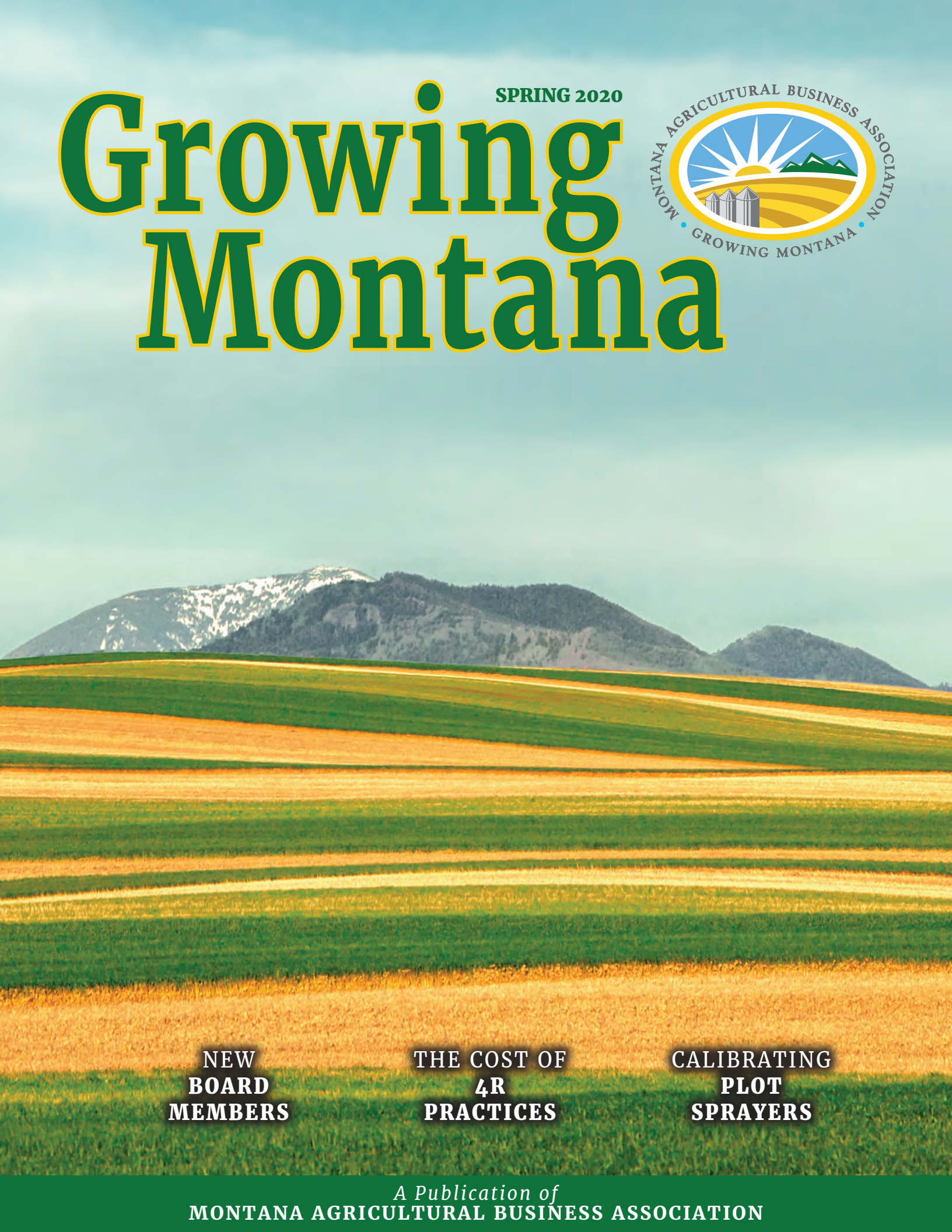
SPRING 2020

Growing Montana



NEW **BOARD MEMBERS**

THE COST OF **4R PRACTICES**

CALIBRATING **PLOT SPRAYERS**

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.**

A Message from the President

Gratitude. That's the word I keep coming back to over and over again as I think about a Spring 2020 message to you, the MABA membership. We're all experiencing something we never thought we'd go through as the COVID-19 epidemic sweeps the globe. Contingency plans for operations. Supply chain issues. Government orders and regulations. The list goes on and on. There's plenty to think about and plan for out there; you all know the snowball effect on your daily lives and businesses as governments and private industry navigate what the best course of action is. So instead of looking at all the adversity we face, I'd like to focus on something that has really built up in me over the past weeks (and I'm sure it has in you as well) – gratitude.

Luke Dighans
President
Montana Agricultural Business Association

I'm grateful to work in this industry. As we are deemed an essential part of the infrastructure, we strive to keep going forward every day and serve our customers so that we can maintain a secure, safe food supply. I feel the vast majority of people in Ag Business have the farmers' well-being at heart when they get up and go to work every day.

One of the things that drives me while on the board is standing up for what our industry contributes to production Agriculture and the economy. There are those out there who want to attack us – whether it's consumers who don't understand the science of some of the tools we use, or those who try to spread fear and misinformation to our farmers and ranchers about some "ulterior motive" our businesses may be after. Don't let them! We should be proud to do provide the products, services, advice, and infrastructure necessary to keep America's farmers going in an efficient, environmentally responsible, profitable way!

Looking back to January, I'm grateful for a convention that, in my opinion, was one of the best ever! Grateful for the comradery, relationships, and unique Montana spirit we all shared as we learned a few things, got some business done, and raised money for tomorrow's Ag leaders. Grateful for the service of American heroes like Captain Chad Flemming. Grateful for the generous sponsorships and donations you and your companies contributed to make the whole thing come together. Grateful to work with an engaged and professional board who has entrusted me in this leadership position as President while we face challenges to our industry on a state and national level.

I'm grateful for the hard work and dedication of Krista Lee Evans, our

President *continued on page 15*

MABA 2020 Board Members

Luke Dighans, President
Pro Co-op Ag Center

Luke grew up on near Peerless on his family's farming operation and graduated high school in Scobey. He completed two years at MSU-Bozeman before transferring to the University of Minnesota to finish a B.S. in Agronomy in 2008. Luke was employed with CHS-Eastern Montana Operations as an agronomist, location manager, and sales manager for 6 years before returning to his home area in 2014 to join Grain Growers based in Scobey. He is currently the Agronomy Division Manager and a CCA for PRO Co-op (formerly Grain Growers) serving much of Northeast Montana. Luke enjoys sports, travel, history, and spending time with his wife Paula, kids Natalie and Mallory, and dog Madoc.

Jake Yates, Vice President
Nutrien

Jake is a regional Sales Manager at Nutrien, where he is responsible for wholesale fertilizer sales in MT, S. ID, UT and WY.

Before starting with Nutrien he spent time as a sales rep for Agrium, an agronomy location manager for CHS and Town & Country Supply and as a CES (Certified Energy Specialist) at Town & Country Supply.

Jake is from Chinook, MT (GO Sugar Beeters!) and a graduate of Montana State University (Go CATS!!).

Johnnie Scott, Secretary
Syngenta Crop Protection

Johnnie Scott works in northern MT as a sales rep for Syngenta Crop Protection. He holds a bachelor's degree in Agribusiness from Texas A&M-Commerce. Although a native Texan, Johnnie is very passionate about Montana Agriculture. He has been fortunate to work in the industry across several states including: Texas, Arkansas, Mississippi, and Montana. He is always up for new challenges, and works diligently to promote and advance agriculture.

Tanner Hoversland, Treasurer
Moore Farmers Oil

Tanner was born and raised on a farming family in Scobey, Mt and graduated Scobey High School in 1996. Attended Carroll College and graduated with a B.A. in History, then continuing his education at Montana State University-Bozeman receiving a B.S. in Agricultural Economics. Tanner worked for the J.R. Simplot Company for five years in Caldwell, ID and Grand Forks, ND. Yearning to be closer to family, Tanner accepted an Agronomist/Sales position with Moore Farmers Oil in 2008 and is currently the Agronomy Manager. Tanner lives in Lewistown with his wife Kelsi and their son Keegan and daughter Kit.

Dan Brattain
Helena Agri-Enterprises LLC

Dan grew up in Great Falls Montana helping on his family's ranch and graduated from CMR High School in 2007. He attended Montana State University-Bozeman from 2007-2012 and graduated with a B.S. in Agriculture Business and a minor in economics. After college Dan worked for CHS in Kalispell as an agronomy sales representative from 2012 to the end of 2014. At the beginning of 2015 he started at Kernaghan's Service, Inc. in Great Falls as their agronomy sales representative. At the beginning of 2019 Kernaghan's Service was acquired by Helena Agri-Enterprises LLC. Dan is currently still the agronomy sales representative for Helena Agri-Enterprises Great Falls retail and is helping on his family ranch with both his parents, wife, and daughter Teagan.

Burl Brawley
Helena Agri Enterprises LLC

Burl was born and raised in Great Falls MT. He has spent most of his career in the Ag Industry in Montana. Burl has worked in Ag Chemical retail and the majority of his career has been spent in the Wholesale Ag Chemical Business. Burl has spent time as a Truck Driver, Logistics Manager, Outside sales and most recently he is the Location Sales Coordinator for Helena Agri Enterprises LLC at their new facility in Great Falls MT.

Arleen Rice
Hi-Line Chemical/Taylor Aviation

Manager of Hi-line Chemical/Taylor Aviation in Havre Montana. Arleen is an alumni of the University of Montana and Montana State University Northern with a Bachelors degree in Business with a minor in Ag. Arleen has served as president of MABA previously in 2003, been active on the Biotech and Legislative committee's. She owns a farm in North Havre, her husband Ed manages Frontline Ag Solutions in Havre. Her daughter is pursuing her Doctorate at MSU Bozeman and is also teaching there, and her

son is a Border Patrolman, and also a Drill Sargent in the Army National Guard. Love of agriculture and protecting its success is paramount in all aspects of her life.

Ryan Helmer
Wilbur Ellis

Ryan grew up in Minnesota before studying AgBusiness at Montana State. He then farmed and ranched fulltime for 6 years south of Wolf Point. Ryan started working for Wilbur-Ellis Company in 2012 after a short stint at Agland Coop in Wolf Point. Ryan specializes in Precision Agronomy and Field Technology. Ryan lives north of Sun River with my wife Megan and daughters Grace, Paige and Claire. His family raises black angus cattle with partners in the Geraldine area. Ryan and his family love to hunt, fish, spend time outdoors and enjoy Montana agriculture.

Don Soper
CHS Big Sky

Don was born and raised in Larslan MT, a little community south east of Opheim MT where My family farmed and ranched. Don graduated from Opheim High School in 1989. Don then decided to see the country and started a stint on the custom harvesting circuit with my uncle's combining business. After 3 years Don moved back to Montana to start his agronomy career. He went to work for Valco Agri-Services in Glasgow Mt., in 1993.

Don moved to Havre the summer of 1995 and started working for an independent agronomy company. After spending 14 years there, Don moved on in his endeavors, and started a new job in agronomy sales for CHS in 2009, where he is currently residing.

My wife has been a schoolteacher in Box Elder since 1998. Hobbies include, camping, and spending as much time as possible at our family cabin in Eureka MT.

NEW BOARD MEMBERS

Casey Odom
Nutrien Ag Solutions, Inc.

Casey Odom is employed by Nutrien Ag Solutions in Billings Montana. Casey has worked for several legacy Nutrien companies for the last 13 years including United Agri Products, Crop Production Services and Nutrien Ag Solutions. Casey has earned a distinguished career in multiple roles starting with his career in Glasgow, Montana as a facility Manager. Company changes gave Casey an opportunity to take a sales role in Billings covering southern Montana and northern Wyoming.

Casey's success is a direct result of working hard, answering the call, building relationships and having common interests with he engages, that being Montana agriculture. Casey takes pride in helping producers meet there goals and growing successful operations.

Tim Takes
KALO Inc.

I am married and have 2 children. I reside in Stevensville MT.

I began my career with a 1-year stint at USDA Soil Conservation Service in Havre MT, followed by a year in Billings working as an applicator/chemical salesman for Harvest States. In 1995 I moved to Stevensville to be a field man for CHS in the Bitterroot valley. From 2002 to 2011 I served as the Agronomy Manager for the CHS Mountain West business unit. From 2011 to 2018 I worked for the CHS Wholesale Crop Nutrients division, supplying fertilizer to ag retailers in MT, WA, ID, UT and OR. Following restructuring and a departure from CHS, I spent almost a year working out of the Ag industry. In 2019 I became the Northwest Area Manager for KALO, an adjuvant company, where I help test and bring new technology to Ag retailers across the northwest to improve product performance on their crop protection products. I also sit on the Ravalli Co Weed Board, I am a member of the Montana Weed Control Association, the MSU Western Ag Research Station Advisory Council, and I am active with several local civic organizations.

James Baguley
Corteva Agriscience

James Baguley grew up on a small fruit production operation in west Michigan. While attending Michigan State, James began his work in the ag chemical industry with BASF. Working in Michigan, North Carolina, Tennessee, Missouri, Arkansas, Montana and South Dakota for BASF. In the winter of 2017 James had the opportunity to return to Montana's agriculture industry with Corteva AgriScience, Territory Manager for Western Montana. ■

Hemp and Pesticides in Montana

CECIL THARP (MSU PESTICIDE EDUCATION SPECIALIST)

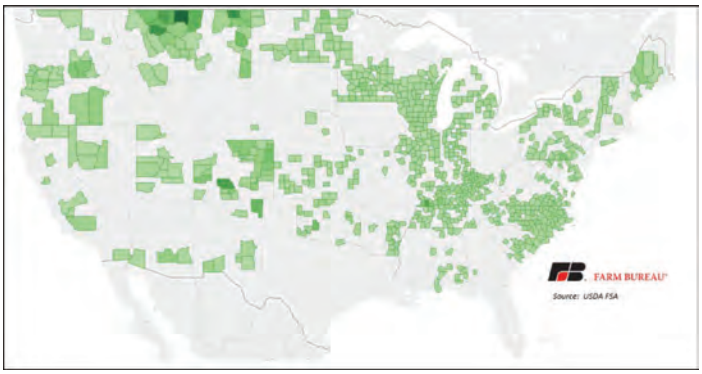

Figure 1. 2019 FSA reported hemp acreage by county. USDA Farm Service Agency.

Industrial hemp, *Cannabis sativa* L., was removed from the list of controlled substances and legalized through the 2018 Farm Bill if the THC content is less than 0.3%. Hemp production is now legal in 47 states with Montana ranked number one in the nation with 45,000 planted acres reported in 2019, followed by Colorado with 21,000 acres and Kentucky with 19,000 acres. Though this crop thrives in Montana, there has been confusion regarding the legal use of pesticides which vary from state to state. This alert is designed to assist producers/ag leaders in understanding the policies governing pesticides and hemp, as well as the pesticides which are now legal to use on hemp in Montana.

The Environmental Protection Agency (EPA) requires all pesticides sold or distributed in the United States to be registered according to the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). This could be through many means, but for now, in Montana, we have ten products which fall under FIFRA Section 3, which is the main registration process, and two products falling under FIFRA Section 25(b), also known as minimum risk pesticides.

FIFRA SECTION 3

The conventional registration of pesticides by EPA falls under FIFRA Section 3 and takes many years and millions of dollars to obtain the necessary data. Data includes risk assessments, establishment of an acceptable maximum residue level (MRL) in food crops, label directions, ecological testing, etc. Since hemp has recently been legalized there are very few pesticides registered using this conventional process. EPA has approved of 24 pesticides which may be used on hemp for food/non-food purposes and they are registered in Montana (Table 1).

MINIMUM RISK PESTICIDES – 25(B)

The EPA has determined that certain "minimum risk pesticide active and inert ingredients" pose little to no risk to human health or the environment. If classified as minimum risk, then products wholly containing these ingredients are exempt from the FIFRA registration process. They are often referred to as 25(b) products as they are exempt under FIFRA Section 25(b). Minimum risk ingredients are automatically approved federally for use on all non-food sites, however if used on a food site the ingredients must have Maximum Residue Limit (MRL) or MRL exemption established by the EPA. MRL's are the maximum level of pesticide residue that is acceptable on food. See the guidance document on pest management in hemp that lists all 25(b) active ingredients which may easily be used on hemp for food or non-food purposes in Montana if the manufacturer sends a request to the Montana Department of Agriculture (MDA). At present only two fungicides can legally be used on hemp as a 25(b) in Montana:

- Fungout (AEF Global, Inc.); Citric Acid
- Custos (D2Bio); Garlic Oil, Peppermint, Rosemary Oil

Send the pesticide manufacturer a request if you

TABLE 1. EPA APPROVED PESTICIDES FOR USE ON HEMP UNDER FIFRA SECTION 3. SEE PESTICIDE LABELS FOR MORE INFORMATION.

Product Name(s)	EPA Reg. #	Active Ingredients	Type
General Hydroponics Exile	91865-2	Potassium Salts of Fatty Acids	Insecticide, Fungicide, Miticide
Debug Turbo	70310-5	Azadirachtin & Neem Oil	Insecticide, Miticide and Fungicide
Debug Optimo	70310-7	Azadirachtin & Neem Oil	Insecticide, Miticide, Fungicide
Debug Tres	70310-8	Azadirachtin & Neem Oil	Insecticide, Miticide, Fungicide
Debug On	70310-11	Neem Oil	Insecticide, Miticide, Fungicide
Regalia Biofungicide	84059-3	Extract of Reynoutria sachalinensis	Fungicide
Regalia Rx	84059-3	Extract of Reynoutria sachalinensis	Fungicide
Regalia CG	84059-3	Extract of Reynoutria sachalinensis	Fungicide
Stargus Biofungicide	84059-28	Bacillus amyloliquefaciens F727	Fungicide and Bactericide
Amplitude	84059-28	Bacillus amyloliquefaciens F727	Fungicide and Bactericide
Amplitude ST	84059-28	Bacillus amyloliquefaciens F727	Fungicide and Bactericide
General Hydroponics Prevasyn Insecticide	91865-1	Soybean Oil, Garlic Oil, & Capsicum Oleoresin	Insecticide
General Hydroponics Prevasyn Insecticide 2	91865-1	Soybean Oil, Garlic Oil, & Capsicum Oleoresin	Insecticide
General Hydroponics Defguard	91865-3	Bacillus amyloliquefaciens D747	Fungicide, Bactericide
Azamax Botanical	91865-4	Azadirachtin	Insecticide, Miticide, Nematicide
Exponent Insecticide Synergist	1021-1511	Piperonyl butoxide	Insecticide
Synerpro PBO Insecticide	53883-258	Piperonyl butoxide	Insecticide
PBO-8 Synergist	89459-33	Piperonyl Butoxide	Insecticide
Green Gobbler 20% Vinegar Weed Killer	85208-1-93489	Acetic Acid	Herbicide
Harris 20% Vinegar Weed Killer	85208-1-3	Acetic Acid	Herbicide
Natures Wisdom 20% Vinegar Herbicide	85208-1-90394	Acetic Acid	Herbicide
Vinagreen	85208-1	Acetic Acid	Herbicide
Vinagreen	85208-1-73015	Acetic Acid	Herbicide
Caron Defense	84846-1	Potassium silicate	Fungicide

think their 25(b) pesticide product would be an excellent fit for use on hemp in Montana. For more information see the EPA minimum risk website.

MEDICAL MARIJUANA

The legal use of pesticide products in this news release does not convey to medical marijuana growers wishing to manage pest problems. There are currently no legal pesticides for use on medical grade marijuana in Montana due to the current classification as a schedule 1 drug by the United States DEA.

FOR MORE INFORMATION

For updated information regarding legally approved hemp pesticide products in Montana contact the MDA Pesticide Registration Specialist (Jerin Borrego, 406-444-5471, jborrego@mt.gov), or search the MDA registration database. Contact the MSU Pesticide Education Specialist (Cecil Tharp, 406-994-5067, ctharp@montana.edu) for other questions related to this news release. Individuals may wish to view EPA fact-sheets which detail approved 25(b) active and 25(b) inert ingredients for food and nonfood purposes. ■

Pam Langley Memorial Scholarship

The Pam Langley Memorial Scholarship has long been an MABA activity - one that the association has been very proud to promote and support. Starting in 2017, MABA and its membership worked hard to establish the Montana Agricultural Business Foundation (MABF). The MABF was formally established in the fall of 2018 and is now in operation.

One of the benefits of MABF is that it is organized as a charitable foundation therefore removing any question regarding the appropriateness of providing scholarships to our membership and their children. In 2019, the Pam Langley Memorial Scholarship transitioned away from MABA and to MABF for administration and granting. This is a great opportunity for MABA members to provide funding to MABF to bolster these types of activities.

The current MABF Board of Directors include: Bob Hollern, Tom Burchett, Nathan Brooks, Chris Barge, Nichole Drake, and Nate Fairbanks. Please reach out to any of them for additional information or to provide funding for the foundation and its activities.

Please spread the word to your employees and others in our business so that this scholarship opportunity isn't missed. The deadline for applications is May 15. ■

MONTANA AGRICULTURAL BUSINESS FOUNDATION

Our Mission

To preserve Montana's agricultural heritage and to foster its future by supporting and developing sound agricultural practices and promoting the positive impacts of agribusiness on agriculture, the environment, and Montana communities.

MABF SCHOLARSHIP APPLICATION

PAM LANGLEY MEMORIAL SCHOLARSHIP

Deadline: May 15

There is no longer a requirement that an applicant be entering their second year – the student must be enrolling in next semester.

ELIGIBILITY:

Three $1000 scholarships will be awarded to students in pursuit of post-secondary education. Scholarships are not limited to in-state schools or to any field of study. The applicant or legal guardian of applicant must be employed a minimum of 800 hours per calendar year or be retired from a career with a business that is currently a member of the Montana Agricultural Business Association and its adjoining states. A student receiving a scholarship may reapply for subsequent years, but will not be awarded a scholarship more than twice.

SELECTION:

The selection committee policy does not advocate, permit nor practice discrimination on the basis of sex, race, age, color, national origin or handicapping condition. The selection committee shall consist of at least three members of the MABF Board of Directors. Committee members should not have potential applicants. The president may select committee members from the general membership if necessary. Winners will be announced and funds awarded before the fall semester.

PERSONAL INFORMATION:

Name _____

Current Phone _____

Marital Status_____ # of Dependents_____ Email: _____

Current Address _____

Permanent (home) Address_____

Name of Parent or Guardian _____

Parent or Guardian Address _____

Parent or Guardian Phone _____

Occupation of Parent or Guardian _____

MABA Employment Location _____

Number of brothers and sisters: older _____, younger _____, # in college now _____

over

PREVIOUS EDUCATION:

1. High School _____ Town _____

   High school rank: _____of _____ in class. Year graduated _____

2. Post Secondary Education (if any):

   A. School _____Town _____

   Years completed_____Degrees earned _____GPA_____

   B. School _____Town _____

   Years completed_____Degrees earned _____GPA_____

ACTIVITIES AND ACHIEVEMENTS:

1. What has been the nature and extent of your participation in activities of: (answer for both your high school and post-secondary years; use additional sheets if needed.)

   Your School:

   Your Community:

2. List any special recognitions or awards you have received.
3. Why do you feel you deserve this scholarship?
4. What work experiences have you had?
5. Write a paragraph or two indicating what your career plans are.
6. In which School and Program do you intend to enroll in seeking this scholarship?

   Name of School _____

   Major_____

   Option or Area of Concentration _____

7. Are there any other circumstances, financial or otherwise, which you would like the committee to consider as an additional reason to grant aid?

REFERENCES:

Give the names, positions and addresses of three persons (not relatives) as references. It is preferable that at least one be a person for whom you have worked.

Name and Position:	Address:
_____	_____
_____	_____
_____	_____

Attach two letters of recommendation, your high school and postsecondary transcripts and a photo (the winners photos will be used for publicity).Return to Scholarship Committee, PO Box 7325, Helena, MT 59604 by May 15. **Preferred method: Application materials may also be submitted to: mabamgea@gmail.com**

I understand that this application is for $1000 in aid for the next school year. Any breach in enrollment or other unsatisfactory performance in my course of study will result in cessation of aid.

Date_____ Signature of Applicant _____

New Faces in the Pesticide Programs at Montana Department of Agriculture

The Agricultural Services Bureau at the Montana Department of Agriculture (MDA) operates pesticide programs that are tasked with ensuring products are available for use, properly used, and do not pose unreasonable adverse effects on human health or the environment. The people providing these services strive to meet regulatory responsibilities and exceed customer service needs. They are some of our state's most valuable assets and worthy of introductions.

Rory Ruffner recently transitioned into the lead role as Pesticide Licensing, Registration, and Training Program Manager. He's no stranger to protecting Montana's natural resources. Most recently, he served as the department's Noxious Weed Seed Free Forage Coordinator. Before that, Rory spent two decades in a contracting role with the Dept. of Defense helping to manage natural resources of the MT Army National Guard. With a wealth of knowledge in noxious weed management, land reclamation, NEPA procedures, and beyond, Rory aims to build on the industry relationships he's fostered already to pursue new goals.

"I'm looking forward to establishing a trusted and cooperative relationship with industry," said Ruffner. "I want to share the importance of the pesticide program's role in the success of Montana's ag community and provide solid leadership in a dynamic regulatory environment."

In his spare time, Rory can be spotted spending time with this wife and trying to keep up with their 10-year-old son while casting flies in a river, making tracks on the slopes, and biking Helena's trails.

Rory oversees a small staff with big responsibilities. Jenn Bergner, the Pesticide Education Specialist, is one of these staff members. Experienced in providing education in non-traditional settings, Jenn enjoys using her creativity to develop and deliver curriculum. She became well acquainted with Montana's pesticide recertification credit approval process, examination procedures, and training manuals while serving as the Training and Development Specialist for the Pesticide Education Program before being promoted to her new role.

Jenn says, "I'm grateful for the insight I've gained already and I'm excited to develop new working relationships with partners, exercising adaptability and creativity to meet the demands of the pesticide industry."

When she's not at work, Jenn spends most her time outdoors along with her fiancé, black lab, and chickens. She embraces all Montana has to offer by elk hunting, fly fishing, hiking, and camping. ■

Rory Ruffner
Pesticide Licensing, Registration, & Training Program Manager
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Pesticide Education Specialist
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Committee Spot Light: Bio Technology

Dan Brittain
Board Member
Montana Agricultural Business Association

The Montana Agricultural Business Association believes strongly that there is room for ALL types of production on the landscape and that it is important to recognize that we can and do co-exist. Technology in agriculture continues to face an uphill battle with public perception, misconceptions, and falsehoods. Unfortunately, those opposed to technological advances don't recognize that biotechnology can help the world in more ways than just agriculture.

Norman Borlaug drew a line in the sand when it came to the ability of organic farming to feed our ever growing world with his well-recognized quote. "There are 6.6 billion people on the planet today. With organic farming we could only feed four billion of them. Which two billion would volunteer to die?"

Although Norman passed away in 2009, and at the end of 2019 we had 7.6 billion people on the planet, he paints a very real picture about the importance of progressive farming and using available technology to help raise crops. MABA supports all our members regardless of what segment of the industry they serve. The purpose of the article is to highlight the importance of technology in our world.

Bio Technology isn't just saving lives through farming; bio technology has saved, and is currently saving, millions of lives through synthetic insulin, many vaccines, and is our first line of defense for new strains of viruses and diseases. Planting bio tech crops can take a little pressure off the shoulders of famers as well. Depending on the crop they plant, and what pests they face, majority of bio tech crops have a great disease and pest resistance package built into them. This allows the farmer to be focused on other activities with their farm or their family, and not have to worry about using strong pesticides to control pests. Bio tech crops benefit famers by planting usually high yielding varieties and normally making a single herbicide spray pass, instead of multiple herbicide and insecticide passes. Fewer times over the field results in a lower risk of off point drifting, less compaction in the soil, and other environmental benefits. This technology is truly working to make the world a better place, and to allow future generations to prosper ahead of our past.

A new area of technology that is quickly advancing is gene editing. Gene editing is as simple as turning on or off a gene in a living organism with the goal of improving a crop, farm animal, or correcting a genetic disorder. Gene editing allows researchers to develop plant traits in a fraction of time when compared to conventional plant breeding, and it allows the possibility for researchers to single out conditions such as sickle cell

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anemia and correct the disorder. Gene editing is at the forefront of taking land, water, and climate that was previously thought uninhabitable for raising crops and turning it into productive areas for both economic and sustainable growth. This technology is a crucial part of the equation for the human race to continue to thrive, and adapt to constant changing weather and soil conditions, disease, waste, and to battle many new problems we face in the field and in our bodies.

Montana Agriculture Business Association has its own committee devoted towards education and acceptance efforts with the public and growers about the benefits of technology, and it also emphasizes the four points of biotechnology. The Four points are that it is safe, it benefits the economy, it is important to quality of life, and it is good for the environment. This same committee is also devoted towards pollinator health across Montana. We focus on working with major seed and Ag pesticide companies to come up with solutions to protect pollinators. These solutions typically consist of trying to provide growers with pollinator habitat seed, and our members working with beekeepers to reduce the risk to bees.

I would like to leave you with another quote: "As long as there is malnutrition in the world, there is a place for biotech. As long as there are farmers who cannot progress past subsistence, there is a place for biotech. As long as there are crop failures, there is a place for biotech." – Wayne Parrott, professor, institute of plant breeding, genetics and genomics, University of Georgia. From Crop Life International.

Thank you too all the members of the Montana Agriculture business association for your dedication to our great industry and to protecting our beautiful state of Montana. If you are interested in serving on the MABA board or any of its committees, please contact any of our current board members. ■

REMEMBER . . .
IT'S THAT TIME OF YEAR AGAIN!!

Montana811.org

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

COVID-19

THE GOOD, THE BAD, THE UGLY

At the time of printing the challenges associated with COVID-19 were many.

Current Information: https://mtagbiz.org/issues/covid-19-resources/

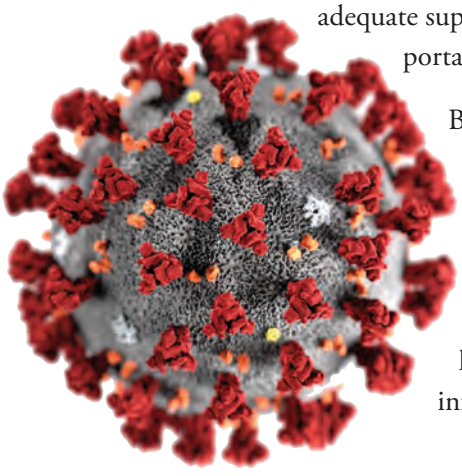
The Good: Information coming from State and Federal regulatory agencies is changing on an almost hourly basis. The agriculture supply chain is critical to the ability of our growers to continue to provide safe and healthy food to consumers. At this time, the regulatory agencies have recognized that we are essential businesses. This is very significant for our industry and we will work to continue this status moving forward. As other states are facing shelter in place requirements it becomes very evident how important this designation is so that we can continue the flow of products to and from growers.

During this time of extremes, it is amazing to see our industry work together for the better of all. Agricultural Businesses will continue to work hard to keep healthy and affordable food on consumer's tables.

The Bad: Not all people are following the social distancing and gathering limitations. Unfortunately, this could cause a lengthening in the duration of our challenges with COVID-19. Our desire and craving for social interaction has made this an extremely challenging requirement for many people.

Our industry has stepped up to the plate and identified ways to run their businesses while still meeting the state and federal mandates. Again, MABA members are doing things right.

The Ugly: The hoarding of consumer goods has caused significant concern and a bit of bafflement. There has been some concern of input hoarding mentioned but to date we have not seen that occur in Montana or other areas of the country. Suppliers assure us that there is adequate supply provided we can keep our transportation routes open and operating.



Because the information is changing so quickly MABA created a Resource page on the MABA website to provide timely information for our members and others. Please take advantage of this resource and reach out if you have any questions or need additional information. ■

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COVID-19

EMERGENCY RESPONSE IN MONTANA

During these uncertain and challenging times, the resiliency of our ag industry is more apparent than ever. Montana Department of Agriculture is working to the best of its ability to protect and advocate for producers and stakeholders by maintaining services and adapting to changing circumstances. Montana's response to COVID-19 remains a dynamic and ongoing situation. Governor Bullock activated a Coronavirus Task Force to bolster the state's preparations and to ensure we are doing all we can to continue coordinating efforts across state government to aggressively respond.

If you have questions or concerns related to Coronavirus, please contact the State Emergency Coordination Center:

Phone: 1-888-333-0461 | Email: COVID19info@mt.gov
Website: https://covid19.mt.gov/

President *continued from page 3*

Executive Director. If there ever was a textbook situation where being a part of the Montana Agricultural Business Association mattered, it's now. The prompt communications to membership on Governor's orders, Department of Agriculture updates, Hours of Service impacts, and much more means a lot to ag businesses as each day brought something new to decipher. The connections to Department of Agriculture, Governor's office, and our US Congressional Delegation (Daines, Tester, and Gianforte) are huge in times like this. I hope all of you inform Krista on anything at all that is affecting your abilities to operate during the pandemic.

Finally, I'm grateful we can face "normal" challenges going forward. Sure that sounds odd as it's no easy task dealing with weather, markets, consolidations, and more. I'd much rather fight those battles than the ones many of the "Main Street" small businesses are faced with – restaurants, furniture stores, hair dressers, construction crews, etc.… Let's do our part to support those people however we can as they navigate through the upcoming months. "This too, shall pass", but please take care of yourselves and try to think positive during this stressful time.

If there are ever any concerns, questions, or ideas you have for MABA going forward, by all means reach out to me! My cell is 406-783-8549 and email is ldighans@procoopag.com. Have a safe, successful spring! ■

Congressional Comments

Steve Daines
United States Senator
For the State of Montana

U.S. SENATOR STEVE DAINES

Over the past month I have been working around the clock with healthcare professionals, experts in the industry and the White House to ensure we protect public health and stabilize the economy during the Coronavirus outbreak. I have also worked to ensure Montana's farmers and ranchers are protected during this global pandemic.

I have been in communication with ag industry leaders, farmers and ranchers across the state to ensure the needs of our ag industry are met during this crisis. For example, I helped introduce legislation that would create a Cattle Producer Payment Program to offset losses due to COVID-19 and support ranchers for the calendar year 2020. I also worked hard to secure increased funding for USDA to ensure that our farmers and ranchers received some relief from the impact of COVID-19 on markets and to ensure critical inspections continue to take place to protect our nation's food supply.

This Coronavirus has only worsened market conditions and it is critical that we provide the necessary support for Montana ag. Our ag folks need relief quickly while we continue to work together on overcoming this crisis. Montanans are strong.

Greg Gianforte
US Representative
For the State of Montana

U.S. CONGRESSMAN GREG GIANFORTE

As we move into Spring, COVID-19 has changed our country, our state, and our communities. We must act swiftly and wisely to contain the spread of COVID-19 and protect the public health. We need to slow transmission and get off the curve to save lives. Times are going to be tough, but we need to take necessary precautions. We will work together, as we do, to keep our families safe. Despite the challenges we face, Americans still need to eat, and they count on you and Montana ag producers.

Following the closure of the U.S. border with Canada, I worked with

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U.S. Customs and Border Patrol to ensure that fertilizer and other shipments important to Montana ag could continue. I also urged the U.S. Department of State to make arrangements to ensure that H-2A worker under contract could come into the country despite the shutdown of many U.S. consulates overseas. The EPA has also announced its intention to use discretion in enforcing certain reporting and monitoring requirements.

Congress has passed and President Trump has signed into law three pieces of legislation to address this crisis. They include $14 billion for USDA's Commodity Credit Corporation and $9 billion for USDA to provide support to farmers, ranchers, and connected business. They make many more forms of business organizations eligible for unemployment.

They provide $350 billion to make loans that can be converted to grants to help businesses make payroll, pay rents or mortgages, and cover other expenses. This program will be administered through community credit sources like local banks, credit unions, or farm credit service lenders under guidance from the Small Business Administration.

While you keep supporting those who feed America, I'll continue to support Montana farmers and ranchers, as well as the businesses that make their work possible. Please reach out to me anytime if I can be of any help to you. ■

What Do 4R Practices Cost and What Is The Benefit?

By Sally Flis, Ph.D., CCA, Senior Director of Agronomy, The Fertilizer Institute

Economic, environmental, and social challenges face today's producers and crop consultants as agriculture is indicated as contributor to decreased water quality and greenhouse gas emissions. Recently agriculture practice change has been recognized as a solution for carbon sequestration and water quality improvements at lower costs than large municipal or commercial changes. Implementing 4R Nutrient Stewardship practices on all farms is a key to this solution. In case you haven't heard of them, the 4Rs of nutrient stewardship are working to actively and adaptively select the right source of fertilizer applied at the right rate, the right time, and in the right place. A critical part of making 4R decisions is considering the features of the field – soil type, slope, and drainage – along with other conservation practices like cover crops and reduced tillage.

But, what does the implementation of 4R practices look like in the field and how much does it cost a producer? Since 2012, The Fertilizer Institute (TFI) has recognized 90 farmers and crop advisors from across the United States who manage 4R practices in everything from hops to oranges to corn and soybean rotations. The 4R Advocates are from 22 states and farm more than 200,000 acres. Working directly with the 4R Advocate farms and other stakeholders, TFI collected data on 12 farms to calculate the cost of changing practices, changes in nutrient use efficiency, and estimated reductions in greenhouse gas emissions reported as carbon dioxide equivalent (CO2e) related to fertilizer applications.

Farmers and consultants shared with TFI staff the amount (rates and types) of fertilizer they used, when and how they applied fertilizer, equipment used, cost of equipment, prices for fertilizer, and crop yields. The cost of 4R practices also includes the cost of services used to make fertilizer recommendations, like soil sampling, variable rate mapping, software subscriptions, and tissue testing. Then working with economists from the University of Kentucky, TFI staff developed a tool to calculate cost and nutrient use efficiencies. Additionally, work that TFI supported for the Field to Market program was used to calculate the CO2e emissions related to 4R practices.

Case studies done on corn for grain, potatoes, cotton, and tomatoes have demonstrated a reduction in cost per acre as farms transition from basic to more advanced 4R practices. In strawberries there was a slight increase in cost of $6.00 because of the addition of soil sensors in a single year. The reduction in corn grain production costs averaged $37.90 per acre and ranged from $10.89 to $101.11 per acre. Reductions in cost across all case studies were from reduced fertilizer product cost, reduced equipment time and cost, and reduced fuel costs.

Basic 4R practices include field level soil testing, single nutrient applications, or not accounting for all nutrient sources. Advanced 4R practices include variable rate application, use of enhanced efficiency fertilizers, more in-season nutrient application, fertigation, improved nutrient incorporation, and conservation practices like reduced tillage and cover crops.

IN-DEPTH EXAMPLE – ILLINOIS NO-TILL CORN

This family farm located in central Illinois is managed by a young farmer who was an early adopter of the 4Rs. Seeing the benefits of these practices and willing to make investments in the farm, the family made advanced leaps in adoption of 4R practices and saw immediate returns. Over the transition from basic to advanced 4R management the farm has moved all nitrogen applications to in-season, splits nitrogen applications into as many as four applications, applies phosphorus and potassium using variable rate technology, seeds corn based on variable rate mapping, and uses nitrification inhibitors with side-dress applications of anhydrous ammonia.

Adding advanced 4R practices to the management on this farm decreased the cost per acre of 4R practice implementation by $25.39 per acre (Table 1). The decrease in cost per acre was influenced by reduced fertilizer, equipment, and fuel costs. Operation cost of an in-season sprayer and use of a smaller tractor for in-season nitrogen injection were the

changes in equipment costs. Changing from the use of a 575-horsepower tractor for pre-plant anhydrous ammonia injection to a highboy sprayer with 100-foot booms and y-drop attachments decreased fuel needs for one of the nitrogen application passes from 25.7 gallons per hour to 15.4 gallons per hour. The time spent per acre implementing 4R practices was 0.21 hours per acre for basic practices compared to 0.22 with advanced practices, a small change considering more passes over the field for fertilizer applications each season.

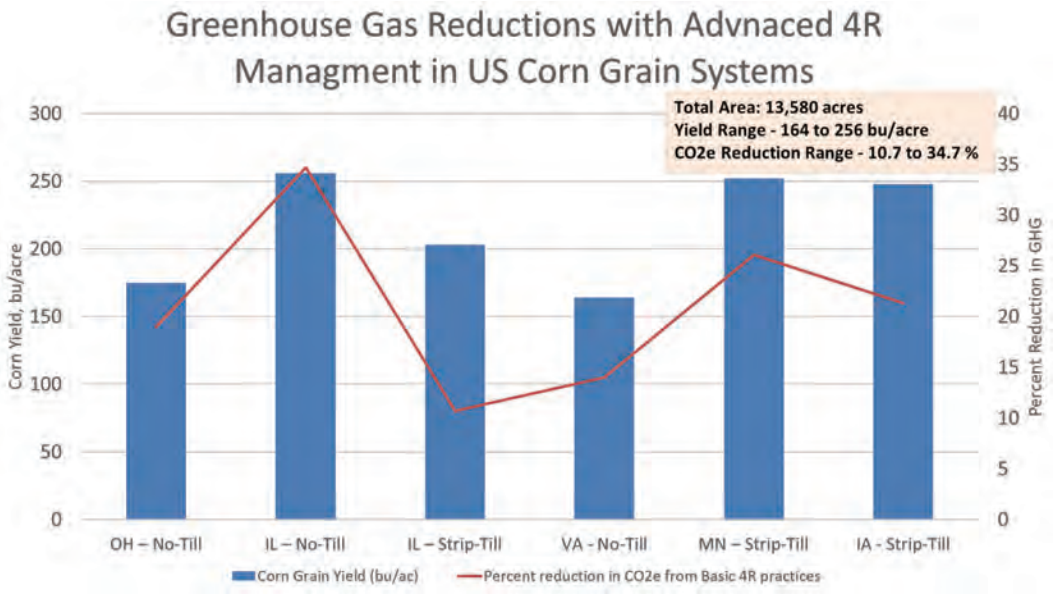
Table 1. Case Study results for No-till Corn in Illinois.

	2014	2015	2016	2017
4R Practice Level	Basic	Basic	Intermediate	Advanced
Corn Grain Yield (bu/ac)	229	220	246	256
N Application Rate (lbs/ac)	253	208	253	204
Nitrogen Use Efficiency (lb N applied/bu corn grain)	1.11	0.95	1.03	0.80
N Balance (lb N applied – lb N harvested)	69.5	31.9	56.6	-1.14
CO2e Emissions per bu	9.4	8.43	8.17	6.14
Percent reduction	-	10.3	13.1	34.7

In addition to cost savings for the producer the pounds of nitrogen used to produce a bushel of corn also decreased to 0.80 (Table 1). Improvements in nitrogen use efficiency (NUE) are related to decreases in the loss of nitrogen to the air as nitrous oxide or as nitrates to surface or ground waters. The other environmental metric that has been calculated is the CO2e from fertilizer applications and management. In this case study, the adoption of advanced 4R practices decreased the CO2e emissions by 34.7 percent from the year when basic 4R practices were used (Table 1). Detailed information on all 12 case studies is available at 4rfarming.org.

Six corn grain case studies have been completed, and for each one the cost of implementing more advanced 4R practices has decreased cost per acre. Additionally, all farms saw reduced CO2 equivalent emissions (Figure 1).

TFI is continuing to work with 4R advocates and other partners to grow the number and diversity of case studies. If you have a farmer that should be nominated as a 4R Advocate or that could be a case study, please reach out to Sally Flis, Senior Director of Agronomy at TFI, sflis@tfi.org. ■



Points to Ponder

Tim Tackles
Board Member
Montana Agricultural Business Association

I am one of the new board members elected during the last MABA Convention. I have been a member of the Montana Ag Business Association for almost all my 27 yearlong ag business career in Montana. This is my first term as an elected board member but not the first time I have run for the board. I have run 3 times before, mostly during my years working as a retail crop advisor.

In hindsight I am thankful I was not elected back then as between having young children and working long spring hours, I did not have the time to devote to be an active board member. Board members need to desire to be on the board to make a difference in the industry in which they work, not just as an item on a resume or an opportunity for a social outing.

I have spent the last 10 years of my career working first as a wholesale fertilizer sales rep and most recently as a technical sales manager for an adjuvant company, covering the states of MT, ID, WA and OR. I have seen firsthand many different issues that affect ag business that vary by state.

I am also a member of other state and national ag business associations like Far West (ag business association for WA, ID & OR), ARA (Ag Retailers Association of America), and CPDA (Council of Producers & Distributors of Agrotechnology – a advocate for adjuvant, inert ingredient and post patent pesticide manufactures). These ag business associations are critical for the long-term viability of our industry.

I will give you a recent example my company was involved with: Adjuvants are required to be labeled and registered in Washington state. The adjuvant label must list the top three active ingredients by inclusion rate, what it does, how to use it, and safety and handling proceeders.

Last year Washington State Department of Ag wanted to change label requirement to list all ingredients found in the product, even the inert ones. As with anything chemically manufactured products, adjuvants can have dozens of ingredients. This would have incurred huge additional cost of writing new labels, re-registering the same products and repackaging any unused inventory. Cost that would have reduced retailer margins and increased grower adjuvant pricing.

This new label requirement would have served no purpose or benefit in addition to regulations that are already in place. CDMA in cooperation with Crop Life was able convince WSDA that this change was not in the best interest of anyone… manufacture, distributor, retailer or grower.

Some of these associations have lost their focus on driving value for their members, in turn lose membership & support and are in jeopardy of disappearing from the industry. I see this currently happening with the Far West Ag Business group.

MABA is a strong organization doing good things for ag business in Montana. I wanted to serve on the board of directors to help do my part and insure it stays a strong, member focused, association. I encourage you to consider volunteering time as a future board member and to also talk to your friends and associates working in this industry who aren't already members, to become a member of MABA.

The value of MABA membership:

- You need a watchdog advocate for ag business issues live;
- A seat at the table representing our/your views;
- The power of a collective voice and anonymity;
- Collaboration & networking with other industry organizations;
- State agency interaction and possibly intervention. ■

MSU Soil Expert Says Not All Soil Test Kits Provide Accurate Results

There are several factors that gardeners need to consider when choosing a soil test kit to make fertilizer decisions, according to a Montana State University Extension soil expert.

Among those factors, according to Clain Jones, MSU Extension soil fertility specialist and professor in the Department of Land Resources and Environmental Sciences, are how soil is prepared, the actual test used, how results are presented, cost and the accuracy of results.

Test kits generally measure nitrogen, phosphorus, potassium and soil pH. These are appropriate basics, though a laboratory test can also measure salts or a host of other nutrients, such as iron, which may be important for gardeners to know. Jones said most soil test kits require combining the soil sample with water to make a slurry. In contrast, soil testing laboratories dry, sort, grind and sieve soils to remove rocks and residue.

"Particularly important is the quality and shelf-life of the reagents (chemical liquids) mixed with the soil to perform each test," Jones said. Laboratories have standard practices to ensure their materials are not out-of-date. Jones cautioned that, just like using outdated milk, using an old batch of reagent might not have desirable results. Jones added that soil test kits may not include the correct phosphorus test. The Olsen P test is accurate for soils with pH greater than 6, while the Bray or Mehlich tests are accurate for soil pH less than 7.3. MSU fertilizer guidelines are based on Olsen P values, because most Montana home garden and agricultural soils have a pH greater than 6. There is no simple conversion from Bray or Mehlich to Olsen P values, he said.

"Even when submitting a sample to a laboratory, it is important to request the Olsen P test, rather than the Bray or Mehlich test, if soil pH is greater than 6," Jones said. Many test kits provide results with a word-based rating of "low," "medium" or "high" — or "deficient," "adequate" or "surplus" — rather than in a unit value, such as parts per million or pounds per acre. Laboratories report unit values and fertilizer recommendations based on field trials that provide the relationship between fertilizer rates and soil test values.

Test kits can be cheaper and more convenient, but, according to Jones, the savings may not be worth the generalized results. Kits cost in the range of $15 for 10 samples to $750 for 100 samples. A commercial gardener or community gardening cooperative may use 100 samples' worth of material in an elaborate kit, while a home gardener likely would not.

"Laboratories can have quick turnaround," Jones said. "Although lab fees can vary from around $15 to over $50 per sample, accurate results are available from labs with low fees. It is better to spend $15 on accurate results than base fertilization on erroneous results and potentially cause fertilizer waste, environmental degradation or lost production." He noted that county agriculture Extension agents can likely help people choose a laboratory to work with.

Jones pointed to a recent article in "Crops and Soils," which is published by American Society of Agronomy, that discussed the testing of four soils using four test kits and compared the results with laboratory results. The kit that provided two options for testing soil phosphorus and required users to sort, dry and grind the soil before mixing it with specific chemical reagents provided results very similar to laboratory results. The results from simpler kits differed moderately or even highly from laboratory results.

More information on soil fertility of home gardens is available at the MSU Soil Fertility Extension website at http://landresources.montana.edu/soilfertility/home-gardening.html and from the MSU Master Gardener program at https://mtmastergardener.org/. ■

Calibrating a Plot Sprayer

It's the rite of passage of many agricultural summer students across the world: applying experimental treatments to field plots using a research sprayer. (Mine happened in 1984 with the expert instruction of Alvin Iverson at the University of Manitoba.) The results of these experiments may be the basis of new product use registrations, or provide clues into future scientific studies. Needless to say, the application method needs to be bullet proof to ensure the results are reliable. Here are a few guidelines, starting with these…

PRO TIPS:

1. When assembling a hand-held boom, ensure the threads are properly sealed using Teflon tape. More or less tape can be used to create a snug fit at the right part of the thread rotation.

2. Choose nozzle bodies with diaphragm shutoff valves. These valves stop flow below 10 psi and prevent dripping of the nozzles after shutoff, without pressure drop during operation.

3. Avoid the use of older style "check-valve strainers". Although these also prevent drips, they create a pressure loss of about 5 psi which creates problems when needing to ensure precise pressures.
4. Install a pressure gauge on the handle of the sprayer in clear view for the operator. This provides important information. Don't believe the gauge on the regulator. Ours, for example, is stuck at 30 psi.

5. For hand-held booms, rotate the booms so that the nozzles point down, for each application. Different size people or height of crops will change this angle and make accuracy more difficult.
6. Set the boom height so that you achieve 100% pattern overlap. This means that a nozzle's pattern width should be twice the boom's nozzle spacing. Boom height will be close to 50 to 55 cm above target, depending on fan. Too low, and the pattern may cause striping. Your supervisor will see that all year long and think of you.
7. You can test the spray pattern by applying water to a concrete pad. At the right boom height, the entire boom width should dry at a similar rate.
8. Install a visual guide for boom height. For

example, place a wire flag at the end of the plot, at the correct height. This will provide a handy reference of boom height as your arms get weary.

9. Minimize weight by using smaller bottles of CO2. We use 20 oz paintball bottles, they are much lighter, last long enough, and can be legally refilled with liquid CO2 or topped up with gas from a nurse tank in the field.

10. Spray out leftover mix in a designated part of the plot area. Do not pour any mix on the ground. Please.
11. When completing a treatment, spray the boom completely empty so air comes out of each nozzle. This provides certainty that the next liquid at the nozzles is from the next bottle, be it water or another treatment.
12. When spraying dose responses of the same product, always start with the lowest dose. Again, spray out in a designated place until the boom produces air, no need to flush.
13. Construct a boom hanger from electric fence posts and coat hangers. Nozzles face down and can be serviced. The boom should never lie on the ground.

14. Use nozzle screens to prevent time delays due to plugging. Usually 50 (blue) or 80 (yellow) mesh is sufficient. Any finer mesh may interfere with some dry formulations. Note: Beware old screens – ISO mesh colours have changed.

15. It's very useful to apply research sprays with low-drift nozzles. Air-induction tips are most effective. These reduce drift, and are also closer to the commercial spray quality used by producers.
16. 01 size (orange) air-induced nozzles are available from Billericay Air Bubble Jet, Greenleaf AirMix, and Greenleaf TurboDrop XL. No other major manufacturer produces this small size of tips in air-induction.
17. 015 size tips (green) and larger are produced by the above, as well as Hypro (GuardianAIR or ULD) and TeeJet (AIXR, AI, and TTI), within both manufacturers listed in order of increasing coarseness.
18. Always carry several other nozzles of the same size and type already on the boom. Should a nozzle plug, replace it, don't clean it. Clean it later.

19. If a nozzle plugs and there is no extra nozzle, use compressed air to clean it. Compressed air electronics cleaners are available in most electronic stores.

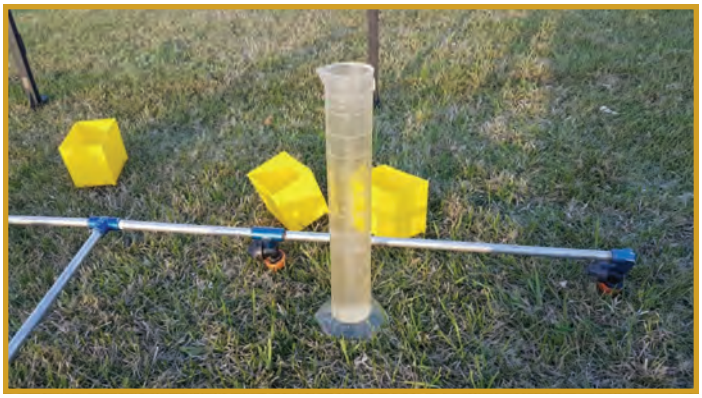
Calibrating *continued on page 24*

20. If a plugged nozzle can't be cleaned, simply place it at the end of the boom and continue. Plot ratings and yields are usually taken from the centre. Remind your supervisor of this.
21. Always de-pressurize a sprayer before disconnecting any liquid hoses. You can't rely on check valves. If two people work together, make sure you practice and communicate this with each other.

CALIBRATION:

1. Assemble the sprayer and run water through it to ensure it's free from silt or residue. Repair leaks.
2. Install nozzles and ensure none are plugged and the pattern looks good.
3. While spraying water, set pressure to what you intend to spray with. (Note: boom pressure will be lower than regulator (attached to CO2 canister) by a few psi, hence the separate pressure gauge on the boom. Also note that the set pressure will always be higher when the system is at rest.)
4. Obtain four containers of similar size that can hold about 500 mL, and place on ground at nozzle spacing. Using stopwatch, emit spray directly into all four for a set time, say 30 s.

5. Expected spray volume at 40 psi: 01 tip, 380 mL/min; 015 tip, 570 mL/min; 02 tip, 760 mL/min. In other words, from a 2 L bottle you'll not get much more than 30 s spray time from 4 tips.
6. Measure collected volume from four tips using the same graduated cylinder.



7. Repeat, for total of three times.
8. Average three reps for each nozzle and convert to mL/min. Make sure all nozzles are within 5% of the average flow. Replace those that aren't or place worst offender on outside edge of boom.
9. Advance to "Calculations", but be prepared to conduct another calibration.

Now for the fun part.

CALCULATIONS:

There are three options for applying the correct amount. We'll be using metric in these examples:

1. Use the average nozzle flow from the calibration (mL/min) and the target application volume (L/ha) to calculate the necessary walking speed (km/h);
2. Use the flow from the calibration and a set walking speed to arrive at an application volume;
3. Use a set walking speed and a set application volume to calculate a required calibrated flow.

Option 1: Walking Speed = (60*flow)/(Volume*nozzle spacing)

If your nozzle flow was 330 mL/min and you wanted to apply 100 L/ha using a sprayer with 50 cm nozzle spacing, your required walking speed is 60*330/100/50 = 3.96 km/h

Option 2: Application Volume = (60*flow)/(Speed*spacing)

If your nozzle flow was 330 mL/min and you wanted to walk 5 km/h using a sprayer with 50 cm nozzle spacing, your application volume is 60*330/5/50 = 79 L/ha

Option 3: Required flow = (Speed *Volume*spacing)/60

If your speed 5 km/h and you wanted to apply 100 L/ha using a sprayer with 50 cm nozzle spacing, your required flow is 5*100*50/60 = 417 mL/min

If you selected Option 3, you now need to return to your sprayer and find a nozzle, or a pressure, that delivers an average of 417 mL/min. You can use math to get into the ballpark with the nozzle you already have:

New Pressure = (required flow/ calibrated flow)2*calibrated pressure

If your required flow is 417 mL/min and the calibrated flow is 330 mL/min, and you calibrated at 30 psi, then you should be close to your required flow at (417/330)2*30 = 48 psi

Now, return to your sprayer, set the pressure to 48 psi, and confirm this estimate.

We use Option 3 when comparing nozzles of the same size but from different manufacturers. It's not uncommon for these to have slightly different outputs. Rather than adjusting our walking speed slightly, which is very difficult to do accurately, we change pressure slightly so all nozzles produce the same flow. This is also useful when comparing water volumes by switching to a larger nozzle.

Travel Speed:

The last step is to confirm travel speed. Say you want to walk at 5 km/h. The best way to calibrate walking speed is to measure a known distance (m) in the field you'll spray. Wearing the gear and carrying the sprayer you will use to spray, walk this distance. Use a wire flag to mark the start and end points; when the boom hits the flags, start and stop the timer. Repeat until comfortable.

Time needed to walk distance: Time (s) = Distance *3.6/required speed

Say your walking distance is 10 m, and you need to walk 5 km/h. 10*3.6/5 = 7.2 s

A simple spreadsheet that can be used for the calculations can be found here.

Congratulations! You're done. Happy spraying! Remember to not worry too much about a 5% deviation from your expected application. That's definitely an acceptable error, as long as you don't allow too many of those to add up.

LOW VOLUME RESEARCH (AERIAL)

Some product uses are by air, and the label volumes for those are often 30 to 50 L/ha. Registrants need to provide efficacy data at those volumes. Ground application can be accepted as a surrogate for aerial as long as the volumes are correct.

Since the spray nozzles aren't typically available below the 01 (orange) size and if they are, they usually plug so easily and make such a fine spray that they're frustrating to use. The alternative, to travel faster, is also problematic on research plots.

We recommend that Turbo TeeJet nozzles be used for this purpose. They produce such a wide fan angle that a 100 cm spacing is justifiable. Simply cap off every second nozzle body. Booms need to be elevated to ensure overlap, for uniformity. The value of the small nozzles and wider spacings is the low total application volume that is now possible. ■

About the Author:

Tom Wolf (Nozzle_Guy) is based in Saskatoon, SK and has 30 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. He also rides a unicycle to the office every day.

Fertilizer Assessment Fund Research Grants

FERTILIZER ADVISORY COMMITTEE MEMBERS (2020)

The advisory committee meets a minimum of once each year with the *MSU Directors (as ex-officio members) and program participants to: (1) review the educational and research programs financed by this Act, (2) recommend needed programs and/or program adjustments and (3) report to the Montana House and/or, Senate Agriculture Committees when requested. The Directors of the MSU Extension and Agricultural Experiment Station have financial responsibility and jointly appoint committee members.

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Stevensville, MT
Term Expires: December 31, 2020

Mr. Ryan Lammers
Havre, MT
Term expires: December 31, 2021

***Mr. Bob Church**
Commodities Section Program Manager
Montana Department of Agriculture
Helena, MT

YEAR	P.I.	PROJECT	AMOUNT FUNDED
2020	Lamb, Bourgault, Jones	Is there a legacy effect of deep application phosphorous in no-till systems	49,776
	Chen, Sutradhar	Fall and spring nitrogen applications with magnesium and zinc to improve sugar beet yield and sugar content	42,038
	Eberly, Jones, Carr, Fordyce	Improving nitrogen management in Montana dryland soils by determining the contribution of microbial mineralization to nitrogen availability	17,400
	Ewing, Brookshire, Klassen, Dobeck, Jones, Payn, et al	Research Analytical Chemist, Environmental Analytical Laboratory	30,000
	Giroux, Oiestad	Examining the Role of Nitrogen in Wheat Growth and Yield in Response to Increased Starch Biosynthesis	55,512
	Maxwell, Hegedus, Broyles, Merja, Van Dyke, Bailey, Wood	On-farm experiments to optimizing site-specific application of nitrogen fertilizer rates to maximize producer profits	73,711
	Miller, Jones, Bekkerman, Ewing, Larson	Long-term N management in alternative crop rotations	34,814
	Sherman, McVay	Relationship between fertility management and malt quality advance spring barley lines	24,000
	Torrion, Lamb, Shine	P and K fertilization of dormant to semi-dormant alfalfa	50,630
	Jones, Zabinski, Miller	A long-term assessment of nitrogen fertilizer effects on soil quality across cropping systems	32,920
	Jones, Miller, McPhee, Baber	Enhancing nitrogen fixation in pea and lentil through breeding and management	15,440

***Dr. Anton Bekkerman**
Assoc. Dir. Montana Agricultural Experiment Station & Professor
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Pesticide Educational Resource Collaborative (PERC) Releases New Worker Protection Standard Resources

PERC is led by University of California of Davis Extension and Oregon State University and is funded by a 5-year cooperative agreement from the U.S. EPA. PERC aims to support the development of resources/materials about the safe use of pesticides by applicators and handlers in agricultural, commercial, and residential settings. Materials could include brochures, factsheets, posters, videos, manuals, and mobile tools, while addressing the needs of low-literacy and multilingual audiences. These materials will help prevent pesticide exposure incidents for pesticide applicators, handlers, workers, and their families. Examples of new WPS resources available from PERC:

- A printable version of PERC's Bilingual Dictionary - http://pesticideresources.org/wps/dictionary.pdf
- One-pager about WPS Ventilation Criteria - http://pesticideresources.org/wps/hosted/ventilationFS.pdf

Resources for Organic Growers:

- Outreach card "WPS applies to you!" -http://pesticideresources.org/wps/jfy/agemp/organic-card.pdf
- WPS Contacts in Your State - http://pesticideresources.org/wps/contacts.html
- WPS Respirator Resources - http://www.pesticideresources.org/wps/respirators.html

And an expanded suite of Spanish WPS resources for:

- Workers: http://pesticideresources.org/wps/jfy/worker/index.es.html
- Handlers: http://pesticideresources.org/wps/jfy/handler/index.es.html

Questions? Please contact PERC directly. ■

"Elevating Agriculture"

2020 MABA/MGEA ANNUAL CONVENTION – BETTER THAN EVER!

The Montana Agricultural Business Association (MABA) and the Montana Grain Elevator Association (MGEA) pride themselves on bringing our members timely, thought provoking and innovate information as the key elements of the annual joint convention.

Pesticide Recertification Agronomic Workshop

The Wednesday morning Pesticide Recertification Agronomic Workshop was well attended and presentations ranging from new product updates, an insecticide in seed treat panel, lessons learned from the 2019 season, and updates on the EPA registration process and products up for renewal. MABA recognizes the importance of providing high quality educational opportunities so that our applicators have the latest information, are safe, and are given the tools necessary for them to provide their services in a professional manner.

Taking Food Bullying by the Horns

Michele Payn with Cause Matters Corporation gave a very insightful presentation on the challenges associated with today's culture and the food bullying that occurs. Michele has great insights into why people behave this way and the best way to rebut their assertions and attacks. It will take all in production agriculture working together to better educate and inform the consumers.

Captain Fleming, Team Never Quit

In an exciting new twist this year, MABA and MGEA brought in world renowned speaker Captain Chad Fleming, Team Never Quit. Captain Fleming brought a message of patriotism, perseverance and hard work. A very fitting theme for the MABA/MGEA membership. Captain Fleming reminded all of us of the sacrifice and commitment that is required to truly be successful in life. This positive message was much appreciated as agriculture faces continued challenges and opportunities.

Benefit Auction

The Thursday night benefit auction has become quite the tradition at the annual convention. This event raises funds for groups or events that further agriculture in Montana. We want to express our sincere appreciation to our members who attend the auction and support these worthwhile groups! This year the net proceeds of the auction were donated to the Yellowstone Boys and Girls Ranch, Montana FFA Foundation, and Montana 4H Foundation. There will be a scholarship of at least $500 granted to an FFA student and a 4H student every year as the result. ■

THE JOINT ANNUAL CONVENTION WOULD NOT BE NEARLY AS SUCCESSFUL WITHOUT THE GENEROUS SUPPORT OF OUR SPONSORS AND VENDORS.

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