MANITOBA AGRONOMISTS CONFERENCE

UM | Faculty of Agricultural and Food Sciences

Wednesday, December 13, 2023

PLENARY SESSION

8:25 **Welcome**

8:30 **Setting the Stage for MAC 2023**

8:45 **My Personal Learnings in Ag Tech: The Good, the Bad and the Ugly**
Todd Ormann, Olds College of Agriculture and Technology

9:30 **Assessing and Weeding Out New Ag Technologies for Agronomists**
Dr. Brian Arnall, Oklahoma State University

10:15 **Coffee Break & Poster Session**

10:45 **Outfitting your Agronomists and Farmers with Useful Technologies**
Dale Cowan, AGRIS Co-operative Ltd.

11:10 **AI and Agronomy - Is the Cart Ahead of the Horse?**
Emile deMilliano (retired)

11:35 **Plenary Speaker Q & A**

12:00 **Lunch**

PEST MANAGEMENT SESSION

1:00 **Farmer Panel: Implementing New Technologies in the Field**
Moderator: Dennis Lange, Manitoba Agriculture
Fiona Jochum, Blue Diamond Farms
Reid Mazinke
Tyler Menold

1:45 **Kochia Warrants our Full Attention**
Dr. Brian Jenks, North Dakota State University

2:30 **Coffee Break & Poster Session**

3:00 **Improving the Management of Foliar and Root Diseases in Field Peas**
Dr. Michael Wunsch, North Dakota State University

3:30 **Do you 'Walk the Line?'**
Marcie Schultz, Pesticide Compliance Program, Health Canada

4:00 **The Diversity and Role of Native Bees in Field Crop Production**
Dr. Jason Gibbs, University of Manitoba

4:30 **Reception**

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CROP MANAGEMENT SESSION

8:30 **Multiple Herbicide-Resistant Waterhemp: The Ontario Experience**
Dr. Peter Sikkema, University of Guelph, Ridgetown Campus

9:15 **The Evolution of Soybean Production**
Horst Bohner, Ontario Ministry of Agriculture, Food and Rural Affairs
Dennis Lange, Manitoba Agriculture

10:00 **Coffee Break & Poster Session**

10:30 **Agronomic Management to Maximize Spring Wheat Yield and Protein while Minimizing Lodging Risk**
Dr. Amy Delaquis, Manitoba Canola Growers

11:00 **Crop Diversification: What Works and What Hasn't**
Scott Chalmers, Manitoba Agriculture

11:30 **Making Every Seed Count: Crop Management Effects on Canola Establishment**
Chris Holzapfel, Indian Head Agricultural Research Foundation

12:00 **Lunch**

SOIL MANAGEMENT SESSION

1:00 **Tuning Up Fertility with Fertilizer Rich and Omission Strips**
Dr. Brian Arnall, Oklahoma State University

1:30 **Nutrient Uptake and Removal in Prairie Crops**
John Heard (retired)

2:00 **What is a Plant Nutrient? Changing Definitions to Advance Science and Innovation in Plant Nutrition**
Dr. Patrick Brown, University of California-Davis

2:30 **Coffee Break & Poster Session**

3:00 **Fertilizer Management Challenges for Direct Seeding**
Lyle Cowell, Nutrien

3:45 **Soil Salinity Fixes: Quick or Patient**
Dr. Tom DeSutter, North Dakota State University

4:30 **Closing Comments**

Thank you for joining us for the 2023 Manitoba Agronomists Conference! Please scan the QR code to complete an evaluation form.

Wednesday, December 13, 2023

8:45 **My Personal Learnings in Ag Tech: The Good, the Bad and the Ugly**
Todd Ormann, Olds College of Agriculture and Technology

With nearly 40 years of industry experience, Todd Ormann, a pioneer in Ag tech, shares his success and failures in the digital space and agriculture. Starting at the early stages of agronomic sales and program management to the development of digital agronomic tools and Ag tech companies Todd shares customer reactions and insight into Ag tech adoption.

Biography: Todd Orman, recognized as one of the Top 50 most influential people in Canadian Agriculture, is a pioneer in the agriculture marketing and technology space, supporting the introduction of agricultural brands, and most recently, the development of TELUS agriculture.

Throughout his career with AdFarm, Syngenta, Farmers Edge, TELUS Agriculture and now Olds College he has succeeded in launching solutions that have influenced how Agribusiness and Farms interact with technology.

Todd began in marketing and created campaigns for products, such as Nexera and Frontline. He led the global launch of FarmCommand, a Farmers Edge product that underpinned their IPO launch. This product was transformed from an agronomic toolset that supported internal agronomists to a farm management platform. At TELUS, Todd was the first agriculture hire supporting the development of strategy and the implementation of the new division. Today TELUS Agriculture & Consumer goods employs over 1600 team members operating in 50 countries world wide and is one the world's largest Ag tech companies.

At Olds College, Todd is the Vice President of Development that leads the advancement, partner and marketing teams that implement the promotion of the college and the strategic relationships with industry, donors and sponsors. Many of those which are Ag Tech companies that participate and support one of Canada's most well known and active Smart Farms.

9:30 **Assessing and Weeding Out New Ag Technologies for Agronomists**
Dr. Brian Arnall, Oklahoma State University

New technologies and techniques seem to hit the marketplace on a regular basis. It is not uncommon for new tech to hit the scene with large marketing budgets and limited ground truthing.

So how do you approach wanting to be on the cutting edge but not falling off the cliff on a regular basis. This session will discuss the approaches that can be utilized in assessing new tech, along with a discussion with the audience addressing technologies they are curious about.

Biography: Dr. Arnall's extension, teaching, and research efforts are focused on precision technologies and nutrient management in all of Oklahoma's cropping systems with an emphasis on site specific techniques. He works closely with extension educators and industry personnel to improve nutrient management practices in Oklahoma that will lead to increased profitability of Oklahoma producers. He currently has several ongoing studies focused on Precision Ag technologies, nitrogen fertilizer timing and placement, increasing nutrient use efficiency, improvement of phosphorus and potassium fertilizer recommendations, and the application of biologicals in the central plains. In addition, Brian has a crew of developers producing iOS and Andriod applications.

10:45 **Outfitting your Agronomists and Farmers with Useful Technologies**

Dale Cowan, AGRIS Co-operative Ltd.

Technology keeps coming to the market place at a brisk pace. It is hard to keep up with all the new equipment, software and services. It begs the question of how the role of the Crop Specialist or Agronomist of tomorrow will change. Basic agronomy skills will remain however they will be augmented by technology. The technology generates a massive amount of data. We will need integrated systems to handle the volume, velocity and variety of data. The fundamental role of a service provider will also change. What training support and tools will be required for employees to thrive in a mobile, digitally connected world?

To sort through all the technology will require critical thinking skills to evaluate the options. Often asking a very simple question. What problem am I trying solve? Will this technology help me? We will share some systems approaches and thoughts on how to manage in a near real time digital world inundated with data from a variety sources.

“Technology will not replace the agronomist however the agronomist that chooses to use technology will replace those that do not. “ (Unknown source).

How will you earn the “trusted advisor” status with your customers?

Biography: Dale Cowan is the Agronomy Strategy Manager and Senior Agronomist for AGRIS Cooperative in Southwestern Ontario. His responsibilities involve training and supporting customer facing staff in utilizing our Digital Ag Strategy of technology, agronomy, knowledge transfer in key areas of stewardship and effective product positioning. Preparing the company and employees to operate in a mobile digital connected environment is a key part of the strategy. Technology is readily available, however training and supporting staff with new technology, new processes is as important as the tools we use. Data is all around us. The volume, velocity and variety of data coming at us requires an organized integrated approach to optimize the relationship we have with our channel partners and customers. Transitioning from an analog world to a digital one will not happen by accident. It takes a strategy to make it happen.

11:35 **AI and Agronomy - Is the Cart Ahead of the Horse?**
Emile deMilliano (retired)

Yes, maybe. But that's OK.
Historically, all new innovative technologies start this way. The trick is to understand where the technology is at, be aware of where it's going, and determine how it will help address your needs but also the needs of your farm clients. AI, even with all its dreams and grand visions, will likely become another good tool in your toolbox. But it is you, the agronomist, who will make it happen in the field. You have an inspiring opportunity to shape its applications. Take on the challenge. We'll likely be going fast to go slow as we find AI's appropriate fit. But expect the journey to continue.

Biography: A University of Alberta graduate, Emile has spent over 40 years immersed in agronomy. After a brief stint in the Peace Country with Elanco (Corteva), he spent 14 years in the Edmonton area with Alberta Agriculture in various roles (D.A., Commodity Development Officer, Pulse Specialist) before joining Westco Fertilizers in 1996 as one of 5 Regional Agronomists in western Canada. In 2014, Emile took on the role of Training and Development Manager for Nutrien Ag Solutions Canada. In 2021, he moved on from Nutrien to enjoy more personal time but maintains an active interest in all things agronomy (and agronomists).

Wednesday, December 13, 2023

1:00 Farmer Panel: Implementing New Technologies in the Field

- *Fiona Jochum, Blue Diamond Farms*

Biography: Fiona Jochum is a third-generation grain farmer from St. Francois Xavier. She is an alumnus of the University of Manitoba, having earned her Diploma in Agriculture and Bachelor's Degree in AgriBusiness. After spending a few years working in various sectors of agriculture, from research and development to ag policy, Fiona saw an employment opportunity on her family's farm and set her sights on a career in farm management. At Blue Diamond Farms Ltd. Fiona co-manages the production of wheat, oats, canola, and soybeans. This fall marked her 5th harvest.

- *Tyler Menold*

Biography: Tyler Menold lives near Carman, Manitoba where he runs a grain farm with his family. They produce soybeans, corn, canola, flax, perennial rye grass, wheat, oats, peas and other crops.

- *Reid Mazinke*

Biography: My name is Reid Mazinke and I'm from Morris Manitoba. I'm 25 years old and I grew up working on the family farm just south of Morris. I've been full time on the farm for about three years. Before I was full time on the farm, I was primarily helping out during harvest time to combine or grain cart. The last three years have been very exciting. I look forward to continuing my career in farming while learning about the many different aspects there are, and implementing them into the operation.

1:45 Kochia Warrants our Full Attention

Dr. Brian Jenks, North Dakota State University

Kochia has been a very competitive weed in the Northern Plains for decades. However, farmers' ability to control kochia has become even more difficult since kochia has developed resistance to some of our commonly used herbicides. In recent years, we have observed that some kochia populations are no longer completely controlled by glyphosate, fluroxypyr, and dicamba. In December 2022, some kochia populations were documented to be resistant to Group 14 PPO herbicides such as saflufenacil and carfentrazone. PPO resistance will leave no-till farmers with few preplant burndown options. There is also evidence that these kochia populations may be resistant to other extremely important soil-applied PPO herbicides like sulfentrazone and flumioxazin. Kochia will need to be managed through cultural practices in addition to using other herbicide modes of action. A genetic test using just kochia leaves is being developed to facilitate rapid identification of PPO-resistant kochia.

Biography: Ph.D. in Weed Science, University of Nebraska-Lincoln 1996
NDSU Weed Scientist (1997-present)
Research and Extension appointment
Area of focus: In 26 years with NDSU, Dr. Jenks has conducted research in 24 crops investigating crop tolerance to herbicides, and control of annual and perennial weeds, with particular interest in kochia, wild oat, green foxtail, Canada thistle, foxtail barley, and milkweed. In recent years, Dr. Jenks has conducted a state-wide screening of wild oat and green foxtail for resistance to Group 1 and 2 herbicides.

3:00 **Improving the Management of Foliar and Root Diseases in Field Peas**
Dr. Michael Wunsch, North Dakota State University

This presentation will provide recommendations for improving the management of Ascochyta blight and Fusarium and Aphanomyces root rot and wilt in field peas. Pathogen resistance to the QoI (FRAC 11) fungicides has resulted in a complete loss of efficacy against Ascochyta blight for this mode action in North Dakota. Resistance was first observed in 2016 and was confirmed in 2017. Alternatives to the QoI fungicides will be discussed, and fungicide efficacy data will be presented. Multi-year, multi-location studies conducted in fields with elevated Fusarium and Aphanomyces root rot and wilt indicate that the combined use of early planting, fungicide seed treatment, and crop rotation can significantly reduce losses to these soil-borne diseases in field peas. Data from field trials and associated management recommendations will be shared.

Biography: Michael Wunsch is a plant pathologist with North Dakota State University's Carrington Research Extension Center. His research and outreach efforts are primarily focused on addressing disease management problems in broadleaf crops grown in North Dakota, with an emphasis on improving the management of white mold in dry edible beans, soybeans, and sunflowers and improving the management of root and foliar diseases of field peas, chickpeas, and lentils. Michael obtained his B.S. from the University of Missouri and his Ph.D. from Cornell University, and he commenced his employment with the NDSU research center in Carrington in 2010. Michael is originally from Montana.

3:30 **Do you 'Walk the Line?'**
Marcie Schultz, Pesticide Compliance Program, Health Canada

The Health Canada is responsible for pesticide regulation in Canada. Pesticides are regulated in Canada to ensure they pose minimal risk to human health and the environment. Under authority of the Pest Control Products Act, Health Canada registers pesticides after a stringent, science-based evaluation that ensures any risks are acceptable. During this presentation, Marcie will correlate the lyrics to a popular country song by Johnny Cash to the regulatory requirements of promoting and using pesticides to ensure you, as an agrologist, have the knowledge and tools necessary to 'Walk the Line.'

Biography: Marcie Schultz is a Regional Pesticide Officer with the Pesticide Compliance Program of Health Canada. In her role, she is responsible for regulating the Pest Control Products Act through inspections with various industries and pesticide sectors. Marcie grew up on a small family farm in the Interlake region of Manitoba. After high school, she attended the University of Manitoba where she received her Bachelor of Agricultural and Food Science degree in 2007 and now calls the Red River Valley home.

4:00 **The Diversity and Role of Native Bees in Field Crop Production**
Dr. Jason Gibbs, University of Manitoba

Wild bees and other pollinators provide valuable ecological services in natural landscapes and crop fields. The diversity of wild pollinators is underappreciated and pollination services may attributed to managed species like western honey bees. The diversity of wild pollinators will be reviewed and the potential of wild pollinators providing pollination services to Manitoba agriculture will be discussed. Management practices that benefit wild pollinators and other beneficial insects are encouraged.

Biography: Jason Gibbs is an Associate Professor in the Department of Entomology at the University of Manitoba. He completed his PhD at York University studying the taxonomy of sweat bees. He was then a postdoctoral researcher at Cornell University studying apple pollination and sweat bee evolution. He was then a Research Associate at Michigan State University conducting research on highbush blueberry pollination. His current research focuses on bee taxonomy, phylogenomics, and the effects of landscape management on beneficial insects. He has published >100 scientific papers on various aspects of bee taxonomy, evolution, and ecology.

Thursday, December 14, 2023

8:30 **Multiple Herbicide-Resistant Waterhemp: The Ontario Experience**
Dr. Peter Sikkema, University of Guelph, Ridgetown Campus

Waterhemp is a small-seeded, summer annual, broadleaf weed with an extended emergence pattern, has high genetic diversity, is a prolific seed producer, is very competitive, and has spread rapidly throughout southern Ontario. Multiple-herbicide-resistant (MHR) waterhemp (*Amaranthus tuberculatus*) was first confirmed in Ontario from seed collected from one field on Walpole Island in 2014. MHR waterhemp has now been confirmed in 17 Ontario counties. Waterhemp has evloved resistance to five herbicide modes of action in Ontario (Groups 2, 5, 9, 14, and 27). Control strategies in corn and soybean will be presented. Results form a long-term integrated waterhemp control study indicate that with a diversified weed control program the number of waterhemp seeds in the seedbank can be decreased substantially.

Biography: Peter Sikkema is responsible for weed management in field crops and teaches "Crop Diagnostics and Recommendations" and "Herbicide Physiology and Biochemistry" at the University of Guelph, Ridgetown Campus. Peter and his colleagues conduct research on weed management in corn, soybean, dry beans cereals. Of particular interest to local farmers, however, are the current investigations on herbicide resistance. Peter is an excellent source of both practical and innovative solutions for local farmers and he readily shares his knowledge with primary producers. Peter maintains a busy speaking schedule sharing his most recent research results at grower meetings and agricultural conferences.

9:15 **The Evolution of Soybean Production**
Horst Bohner, Ontario Ministry of Agriculture, Food and Rural Affairs
Dennis Lange, Manitoba Agriculture

Soybeans have had a long history in Ontario with significant production being recorded in the mid 1970s. During that time the University of Guelph conducted field trials and released recommendations on how to grow soybeans in Ontario. Between 1971 and 2011 soybean yield in Ontario grew from 25 bu/acre to 43 bu/acre. *Source Stats Canada*. In 2023 the provincial average was 53 bu/ac. In Manitoba, soybeans had been tried in the 1970's and 1980s with limited success, but in the year 2000 successful production in southern Manitoba began. During those early years of the 2000's Manitoba farmers were growing conventional soybeans with success but the main roadblock to increasing production in the province was developing suitable maturing varieties for Manitoba growing conditions.

This presentation by Horst and Dennis will show the evolution of soybean production from those early days to the present. In those early days, production systems were quite straight forward but as acres grew in both regions, growers and industry begun to fine tune their production practices and had to development protocols for addressing production issues. New varieties, diseases such as white mould, pest issues such as soybean cyst nematode and now resistant weeds like Waterhemp and Palmer Amaranth. This session will discuss how production has evolved to address these challenges.

Horst Bohner Biography: Horst Bohner has been the provincial Soybean Specialist with the Ontario Ministry of Agriculture, Food, and Rural Affairs since 2001. He collaborates with producers and other researchers to address soybean production issues. His responsibilities include field research, validating production techniques, and providing leading edge information to Ontario growers.

Horst is past chair of the Ontario Oil and Protein Seed Crop Committee and the OMAFRA representative for the Heartland Regional Soil and Crop Improvement Association.

Dennis Lange Biography: Dennis Lange is the Provincial Pulse and Soybean Specialist with Manitoba Agriculture. He has been with the depart since 2011 and has been involved in the pulse & soybean industry for the last 27 years working with soybeans, peas, dry beans and various other pulses. Dennis is also an avid photographer and also enjoys listen to vinyl (his collection is greater than his Hawaiian shirt collection). Dennis is also known for his collection of almost 170 Hawaiian shirts and counting.

10:30 **Agronomic Management to Maximize Spring Wheat Yield and Protein while Minimizing Lodging Risk**

Dr. Amy Delaquis, Manitoba Canola Growers

Improvements in spring wheat genetics and agronomy have resulted in higher yields obtained by producers, but have introduced challenges such as, maintaining grain protein content and managing lodging risk. The objectives of this research were to evaluate the effect of agronomic management practices on spring wheat lodging risk, grain yield and protein content. This was done through two small plot field trials during the 2018 and 2019 growing seasons using cultivars common to, and widely grown across Manitoba. Early season N availability was critical for the development of yield components and allowed the crop to buffer against dry environmental conditions to produce grain protein content. However, increased lodging risk associated with application of large amounts of N early in the season needs to be balanced with lodging management strategies. Low plant densities (150 plants m^{-2}) and PGR applications both improved the crop's ability to resist lodging in this research but are often associated with decreased early season competitive ability against weeds and variable crop maturity. As a result, the ability of PGRs to reduce lodging risk, provides a critical tool for lodging management. Flexibility of application and yield increases, even in the absence of lodging, through increased kernels per spike, support a wide adoption of this technology as yields continue to rise.

Biography: Amy is the Research Manager with Manitoba Canola Growers Association a Certified Crop Advisor and 4R Designated Agronomist. She completed her PhD at the University of Manitoba (U of M) with Dr. Yvonne Lawley focused on spring wheat agronomy, MSc at the University of Alberta in Weed Science and BSc in Agronomy from U of M. Previously, Amy has worked as a research technician in the soil fertility lab at the U of M and as an Agronomist with Pembina Coop.

11:00 **Crop Diversification: What Works and What Hasn't**
Scott Chalmers, Manitoba Agriculture

Crop Diversification not only provides a vast array of foods to grow and eat but it can also reduce economic and environmental risk on the farm and to the wider geography of Manitoba, a strategy so to say, "don't put all your eggs in one basket". In pursuit of growing the many crops Manitoba can grow also comes compounding risks & challenges with diversification. This presentation will pose the importance of crop diversification, the inherit successes, risks & challenges in developing diversified crops and their industries. Scott will present on the behalf of the Manitoba's Diversification Centres, the applied research network, who have had years of experience researching diverse crops, their successes, failures, and some compelling risky opportunities.

Biography: Scott Chalmers grew up on a mixed beef & conventional tillage farm near Carroll, MB in the 80s & 90s. He earned an Honours degree in Botany and Chemistry from Brandon University in 2004 while assisting the plant pathology crew at the Brandon Research Centre for a couple summers. After his graduation at BU he managed the South East Research Farm in Redvers, SK for 3 years then took a Diversification Technician position with Manitoba Agriculture in 2007 until 2012. In 2012, Scott moved into the Applied Research Specialist position where he has worked since managing the Westman Agriculture Diversification Organization (WADO) in Melita, MB. At WADO, Scott and his trusted team have grown over 60 crops in a multitude of trials ranging from mainstream and novel crop trials.

11:30 **Making Every Seed Count: Crop Management Effects on Canola Establishment**
Chris Holzapfel, Indian Head Agricultural Research Foundation

Second only to fertilizer, seed is one of the most expensive inputs in canola production, and like many things, the price of hybrid canola seed has increased substantially in recent years. Consequently, the incentives are as strong as ever to minimize seedling mortality while also avoiding unnecessarily dense stands; thus, managing input costs without increasing yield instability or agronomic issues associated with suboptimal plant populations. In this presentation, we will draw from regionally relevant field trials to look at the impacts of basic management practices on canola establishment, development, and seed yield. The practices we will consider include, but are not limited to, seeding date, seeding rate, row spacing, seed metering technologies, and seed-applied fertilizer rates/formulations. There are pros and cons to the practices we will consider and, as such, definitive recommendations may be difficult to derive. However, the intent is to provide information that agronomists can utilize to make the best possible decisions with respect to canola establishment and yield, while also allowing the flexibility to adapt to the unique circumstances and challenges which they may encounter from farm-to-farm and year-to-year.

Biography: Raised on a small mixed farm near Odessa SK, Chris Holzapfel has a farm background and nearly 25 years of experience with field crop research. This began as a field technician with Agriculture and Agri-Food Canada and continues as Research Manager with IHARF, a non-profit producer group who he was been with since 2005. Chris's education includes a Diploma from Olds College, Bachelor of Science from the University of Lethbridge, and a Master's degree with the Department of Soil Science at the University of Manitoba. Chris holds memberships to numerous professional organizations, previously served as an Associate Editor for the Canadian Journal of Plant Science and received the Outstanding Young Agrologist Award in 2014. While soil fertility issues are his primary research interest, Chris's activities with IHARF cover a broad range of agronomic issues and crops, with a focus on applied research and helping develop practical solutions to today's farming challenges. He takes a hands-on approach to his research / demonstration activities, spending most of the growing season in the field and winter months working through data and trying to fit in extension work whenever possible.

Thursday, December 14, 2023

1:00 **Tuning Up Fertility with Fertilizer Rich and Omission Strips**
Dr. Brian Arnall, Oklahoma State University

The ultimate and precision nutrient management is to use site specific data for your site specific recommendations. But having nutrient rate response studies scattered around your farm every year is just not feasible. This presentation will take the KISS (Keep It Simple Silly) approach to refining your nutrient management for both preplant and in-season decisions. Most farmers have seen addition or omission strips in the fields where either the fertilizer rig double up, or skipped. Learn how these strips are being used across the Great Plains to improve nutrient use efficiency and increase yields.

Biography: Dr. Arnall's extension, teaching, and research efforts are focused on precision technologies and nutrient management in all of Oklahoma's cropping systems with an emphasis on site specific techniques. He works closely with extension educators and industry personnel to improve nutrient management practices in Oklahoma that will lead to increased profitability of Oklahoma producers. He currently has several ongoing studies focused on Precision Ag technologies, nitrogen fertilizer timing and placement, increasing nutrient use efficiency, improvement of phosphorus and potassium fertilizer recommendations, and the application of biologicals in the central plains. In addition, Brian has a crew of developers producing iOS and Andriod applications.

1:30 **Nutrient Uptake and Removal in Prairie Crops**
John Heard (retired)

Crop nutrient uptake and removal guidelines are a valuable resource for farmers and agronomists. The knowledge of actual yields, removal amounts and soil test levels can provide the basis for strategies to balance or maintain soil fertility, to rebuild depleted soils or even to drawdown levels in very high testing soils.

The last published Prairie guidelines in 2001 needed updating based on current genetics and crop production practices. Grain and biomass samples from 14 different Prairie crops were collected from hundreds of farm fields between 2020-2022. Crops included cereals (barley, corn, oats and durum, spring, winter wheats), pulses (peas, chick peas, dry beans, faba beans, lentils) and oilseeds (canola, soybeans, flax). The project was led by Drs. Walley, Farrell and Issah from University of Saskatchewan, and collaborators Lyle Cowell (Nutrien) and myself.

Compared to the original estimates, most macronutrients were removed at lower concentrations (lb per bu), especially P2O5 and K2O. This suggests that current

production practices and varieties have resulted in improved nutrient use efficiency on a per bu basis, although higher yields remove more nutrients on a per acre basis.

An online calculator was developed to quickly estimate nutrient removal based on crop and yield.
https://prairienutrientcalculator.info/

The full research report is posted at:
https://www.saskcanola.com/s/Final-Report-Revising-the-crop-nutrient-uptake.pdf

Biography: John Heard arrived in Manitoba as a refugee from Ontario in 2006 and toiled with MB Agriculture as soil fertility extension specialist until April 2023. He was schooled at the University of Guelph and Purdue University, but educated through working with farmers for 40+ years. He is a proud CCA and was recognized as International CCA of the Year in 2014. On his Almasippi sand he grows the sweetest sweet corn in Manitoba and is the perennial winner in the Maple Syrup class at the Carman fair. In retirement he continues working with past colleagues to deliver soil fertility training. He has served on MAC committees since its resurrection in 2000 and is delighted to still be included in the fun.

2:00 **What is a Plant Nutrient? Changing Definitions to Advance Science and Innovation in Plant Nutrition**
Dr. Patrick Brown, University of California-Davis

Current definitions of essential or beneficial elements for plant growth rely on narrowly defined criteria that do not fully represent the nutrients required for optimal plant performance. This compromises fertilizer regulation and practice. A new definition of what is a plant nutrient has the potential to revitalize fertilizer innovation and discovery. The new definition reads: A mineral plant nutrient is an element which is essential or beneficial for plant growth and development or for the quality attributes of the plant or harvested product, of a given plant species, grown in its natural or cultivated environment. This talk will provide a brief history of plant nutrition and a new definition for what is a plant nutrient.

Biography: Dr. Patrick Brown is the Distinguished Professor of Plant Nutrition at the University of California, Davis - USA. He received his B.Sc. in 1984 from Adelaide University, Australia and Ph.D. from Cornell University, USA in 1988. Dr. Brown has authored more than 260 scientific journal articles and numerous books with contributions to basic and applied plant biology, agricultural policy development and agricultural extension. He has served as a member of numerous scientific and technical committees for governmental agencies and has received many national and international awards including the Norman Borlaug Science Award and the Dennis Hoagland Award for excellence in research and agricultural extension.

3:00 **Fertilizer Management Challenges for Direct Seeding**
Lyle Cowell, Nutrien

Western Canada has a long history of farming in a short growing season with variable precipitation and so has also been a leader in finding solutions to seed and fertilize with minimal soil disturbance. Direct seeding has tremendous value in many respects but can pose some challenges when direct seeding is adopted. We will first remember why we have adopted better fertilizer practices for our farming conditions, consider how some of these best practices are essential to 4R fertilizer management, and ask what questions are still not answered.

Biography: Lyle Cowell is the new Senior Canadian Agronomist with Nutrien Wholesale and supports the agronomy and sustainability of the N, P, K and S fertilizers that are manufactured by Nutrien. His previous career was as a regional agronomist in northeast Saskatchewan where he extended agronomy research to the farm gate.

Lyle has always had the goal of connecting the three points of good research, agronomy extension and farm gate advice and application of soil fertility principles.

3:45 **Soil Salinity Fixes: Quick or Patient**
Dr. Tom DeSutter, North Dakota State University

Undoubtedly, salinity and sodicity pose significant threats to global food security, often stemming from improper irrigation practices, alterations in local hydrology, and soil inundation by ocean or sea waters. At the local level, managing these soil issues presents various challenges, including dealing with high water tables, the absence of natural mechanisms to remove salts from the root zone, crop growth difficulties, limited understanding or misdiagnosis of the problem, and financial constraints. This presentation will delve into the complexities surrounding saline and sodic soils and offer insights into their effective management. Resolving these soil issues goes beyond simply purchasing a product; it requires an educational foundation in understanding soil water dynamics. We encourage you to view this informative video before December 14: YouTube Video Link or search for "002 How Water Moves Through Soil The Irrigation Toolbox" on YouTube.

Biography: Dr. DeSutter received his PhD in 2004 from Kansas State University (Manhattan, KS). After completing a Post-Doc with the USDA-ARS (Ames, IA) he was hired in 2006 as an Environmental Soil Scientist by the Department of Soil Science at North Dakota State University (Fargo, ND). His primary research interests are saline and sodic soils, reclamation of energy-extraction impacted soils, and instrumentation for measuring soil physical and biological parameters. DeSutter teaches Introductory to Soil Science, Soil and Land Use, and Environmental Field Instrumentation and Sampling and is the current Editor of Agricultural & Environmental Letters.