur-free fertilizers, cleaner air and higher S removal as yields increase are leading to sulfur deficiency on some croplands.

Sulfur is one of the 17 nutrients required by all plants. It, like nitrogen, is necessary for making protein. If your wheat protein is consistently lower than you'd expect given your nitrogen rates and yields, consider looking at sulfur.

Sulfur deficient plants have uniformly light green or yellow upper leaves. The deficiency shows up on upper, meaning younger, leaves first because it is immobile in the plant. Unlike a mobile nutrient such as nitrogen, the plant can't move sulfur from the lower leaves to the upper leaves. When the plant runs low on sulfur, it's the actively growing upper leaves that suffer.

Unlike nitrogen, phosphorus, and potassium soil test levels, soil sulfur levels have not been found to be very predictive of crop sulfur fertilizer needs for several reasons. First, a large amount of sulfate, the plant available form of sulfur, can come from decomposition of residue and organic matter, possibly more than the sulfate available at soil sampling time. Thus, in a wet, warm year perfect for decomposition, substantial sulfur can be released during the growing season, minimizing the likelihood of a sulfur fertilizer response. Conversely, in a drought, sulfur release from decomposition will be low and roots can struggle to make it to deeper soil where sulfate levels are often higher than near the surface. Also, in drought, all nutrients move more slowly in the soil. Montana State University scientists have found sulfur to be more important for yield and protein during moderate drought.

Since soil testing for sulfur is not very predictive of sulfur needs, what should producers and their advisers do? I suggest three options: scout for sulfur deficiency, tissue test, or try a sulfur strip trial. When scouting, note that some crops, notably pea and corn, often have naturally lighter upper leaves than lower leaves, so you're looking for leaves that are lighter green than normal. Also, herbicide damage can cause lighter colored leaves. Finally, plants with severe sulfur deficiency will be light colored from top to bottom, and may be confused with severe nitrogen deficiency. You need to catch the deficiency at early stages. See Nutrient management module 9, or our Nutrient Deficiency and Toxicity website (both listed at end) for pictures of sulfur deficient crops.

To verify sulfur deficiency, collect tissue samples and submit them to a lab that will provide fast turnaround times for sulfur. Plant parts to sample are crop and growth stage specific; for example, the whole plant should be collected from wheat when tillering, but just the flag leaf is sampled at boot to heading. Collect the 5th leaf (5th from the top) from canola at bud, the 1st leaf (youngest mature leaf) from pea at any growth stage, and the top 6 inches from alfalfa. To make sure you characterize a field well and provide enough material for the lab to analyze after drying, collect approximately 50 leaves. Tissue sulfur sufficiency levels for wheat and pea are approximately 0.20% at any growth stage, 0.17% for canola at bud stage, and 0.31% for alfalfa at any stage. Actual sufficiency levels for a particular field or crop variety might differ from these general levels. It is best to also collect tissue from plants that do not appear deficient, and then compare deficient vs sufficient tissue concentrations. If sulfur deficiency was suspected, but sulfur tissue levels are essentially the same between bad- and good-looking plants, then sulfur deficiency can likely be ruled out.



If your crop is deficient, you can consider applying liquid sulfur at 3-5 lb S/acre as a 'rescue' treatment. If it is too late in the growing season (for example at grain fill), then consider increasing sulfur fertilizer applications the following year, at least in areas or fields that are sulfur-deficient. A simple rule of thumb is to apply half the crop's sulfur uptake in the fertilizer blend and assume the crop will get the remaining sulfur from the soil. Sulfur removal rates for Montana's common crops are supplied in Table 21 of *Fertilizer Guidelines for Montana Crops* (listed at end). For example, wheat takes up 0.08 lb S/bu and another 4 lb S/ton of stubble. A 50 bu/ac winter wheat crop will contain 4 lb S/acre in the grain and another 10 lb S/acre in stubble (assumes about 1.67 ton stubble/ton grain) for a total uptake of 14 lb S/acre. Therefore, adding 7 lb S/acre with the seed as ammonium sulfate (21-0 -0-24) or gypsum would be a good starting point if you suspect sulfur deficiency.

The best way to see if sulfur will improve crop growth and increase yields is to conduct a strip trial. Fertilize one to three strips with 5 to 10 lb S/acre and flag or record their location. Then look at plant health, and/or measure yield differences in those strips compared to an unfertilized strip or strips. Because sulfur responses can be weather dependent, you likely need to conduct trials over different years. Canola and other brassicas use more sulfur than other crops. Applying 10 to 20 lb S/acre with these crops is a good rule of thumb.

Ammonium sulfate or gypsum should be relatively similar in their effectiveness, and both supply sulfur the year they are applied. If you have acidic soil, gypsum is preferable because it won't further acidify the soil and its calcium can somewhat help buffer soil pH changes around the fertilizer. Elemental sulfur must first break down before it supplies sulfate. This can take two to four years and can acidify the soil. In soils that are consistently deficient in sulfur, such as in shallow or coarse soils where sulfate leaches easily, a blend of sulfate and elemental sulfur could be the best choice to provide both immediate and long-

term sulfate. Both gypsum and elemental sulfur are available as organic certified products.

While the urge might be to apply more nitrogen when wheat protein is low, a little sulfur might improve protein, while a lot of nitrogen might not. In addition, if your crop's growth is limited by sulfur, adding some sulfur will help your crop use the nitrogen you apply more efficiently, thereby decreasing nitrate leaching, soil acidification, and possibly allowing you to back off on nitrogen rates.

Contact Clain Jones at clainj@montana.edu, 406-994-6076, with questions about this or other soil fertility topics. This article is available online at <https://landresources.montana.edu/soilfertility/time-lytopics/index.html>. ■

For More Information:

Fertilizer Guidelines for Montana Crops, MSU Extension EB0161.

Plant Nutrient Functions and Deficiency and Toxicity Symptoms. Nutrient Management Module No. 9. MSU Extension 4449-9. Also at <https://landresources.montana.edu/soilfertility/nutrientdeficiencies.html>

Secondary Macronutrients: Cycling, Testing and Fertilizer Recommendations Nutrient Management Module No. 6. MSU Extension 4449-6

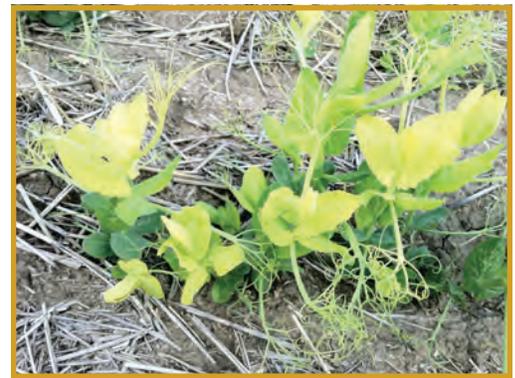
All available at <https://store.msueextension.org/default.aspx>
MSU Fertilizer Facts <https://landresources.montana.edu/fertilizerfacts/index.html>

FF30. *Response of Durum and Spring Wheat to Applied Nitrogen and Sulfur*

FF41. *Winter Wheat Response to Nitrogen and Sulfur Fertilization*

FF48. *Cultural Practices for Producing Dryland Malt Barley: Sulfur Fertilizer Rate*

FF49. *Response of Camelina to Nitrogen, Phosphorus, and Sulfur*



Sulfur deficient field pea. Image by Clain Jones

MABA – The Voice for MT Agricultural Businesses

STATE ACTIVITIES

Numeric Nutrient Criteria

The State of Montana previously adopted numeric nutrient criteria. As a part of this process there were waivers available for point source dischargers due to economic or technology challenges that made it impossible to reach the numeric nutrient criteria for water quality. This process was approved by EPA. Ultimately, the State was sued on the feasibility of having waivers to the numeric criteria. The MT Legislature passed legislation in 2021 requiring the MT Department of Environmental Quality to repeal the numeric criteria and instead develop narrative nutrient criteria. The Nutrient Work Group has been meeting twice per month to develop these narrative criteria.



Krista Lee Evans

*Executive Director
Montana Agricultural
Business Association*

The draft proposal is available on the DEQ website. MABA has participated through public meetings and is tracking the development of the narrative criteria and will alert membership to any Nonpoint Source consequences or opportunities.

Soil Health

A study resolution was introduced in the 2021 MT Legislature to analyze soil health in Montana. This piece of legislation ultimately failed. As the conversations nationwide related to sustainable agriculture, soil health, regenerative ag, etc., continue to ramp up the issue is active in Montana as well. While MABA has not been invited to participate there is activity to develop some type of soil health analysis in Montana. MABA staff will continue to monitor and become involved as requested or necessary.

Sage Grouse ESA Listing

There is again the risk of the Sage Grouse being listed under the Endangered Species Act. MABA is working with other agricultural groups in Montana to reject this idea as state based management has proven to be very effective.

Montana Drought Management Plan

Montana's Department of Natural Resources and Conservation, along with the Drought Task Force

and the Governor's office, is leading the effort to update the state's Drought Management Plan. The new Drought Management Plan will build upon – and enhance - Montana's drought resilience using a collaborative, stakeholder-driven process. The goal is that the plan will expand and improve statewide drought monitoring, preparedness, drought response, and adaptation. If you are interested in being more involved in this process please go to this link: <https://www.surveymonkey.com/r/DPBLDGV>

Calumet Renewable Diesel Ribbon Cutting and Plant tour

MABA was invited and attended the ribbon cutting and Plant Tour for Calumet Renewable Diesel. The event featured Governor Gianforte turning the valve to unload the first railcar of seed oil feedstock which will be used to produce renewable diesel fuel. Montana Renewables is actively moving forward with its energy transition project. The renewable project will require 10-12,000 barrels of renewable feedstock per day.

FEDERAL ACTIVITIES

Coalition Letter to EPA Requesting Neonic Comment Extension

On Oct. 13, MABA signed a coalition letter sent to the EPA Office of Pesticide Programs requesting comment period extension for neonicotinoid draft biological evaluations (BEs) to ensure stakeholders provide the best feedback possible. The extension was swiftly denied; however, MABA will keep its membership updated.

Chlorpyrifos Risk Tolerance Revocation

On Oct. 14, MABA signed on to formal written objections and requested a stay to the Chlorpyrifos Tolerance Revocations. The formal objection, led by the American Soybean Association, was signed by over 80 organizations including grower groups and state agribusiness associations. The formal objection was filed with EPA on October 19. MABA will keep its membership updated on the status.

EPA, Army Announce Regional Roundtables on WOTUS

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of the Army issued a call to stakeholders to propose Waters of the United States (WOTUS) regional roundtables that:



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CHS (continued)

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- highlight how different regions are affected by various WOTUS definitions;
- share stakeholder experiences, challenges and opportunities under different regulatory regimes; and
- facilitate engagement across diverse perspectives to inform the development of a durable and workable definition of WOTUS.

Stakeholders can submit their self-nomination letter with a slate of participants representing ag, conservation groups, developers, environmental organizations, and other key interests in their region by Nov. 3.

MABA is actively engaged in development of a regional roundtable proposal that will represent Montana's unique interests in this issue. MABA will keep you updated on how this process unfolds.

EPA Appoints Rod Snyder as EPA Ag Advisor

EPA announced the appointment of Rod Snyder on Oct. 7 to become EPA's Agriculture Advisor to lead outreach and engagement efforts with the ag community. Snyder joins EPA after serving as president of Field to Market: The Alliance for Sustainable Agriculture where he forged science-based consensus among stakeholders across the food and ag value chain on issues such as climate change, water quality, biodiversity, and pest management. Mr. Snyder's employment history includes time spent at National Corn Growers Association and CropLife America.

Increase in Corporate Tax and the Global Intangible Low Tax Income Rates

MABA co-signed a letter with the Montana Grain Elevator Association that was sent to Senator Tester discussing our concerns with efforts by some in Congress to raise both the corporate tax and the Global Intangible Low Tax Income rate. MABA will continue to track this issue and update membership as details become available. ■

Washington, DC Trip continued from page 29

needed inputs like glyphosate and some fertilizers;

- Defending FIFRA and the need for science-based regulations/registrations for our pesticides – not decisions based on emotion and ignorance, which is what seems to be currently happening.
- The Mexican decree banning the use of glyphosate by 2024 and all the potential implications this will have on crops and products shipped into and out of MT, not to mention the precedent it can set for actions like this in the US.

It was an incredible and enjoyable week for this rural MT country boy! It showed me that no matter how small or insignificant I may feel, groups like MABA are in fact heard and do make a difference for our members. You just need to get involved and be heard! ■

Team Never Quit Speaker: John Tiegen!

SECURITY AND MILITARY CONSULTANT, HERO OF BENGHAZI ATTACKS, CO-AUTHOR OF 13 HOURS

Featured Speaker at the Thursday Night Auction



John "Tig" Tiegen, former Marine Sergeant from 3rd Battalion 7th Marines India Company, Infantry Squad Leader from Colorado. He spent several years as a security contractor for Blackwater working for the company on missions in Afghanistan, Pakistan, and Iraq before going to work for the CIA's Global Response Staff, with over 40 deployments conducting high profile security in high threat environment throughout the world.

Quiet and precise, the married father of twins was the most experienced Annex Security Team member in the city. It was during his third trip to Benghazi, Libya for the CIA's GRS when the attack of September 11, 2012 occurred, and he was part of the CIA's Annex Security team that responded to the terrorist attack on the US Special Mission. "Tig" directly saved the lives of many on his team, he was also paramount in the saving of over 2 dozen lives while fighting off terrorists from the US Special Mission and the CIA Annex for over 13 Hours. Tig received the Award for Heroism and Valor in recognition of his bravery.

He is the co-author of "13 Hours: The Inside Account of What Really Happened in Benghazi" along with members of the Annex Security Team and NYT's best-selling author, Mitchell Zuckoff.

He also consulted on the movie *13 Hours-The Secret Soldiers of Benghazi* and helped with the set design and the movie script.

Topics: Leadership, Teamwork, Preparation and Fortitude, How to Overcome hard situations, and the Never Quit Mentality

TEAM NEVER QUIT SPEAKERS REPRESENTS A SELECT GROUP OF ELITE WARRIORS, ATHLETES, AND LEADERS HAND PICKED AND TRUSTED BY the Lone Survivor, Marcus Luttrell.



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A CONTINUOUS PATH OF LEARNING WITH THE AGRICULTURAL RETAILERS ASSOCIATION (ARA)

Professional development opportunities increase employee engagement and lead to higher employee retention at your organization. Through ARA, ag retail industry professionals have the Professional Development Pathway at their fingertips to offer employees educational workshops and networking opportunities to increase their competitive edge.

The Professional Development Pathway guides members to the ARA programs that will be the most beneficial to them at various steps of their career. The order of programs is a suggestion by ARA and some programs are valuable to all levels of employees.

- **NAVIGATOR 360°:** an online assessment evaluating a leader's effectiveness in two ways, the level of skill the leader has and the ability to use those skills when needed.
- **Rising Stars:** Recognize, reward and develop your organization's top performers and future leaders.
- **ENGAGE for Ag Leaders:** Empower our industry to effectively communicate with the consuming population.
- **ARA Management Academy:** Develop your management skill set while sharing ideas.
- **ARA Crisis Preparedness Workshop:** Create a safety-conscious culture and have an actionable plan in place.
- **ARA Strategic Decision-Making:** Gain the knowledge and tools needed to make strategic choices and increase the odds of workplace success.
- **Leadership At Its Best:** Sharpen written and oral communication skills in leadership training that prepares today's leaders for tomorrow's future challenges.
- **Sustainability Programming for Agricultural Retailers and CCAs (SPARC):** Deliver improved sustainability outcomes to farmer customers with online learning & field resources.
- **ARA Webinars:** Explore industry-specific topics with the opportunity to pose questions to a subject matter expert and receive answers in real-time.

You can find more information about all these opportunities at www.aradc.org/pathway.

UPCOMING DATES:

ARA Webinar: Doing Ag Business in the E-Commerce Age

Oct. 28 | Virtual

2021 ARA Conference & Expo

Nov. 30-Dec. 2 | San Antonio, Texas

2021 ARA & Syngenta Leadership At Its Best

Jan. 24-28 | Raleigh, N.C., and Washington, D.C.

2022 ARA Management Academy

Jan. 25-27 | Tempe, Ariz.



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