MANITOBA Pulse Soybean GROWERS

pulse beat

Issue 89 • Spring 2020


How do you beat
the ultimate burndown?
Extend it.
Heat® Complete
Powered by Kixor® Herbicide
Multiple modes of action deliver both fast burndown and extended residual.
Just when you thought the best couldn't get better. New Heat® Complete provides fast burndown and extended residual suppression. Applied pre-seed or pre-emerge, it delivers enhanced weed control and helps maximize the efficacy of your in-crop herbicide. So why settle for anything but the complete package? Visit agsolutions.ca/HeatComplete to learn more.
BASF
We create chemistry
Always read and follow label directions.
AgSolutions, HEAT, and KIXOR are registered trade-marks of BASF. © 2020 BASF Canada Inc.

Publisher Manitoba Pulse & Soybean Growers

Editor Toban Dyck MPSG

Associate Editors Sandy Robinson MPSG, Laura Schmidt MPSG

Design and Production Imprint Media Services Inc.

Manitoba Pulse & Soybean Growers thanks the authors who have taken the time to contribute to this publication.

Publications Mail Agreement #40016070

RETURN UNDELIVERABLE CANADIAN ADDRESSES TO:

Manitoba Pulse & Soybean Growers
P. O. Box 1760, Carman, Manitoba R0G 0J0

204.745.6488 Fax 204.745.6213
Email mpsg@manitobapulse.ca

Pulse Beat is the official journal of and published by Manitoba Pulse & Soybean Growers (MPSG) – a farmer organization funded by sales of pulse (beans, peas, lentils and faba beans) and soybean crops grown in the province of Manitoba. Circulation is approximately 4,200 distributed to farmers, government, researchers and industry involved in pulses and/or soybeans.

MEMBER PRIVACY POLICY

Member information is collected and used in accordance with the Personal Information Protection and Electronic Documents Act (PIPEDA) and is the property of Manitoba Pulse & Soybean Growers (MPSG). Information will not be shared, sold or viewed by any individual or group outside of MPSG unless directly related to member communications.

Please direct your comments or concerns to Sandy Robinson at 204.745.6488 or email sandy@manitobapulse.ca

In This Issue

Manitoba Pulse & Soybean Growers – 2020 Board of Directors and Staff

ELECTED FARMER DIRECTORS

Chair – Calvin Penner – *Elm Creek*
Vice Chair – Melvin Rattai – *Beausejour*
Hailey Jefferies – *Brandon*
Bryce MacMillan – *Marquette*
Ben Martens – *Boissevain*
Brendan Phillips – *Hartney*
John Preun – *St. Andrews*
Frank Prince – *Deloraine*
Garrett Sawatzky – *Altona*
Ernie Sirski – *Dauphin*

STAFF

Executive Director – François Labelle – *francois@manitobapulse.ca*

Director of Finance and Administration – Melissa Denys-Roulette – *melissa@manitobapulse.ca*

Finance and HR Administrator – Sandy Robinson – *sandy@manitobapulse.ca*

Research and Check-off Administrator Wendy Voogt – *wendy@manitobapulse.ca*

Director of Communications – Toban Dyck – *toban@manitobapulse.ca*

Director of Research and Production Daryl Domitruk – *daryl@manitobapulse.ca*

Production Specialist – Cassandra Tkachuk – *cassandra@manitobapulse.ca*

Extension Coordinator – Laura Schmidt – *laura@manitobapulse.ca*

Agronomist – On-Farm Network Megan Bourns – *megan@manitobapulse.ca*

On-Farm Technician – Ian Kirby – *ian@manitobapulse.ca*

MANITOBA Pulse Soybean GROWERS

2020 AGM Annual General Meeting Summary

THE ANNUAL GENERAL meeting of Manitoba Pulse & Soybean Growers took place on day one of the CropConnect Conference on February 12 at the Victoria Inn Hotel and Convention Centre in Winnipeg, MB. The terms of four members of MPSG's board of directors were up this year. **Bryce MacMillan, Frank Prince, Melvin Rattai** and **Ernie Sirski** all let their names stand for re-election. All four were re-elected by acclamation.

Auditors George & Associates Chartered Professional Accounts Inc. walked attendees through the 2019 financial reports (available online at manitobapulse.ca) and opened the floor for discussion. MPSG's Melissa Denys-Roulette presented on the association's Scientific Research and Experimental Development tax credit. This year, MPSG members in good standing are eligible to get a tax credit of 73.68% of the check-off they've paid to the association.

Executive Director François Labelle gave his report, which highlighted some of the challenges farmers faced over the last growing season and several ways MPSG is working on behalf of its members.

Following a brief presentation from MPSG's Director of Research and Production Daryl Domitruk, On-Farm Network Agronomist Megan Bourns, along with three On-Farm Network participants took to the stage and walked attendees through the program and the valuable lessons they learned in participating in it.

Federal Agriculture Minister Marie-Claude Bibeau was the morning keynote speaker on day one of CropConnect. To allow attendees to take in her opening remarks, the AGM adjourned roughly 45 minutes after it was called to order.

OUR MISSION

To provide research, production knowledge and market development support to Manitoba pulse and soybean farmers.

OUR VISION

Manitoba farms sustainably producing profitable, quality pulse and soybean crops.

Message from Board Chair

Calvin Penner, Chair

BY THE TIME you read this, you will have talked to seed dealers and compared the data on varieties of pulses and soybeans that are the best fit on your farm. Hopefully, you have been able to use some of the data that Manitoba Pulse & Soybean Growers (MPSG) has generated for more profitable decisions for the upcoming season.

I hope that you have taken the time to talk to an MPSG director or staff at one of the agricutural shows or grower meetings that have taken place over the winter. These are all great places to gather information that you can take back to the unique needs of your farm.

Our staff are always working hard to try to get seed and variety comparisons out earlier to match the timing of the early sales discounts. MPSG's *Pulse and Soybean Variety Guide* is a very useful non-biased source of information available to our members.

Last year, harvest was difficult not only for farmers, but also for field researchers. Although, there were challenges with some of the plots, we were still able to gather useful data from the majority of research plots. You will be reading about it in this issue of *Pulse Beat*.

The On-Farm Network has been a great source of information on our farm. We have been able to do field-size plots. We have tried population trials, seed treatments, fungicides, inoculation trials, rolling trials and other products in field-size replicated trials. Our On-Farm Network staff helped us check these and measure the different treatments on our farm and compare them to similar trials on other farms and other years.

I know that the trial results have saved us money in discovering that some things do not always work as advertised. MPSG also has information that has earned our farm money over the years. I have come to appreciate unbiased, independent research from a source like MPSG that is not trying to make a sale.

I would encourage you to consider an On-Farm Network trial on your farm. The few extra minutes that it takes could pay significant dividends. Our On-Farm Network staff would be happy to share this year's or a past year's data. If you have a production question specific to your farm, please call them to talk about setting up a trial. We also have a great website that I would encourage you to take time to check out.

MPSG is involved in small-plot research and have invested in and are collaborating with other groups to make our dollars go further. Together, we can find solutions to common issues and make our farms more profitable. An area of concern, however, is the trend to less government funding and extension.

Another area of immediate concern is, whether there will be enough fertilizer available to keep up with demands. One way to avoid this is to plant a crop that can fix its own nitrogen.

I want to thank our dedicated and hard-working staff for all the work they do for Manitoba farmers. I also want to thank the board of directors for all they contribute. They represent both MPSG and Manitoba farmers on various committees and groups they are part of. Our influence extends to many parts of the Canadian agricultural communities and it is my opinion that together we make agriculture a more profitable place.

I wish each of us a safe and productive growing season. A season that will make the difficulties of 2019 a distant memory, so that we can tell great stories to our children and grandchildren. May 2020 be the year when all the seed salesperson promises come true.

— Calvin ■

Field Pea Scout

What issues are these peas faced with?

A

B

Answers can be found on page 46

Message from Executive Director

François Labelle, Executive Director

STARTING A NEW decade, it's easy to think in terms of what the future will bring us. If only there were an easy way to tell what that would be. Many of us can remember the year 2000 and how it was going to change the world. Computers were going to crash and bring everything to a halt. Other than someone turning the lights off at midnight, New Year's Day 2020 was uneventful.

Well, what will 2020 bring us? Let's look back at what the last 100 years have brought us. In agriculture, there were four main developments:

- Process to produce nitrogen fertilizer
- Development of hybrid corn
- Introduction of pesticides
- The internal combustion engine.

One of the top items of the last 200 years was barbed-wire fencing. Wow! We have come a long way.

Looking forward, we have many new shiny things coming, but how many of them will still be shiny in 10 years or even be around in 100 years?

These top-four developments of the last century are all under scrutiny now and will continue to be for some time.

Nitrogen fertilizer production is a very high carbon user, and this brings up discussions about climate change and sustainable production. We are fortunate with pulse and soybean crops being able to produce their own nitrogen—a real definite plus for growing our crops. Much work has been done to get cereals and other crops to also fix their own nitrogen, but that is still a ways away.

How about other fertilizers, and researching ways to get more efficient use out of them—not only in placement but to influence the roots and soil microbes to work symbiotically to get better use of our applied fertilizers?

That could be important when considering the sustainability of phosphorus supplies, which come from a finite source and could run out in the future. It's important to continue this discovery research to improve fertilizer use, but in the short-term, growing pulses and soybeans is a good start. We should all be implementing the 4R Nutrient Stewardship program as well — right source, right rate, right time, right place.

The development of hybrid corn saw a dramatic increase in yields, but also ushered in breeding advancements that affected other crops. First, corn hybrid reported increases in yields from 20-plus bushels per acre to 60-plus—a huge gain. The first hybrids were produced by traditional breeding methods of crossing two different lines and then crossing four lines. When hybrid corn was developed, no one questioned it, how times have changed. With all the work on genetically modified organisms and gene editing, there is discomfort that some of these new crop varieties are questioned for safety and people are scared of changing the genetic makeup of the environment. It's hard to grow crops without seed.

PESTICIDES

In the 1940s, two major products hit the marketplace and became widely used very quickly—2,4-D and DDT. Both products were hailed as wonder drugs. My father said that during this time people thought that 2,4-D would end wild mustard and sow thistle on the farm. He told me this while driving through the countryside in the '70s when there was a particularly bad infestation of sow thistle. It also reminded us of that when we were rouging wild

continued on page 5

Scientific Research & Experimental Development Tax Credit

Farmers that contribute check-off dollars to MPSG and are in good standing are eligible to claim the federal Scientific Research & Experimental Development (SR&ED) tax credit.

For the 2019 tax year, 73.68% of MPSG check-off qualifies for the SR&ED tax credit.

For more information on the process of claiming the tax credit, please consult your accountant or visit the Canada Revenue Agency website.

The 2001–2019 MPSG SR&ED tax credit rates are available on the MPSG website **manitobapulse.ca**

mustard in the flax field. DDT is long gone in most countries due to environmental concerns, human toxicity and quickly developing resistance. Many other pesticides have come and gone, and we have several more under scrutiny all the time—even glyphosate.

Pesticides have been very valuable to our cropping systems, and it is hard imagining what farming would look like without some. There is a lot of pressure from environmental groups, the food industry and the public to reduce or eliminate pesticides. Few growers want to see this happen, so it's all that more important to look at the responsible use of pesticides.

INTERNAL COMBUSTION ENGINE

The introduction of internal combustion engines to our farms allowed a single person to work more ground quicker than horses could while requiring less labour than steam engines. They transformed our farms. But with climate change and pressure to lower our carbon footprint, we are seeing an evolution to electric or other systems. Reducing our carbon footprint can be looked at as a way of improving our bottom line. Using less fuel, saving fuel dollars—who can complain? But this may mean changing a lot of our ways.

Learning from history, we can tackle the next decade with a sense of the present and view to the future.

Growing pulses and soybeans are a great option—less nitrogen fertilizer. Then, we need to research ways to get better use of other elements such as P, K and more. The more we understand the soil environment and all the interactions with roots, micro-organisms, the chemicals we apply, disease and insects in the soil, the better off we'll be. Soil health has become a real focus of research and we need to continue funding this area. MPSG is on it. Some of your dollars are invested in this space.

SEED INDUSTRY

How seed is developed, who develops it, and how is it going to be paid for, are all coming issues for the next decade. With the proposal to impose royalties on seeds, we will need to re-assess our variety development and testing involvement. Your dollars have been matched with government dollars to develop new varieties and traits, but now if there will be royalties, do we continue in these programs? Do we get a share of royalties? How best do we deal with new technologies? Everything from funding to getting consumer acceptance is all a going concern.

MPSG must be involved in all these discussions, with the goal of trying to influence the system with growers' interest in mind. It's not only about having shiny new varieties. Farmers need to make a profit.

Pesticides will see lots of scrutiny for many years to come. As growers, are you seeing benefits for all products used? Are you getting a return on your investments? Are we all using them responsibly? If we all know the answers to these questions, it's much more defendable.

I strongly suggest growers review MPSG's work with the On-Farm Network program doing replicated trials. We have tested some products that show there is little or no benefits to using them—no payback on your investments. We need to do more work in this space and all farmers need to ask the question about all the products they use.

The easiest way to increase your bottom line is to not spend money on items that do not work.

I wish I had an answer to the internal combustion engine topic, but committing to efficiencies is essential. MPSG needs to focus on what we can influence, and this is not our area of expertise. It would be interesting to have an electric tractor.

At the end of the decade, what will be most important — farming profitably, being sustainable and not harming our environment?

MPSG will continue to provide the best information to farmers so that you can make decisions that will benefit your farming operations.

Let us know if there are areas you would like us to focus on.

Have a great and safe growing season!

— François ■

MPSG 2020 Strategic Plan Review

Toban Dyck, Director of Communications, MPSG

WE ASKED FOR the impossible and we got it. In January of this year, board and staff at Manitoba Pulse & Soybean Growers (MPSG) locked themselves in a room at the CanadInns in Brandon with the determination to review its strategic plan. We were successful.

This isn't news. It happens all the time. Organizations are encouraged to do this on a regular basis, and we do. We participated in one in 2017 and have reviewed that plan since. Introspection and accountability are priorities for us.

This strategic plan review was different, though. Everyone felt it needed to be. Strategic planning sessions, whether they are merely reviews or a complete rehashing of an organization's vision and mission, tend to be led by an impartial facilitator running participants through a familiar workbook that was adapted for a specific event.

We needed something different. We needed something unique to MPSG's board and staff and we needed one that addressed the specific challenges Manitoba's pulse and soybean industries are facing—2019 had novel challenges. We wanted to put this one together, relying on staff experience (many of us have been through a few strat plans).

It took us months to put together. Thinking about what we wanted out of such a session and what it would take to achieve our lofty desires took us down an intellectual rabbit hole that, at times, felt untethered and impractical. We got lost and then we'd find footing. This happened more than once.

Our premise was to come up with a day or two that would utilize and engage MPSG's staff and board. The approach couldn't be predictable and it would have to be interesting. We could all agree that there's nothing worse than boredom.

When I taught writing at Red River College, I had to take a brief course on how to teach adults. I wasn't excited about it, but I learned things such as the human brain, no matter how old or mature, doesn't want to listen to someone talk for much more than 20 minutes at a time. I also learned that equipping small groups with the required information and tasking them with figuring out solutions on their own is not only effective but also memorable and interesting.

We all came to the table with anecdotes and expertise on what works and what doesn't during strategic plans, and we drew from a deep pool to come up with what we did.

As a farmer myself, I've spent a lot of time thinking about the nature of commodity groups and how they could be the most effective. It's a tricky thing to frame thoughts around. MPSG does amazing things for its members—stuff I appreciate because I am immersed in it—but there's a parallel story taking place within agriculture.

Private companies are spending a lot of money to ensure their information reaches farmers. Few commodity groups, ours included, can compete with those dollars.

We routinely ask ourselves, how can we better serve our farmers. We produce independent, unbiased information that can genuinely benefit growers and we're intimately connected to the broader agricultural industry. We see a lot.

We see that there's a need for western soybeans to have a stronger voice in the prairies. We see that government could be pushed in ways they currently aren't. We see that market access, business risk management programs and the carbon tax have become very real concerns for Manitoba's farmers.

On January 9, following a brief in-camera session, the session began.

continued on page 7

Commodity groups can be a lot of great things, but they can't be everything.

François set the stage and then the heavy lifting started.

Here is a snapshot of some of the questions/group work we participated in. The following was taken, verbatim, from the workbooks we prepared in advance of the session:

- You're a farmer in Manitoba and you're paying a .5% check-off to a brand-new organization that is up to you to create.
- As a group, take 20 minutes to build this new association from the ground up using a $2-million budget. Designate a person to present your new organization to the group.
- What does this new association look like?
- What does it do for you?
- How does your new organization ensure high levels of satisfaction among staff and its board of directors?
- How does your new organization be a leader?
- How does your new organization ensure it's accountable, transparent and efficient?
- How does your new organization deliver value to its members?
- How does your new organization define independence and how does it achieve it?
- Using elements from each of the three presented models, determine what this new organization looks like?

Commodity groups can be a lot of great things, but they can't be everything. Something quite interesting came out of this, though. An ideal association started to come into focus.

As markets slump and governments claw back on agriculture, there is perhaps a need for commodity groups such as MPSG to start participating in what is commonly referred to as policy. This has been something on MPSG's mind for a long time, and the organization's commitment to proceed in this direction was galvanized on day two of our strategic plan review.

A policy committee has been struck and we've been working with material from the session to come up with a plan for how we can intelligently and effectively further Manitoba's pulse and soybean industries. There are a lot of groups doing great work in policy, and we have already committed to collaborating where possible, as such efforts consume a sizeable amount of fiscal and administrative resources.

MPSG will be releasing the results of its strategic plan review once all the information has been sifted through, condensed and fit into a form that will make it clear, shareable and implementable.

It was an honour to be a part of such a process. It was an honour to work with my smart colleagues at MPSG putting it together and I speak for all of us when I say I'm excited to start implementing the guiding principles this process yielded. We really did ask for the impossible, and if we didn't get it, entirely, we got dangerously close. ■

www.manitobapulse.ca

Eyes on India

How changes in domestic policy mean market access challenges for global pulse trade

Mac Ross, Director, Market Access and Trade Policy, Pulse Canada

Pulse Canada

AS THE PULSE industry work towards its goal of having 25 percent of Canadian pulse production going into new uses and new markets by 2025, it is critical to continue to address trade barriers in the markets on which Canada relies. The bulk of Canadian pulse exports go to a small number of markets. In 2019 alone, more than 60 percent of our exports went to the Indian subcontinent and China.

Over the past two years, growers and the Canadian industry have continued to feel the pinch from trade barriers into key markets. Not only are there barriers facing pulses going into India, but also for durum to Italy and canola to China, among others. While these issues may follow a similar protectionist theme and the effects in the industry have been similar, the context behind each issue can be quite different.

In India, the market access situation is being felt by countries around the world. The restrictions on pulses going into the Indian market are global in nature and refer to pulses in general, regardless of origin.

Since 2016, India has had an extremely strong political mandate to "double its farmers' income" by the year 2022. One of the goals is to achieve self-sufficiency in pulse production. As an incentive, India has continually increased the Minimum Support Price offered to their pulse growers. This has been accompanied by a number of restrictive trade measures on pulses going into India.

These restrictive measures can be broken into two buckets—technical barriers, which include fumigation requirements and weed seeds, and import policy. Starting in 2017, India began imposing tariffs on the import of peas, lentils and chickpeas and applying those equally to all origins, with the exception of the U.S., which currently faces slightly higher tariffs on chickpeas and lentils. Along with tariffs, pulse supplying countries like Canada have faced additional restrictions such as quantitative import restrictions on a number of pulse crops, most notably on peas.

On the technical barriers, Canada continues to seek a technical solution and reach an agreement based on a demonstrated ability to supply pulses that comply with India's plant health requirements. While Canada continues to work towards a bilateral agreement with India on plant protection, Pulse Canada is marshalling a global response to improve the predictability and transparency of pulse import policy.

Since these issues are global in nature, the Global Pulse Confederation (GPC) has partnered with NAFED, a government agency in India involved in domestic agricultural policy, to work towards improving access for pulses. Pulse Canada held a joint GPC-NAFED event and policy workshop with industry and Government of India officials in New Delhi in February. The goal of this meeting, which took place on World Pulses Day on February 10, was to ensure that as India strives to meet its domestic policy goals of increased production and consumption of pulses, it is done in a predictable and transparent trading environment. This would allow pulse-producing countries like Canada to augment India's domestic programs with imports when needed and enable growers in Canada to make the best planting and marketing decisions.

GPC Global Pulse Confederation

NAFED

It is very important for Canada to work with other pulse producing countries to address these market access issues. Even with the current state of barriers to the pulse trade with India, there are tremendous opportunities there. Pulses remain the most affordable source of protein for India's growing population, a third of which is vegetarian, and no country has demonstrated an ability to supply India with safe, nutritious food year in and year out like Canada. In 2019, India returned as Canada's top export market for lentils, even with a 33 percent tariff. India remains a key market for Canadian pulses and working towards resolving the market access issues will continue to be a top priority for the Canadian pulse industry in 2020 ■.

Grow
With Us

Partner with the leader in pea and new plant-based proteins!

Roquette Offers

- Yellow Pea Contracts
- Domestic Market
- Price Premium
- Price and Delivery Options

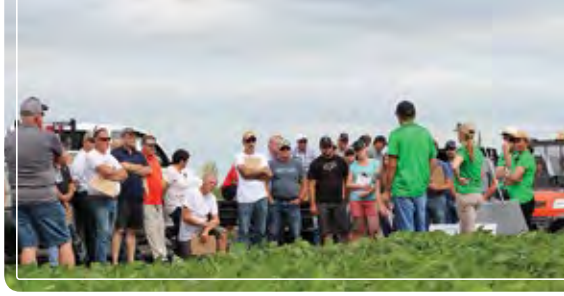
ROQUETTE
Offering the best of nature™

Contact RCL_fieldteam@Roquette.com for more information.

www.roquette.com · Follow us on LinkedIn

Nutralys®
PLANT PROTEIN BY ROQUETTE

Putting Farmers in Front of Policymakers



Erin Gowriluk, Executive Director, Grain Growers of Canada

WE ARE WELL into the New Year and Grain Growers of Canada's plan to "put more farmers in front of policymakers more often" is firmly in place.

It started with our third annual Grain Week February 18–20, 2020. That was our first outreach initiative since the 2019 federal election. We welcomed members from across the country to the nation's capital to meet with parliamentarians from the four major political parties to discuss upcoming priorities for Canadian grain farmers.

What made this year's Grain Week especially exciting, is that it was a celebration of GGC's 20th anniversary and marked the first in a series of member-led outreach initiatives. While having an annual event like Grain Week gives everyone something to look forward to, we know that to be effective in Ottawa, you have to have a consistent presence. That is why the GGC team is so excited to welcome members from Manitoba and Saskatchewan back to the nation's capital for meetings from March 23–26. In April, members from Alberta and B.C. will join us from the 20–23. These events are important to put a face to a name and ensure that farmers can interact directly with policymakers. This strategy is by far the most effective and compelling way to advance our sector's priorities.

Manitoba Pulse & Soybean Growers have and will continue to be a key contributor to GGC's national outreach efforts and 2020 will be no exception. Policymakers need to hear firsthand about the challenges that Manitoba farmers have faced with the 2019 harvest. They also need further insight as to how the carbon tax is punishing farmers who need to dry their grain after a particularly wet harvest season. This is in addition to the government's failure to make meaningful changes to business risk management programs. These decisions have left farmers in every province of this country feeling as if they have nowhere to turn for support at a time when they most need it.

On the value creation front, GGC will be leading the national conversation in 2020 to ensure the producer's perspective is front and centre. We will also work with the national value-chain associations to encourage the government to address the increasing number of market access restrictions facing many Canadian commodities.

Advancing the grain sector's priorities under a minority government requires a focus on issue-specific campaigns that will inspire support from agriculture champions across the political spectrum. Collaboration is the key to obtaining policy wins in a minority government and we have a plan to achieve just that.

To advance this work, GGC has developed an advocacy strategy which aims to:

1. Raise the profile of GGC and its key issues.
2. Raise the profile of GGC Board members and farmers and build relationships with newly elected and re-elected members of Parliament.
3. Establish GGC as a "trusted voice" and "trusted advisor" to government.
4. Optimize the 20th Anniversary of GGC in 2020 to connect the organizations and its story to decision-makers.

By creating meaningful opportunities for direct engagement between farmers and policymakers, GGC can present a united and informed grower voice—one of five "value propositions," which our team is committed to delivering to members. The other four are:

1. Providing members with real-time intelligence accompanied by critical analysis. *Active and ongoing reconnaissance in the nation's capital coupled with critical analysis ensures GGC members have what they need to develop informed policy positions.*
2. Being proactive and nimble. *GGC must retain the ability to respond quickly and decisively to issues as they arise.*
3. Building trust and community amongst members.
4. Fostering a culture of service for our member "customers."

The challenges facing grain farmers in Manitoba and right across the country are numerous and often beyond farmers' control. This year, GGC will be focused on ensuring that government understands those challenges and what they can do to minimize the impact on Canadian farmers.

Thank you for the opportunity to serve you. I look forward to what we can accomplish together. ■

Soy Canada Perspectives

Ron Davidson, Executive Director, Soy Canada

OUTCOME OF U.S.-CHINA DEAL EQUATES TO GOVERNMENT-MANAGED TRADE

For the Canadian soybean sector, the U.S.-China *Economic and Trade Agreement* signed on January 15 contains both commendable and lamentable provisions. The Chapter entitled *Trade in Food and Agricultural Products* is positive in that it contains commitments for:

- science- and risk-based sanitary and phytosanitary measures;
- technical consultations on pesticide maximum residue levels;
- enhanced public acceptance of agricultural biotechnology (GMOs);
- science- and risk-based regulations and expedient approval of biotechnology traits;
- timely management of low-level presence (albeit, in the case of "a U.S. shipment"); and
- respect of WTO obligations to publish laws and regulations pertaining to domestic support programs and policies.

Conversely, the bilateral minimum purchase obligations contained in the Chapter entitled *Expanding Trade* constitute a repudiation of the international trade promoting policy pursued by successive U.S. governments throughout the past seven decades. Rather than international trade driven by commercial considerations, the minimum purchase obligations imposed by the current deal equate to government-managed trade for at least the next six years.

Specific purchase commitments include:

- Chinese imports of U.S. agricultural goods in 2020 valued at no less than US$12.5 billion above 2017;
- Chinese imports of U.S. agricultural goods in 2021 valued at no less than US$19.5 billion above 2017;
- at the request of the U.S., Chinese endeavour to import $5 billion per year in addition to the specified minimums; and
- anticipation that the "trajectory of increases" registered in 2020 and 2021 will continue during calendar years 2022 through 2025.

SOYBEAN SECTOR BEARS THE BRUNT OF CANADIAN AND FOREIGN GOVERNMENT POLITICAL DECISIONS

Since September 2018, Soy Canada has advocated consistently for a compensatory payment for soybeans in the context of the severe and unique impacts on the sector of U.S.-China-Canada political decisions. Each succeeding month has provided

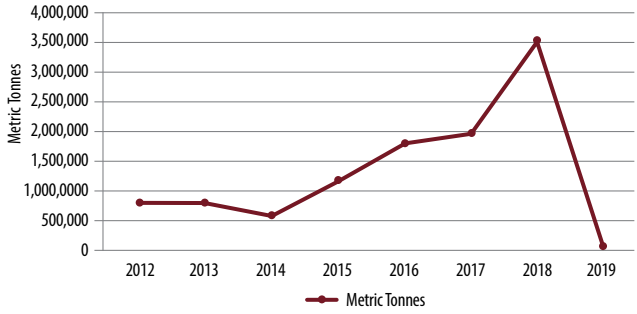
continued on page 12

continued from page 11

further evidence of the price, trade, and competitive prejudices being incurred by Canadian soybeans. For example:

- producer prices in Manitoba fell from $408.85 per tonne in May 2018 (the beginning of U.S.-China trade dispute and decreasing futures prices on the Chicago Board of Trade) to $362.77 per tonne in May 2019, a decrease of 11.3% or $46.08 per tonne;
- heavily subsidized soybean imports from the U.S. into Canada exploded from 281,156 tonnes in 2016 and 385,550 tonnes in 2017 to 781,880 tonnes in 2018 and 506,692 tonnes during the first eleven months of 2019;
- Canada exported, on average, only 4,196 tonnes of soybeans to China from January–November 2019, representing only 2.4% of the 2015–2018 four-year annual average of 175,461 tonnes per month (see graph); by comparison, Canada exported, on average, 129,007 tonnes of canola to China from January–November 2019, representing 36.9% of the 2015–2018 four-year annual average of 349,322 tonnes per month; and
- contrary to every year from 2015 to 2018, and coinciding with a political decision by the Government of Canada, this country did not export a single shipload of soybeans to China during the eleven months from January–November 2019.

SOYBEAN EXPORTS TO CHINA 2012–2019



CERTIFICATION OF SUSTAINABILITY

Exporters returning recently from visits to the European Union and Japan reported consistent client requests for certification of Canadian soybean sustainability. The urgency of rapid progress by Canada in sustainability certification is propelled not only by foreign consumer demand and government regulation but also by aggressive U.S. promotion of its Soy Sustainability Assurance Protocol (SSAP). SSAP is a certified aggregate approach audited by third parties that verifies sustainable production at a national scale. It is quantifiable and results-driven with mass balance international verification available.

In collaboration with others in the value chain, Soy Canada has initiated an analysis of key factors such as specific certification requirements by market and by end-use as well as the potential imposition of any associated new requirements on both producers and industry.

MARKET DEVELOPMENT MISSION TO EUROPE

Soy Canada led a market development mission for both processing/crushing and identity-preserved soybeans to Italy, Belgium, the Netherlands and Germany from November 21–29, 2019. In each location, the delegation presented a seminar, met with importers and visited soy-related businesses.

Highlights of client comments included: (i) the current or rapidly approaching necessity of sustainability certification of soybeans for use as feed, food, and fuel; and, (ii) the importance of further increasing both the protein and oil content of Canadian soybeans.

MARKET ACCEPTANCE OF PESTICIDE USE POLICY

Soy Canada has joined other value-chain organizations in the grains and oilseeds sector in the approval of a *Market Acceptance of Pesticide Use Policy*. The policy strives to provide an appropriate balance between enabling the commercialization of innovative new chemistry/crop use pattern products while ensuring that Canadian exports are not exposed to unacceptable trade risk. The objective of the Policy is to proactively evaluate the maximum residue level-related trade risk of chemistry/crop use patterns with new or amended registrations. When value-chain representatives determine that the potential for a maximum residue level-related trade disruption is unacceptable, a recommendation on the use of the chemistry/crop use pattern will be developed for the applicable crop year and communicated throughout the value chain. ■

Clancey's Stats

Pulse market analysis

Brian Clancey, Senior Market Analyst and Publisher, STAT Communication

PRODUCTION PROBLEMS IN many net exporting countries have changed the tone of international pulse markets, with prices for many commodities looking like the recent upward trend in prices will be maintained. That could be the case through at least this year's northern hemisphere harvests.

As was the case with India's Kharif season crop, farmers in many parts of the world faced significant weather challenges this year.

Unusually dry conditions in Australia have been making headlines because of widespread bush fires. By contrast, farmers in India, Canada, the U.S. and parts of Europe struggled with excess rain during planting.

The resulted seeding delays not only increased the risk of poor weather during harvest, but in general, the later crops are seeded, the lower their yield potential.

That proved to be the case with much of North America's pulse crop. Dry edible bean yields were, on average, 22% lower than in 2018, chickpeas 7% lower, while pea yields slipped a modest 1%. By contrast, lentil yields for the Canadian and U.S. crops were 21% higher on average than in 2018.

INDIA AND THE WORLD MARKET

India's pulse harvests are always controversial. Assertions that the government does not know how many farmers there are in-country compounds the problem, with many market participants believing official crop estimates are overly optimistic.

There is an expectation the second advance estimates for the 2019–20 production cycle will show a massive drop in the Kharif season pulse output from last year. However, the losses in the summer crop could be more than offset by the rabi crop, which should benefit from the late withdrawal of the 2019 monsoon.

Assuming average yields for the rabi crop, total pulse production in India across its 2019–20 production cycle could reach 22.27 million metric tonnes (MT), down from 23.4 million last year. The implication is not only that imports could decline during the 2020 calendar year, but there appears to be no incentive to moderate import policies for pulses.

Though India is no longer a key destination for peas and desi chickpeas, total pulse imports are currently averaging 2.5 million MT per calendar year. This is well below the average of

continued on page 14

continued from page 13

5.3 million MT imported between 2013 and 2017. Demand should remain muted through the end of 2021, but there is a possibility import needs could start building again by 2022 unless there is continued expansion in that country's domestic output.

India's reduced presence on world markets has not resulted in an overall reduction in international trade in all classes of pulses. During the previous five years, global exports averaged just under 17.12 million MT per year. An estimated 16.23 million MT was exported last year and movement could reach 16.92 million MT in 2020.

CHINA AND U.S. TRADE

A fundamental change has been the trade tensions between China and the U.S. Reduced purchases of U.S. origin soybeans prompted livestock feed manufacturers in the country to look for alternative products, resulting in a surge in demand for field peas.

After averaging around 860,000 MT per year, Canadian exports jumped to 1.89 million during the 2017–18 marketing campaign and 1.79 million last season and are on pace to exceed last season's totals during its 2019–20 marketing campaign. Shipments to China between August and November topped one million MT, with the product going to feed manufacturers, noodle makers and fractionation plants.

A lot of attention was focussed on the spread of African swine fever in China and the steep reduction in hog numbers in the country. However, it appears most of the decline was borne by small producers, while commercial operations faced fewer issues with the disease.

Unlike large scale, commercial hog operations, small producers do not generally use manufactured feed. As a result, there has not been a significant change in the demand for feed ingredients. That has helped sustain China's field pea imports, with feed manufacturers taking advantage of the fact peas contribute energy, protein and lysine.

DEMAND FOR LENTILS IN 2020

The overall demand for lentils has also started the North American 2019–20 marketing year on a strong note. Worries about the Kharif crop resulted in increased movement of lentils to India, where some millers used green lentils as a substitute for tur or pigeon pea.

Purchases by resellers in Turkey and the United Arab Emirates are also higher than last year. Much of the product is destined for regional buyers, many of whom find it hard to buy directly from exporters in Canada or the U.S..

Sanctions are a problem for some. Local economic issues are a problem in some countries, while widespread civil unrest and wars have reduced pulse production in many countries in northern Africa and the Middle East. Overall consumption is likely down from 10 to 15 years ago, but underlying import demand remains relatively strong.

Demand fundamentals are being helped by the fact there have been significant problems with crop quality in Canada, the U.S. and parts of Europe. Problems with plant diseases and weathering resulted from a wet growing season that delayed both seeding and harvest operations in many areas.

Exporters do not seem to be having problems buying good-quality products from farmers, though the prices they need to pay have been trending upward since the start of the marketing year. The reason is a lot of pulses were carried over from the 2018–19 marketing year.

In North America, residual stocks of lentils and chickpeas were well above the previous five-year average. At the same time, the average quality of old crop lentils and chickpeas is better than new crop, making it easier for exporters to fulfill sales contracts.

PEA PRICES

Quality issues are less evident in peas because the industry is seeing good demand from both animal and human consumption markets. On the other hand, it is becoming more obvious in dry edible bean markets. Prices offered to farmers for most classes are trending upward as processors and exporters work to cover outstanding shipping commitments.

DRY EDIBLE BEANS AND PULSES IN 2020

Dry edible bean markets are being helped by an ongoing fundamental shortage of domestic production in Mexico. Opening season exports from the U.S. to Mexico are up over last year, with processors confident demand will remain relatively stable through the balance of the 2019–20 marketing campaign.

One byproduct of quality issues with the 2019 harvest is that for most pulses, domestic disappearance could be higher than initially expected. Farmers may divert the worst product into domestic livestock feed markets. But, the amount fed to livestock can only be inferred from stocks in all positions estimates because there is no statistical reporting in Canada or the U.S.

Quantities of pulses used by the domestic food industry are also hard to estimate. Usage appears to be growing significantly. There has been a recent expansion in the fractionation capacity based on the market potential for protein from peas and other pulses. However, further development of that sector may be limited by the difficulty in developing demand for starch. Modern facilities are expensive and face significant challenges. The demand for pea fibre and starch is not growing at the same pace as pea protein. There is a belief global demand for pea protein isolates will quadruple by 2025, creating a more significant marketing challenge for starch and fibre.

That seems to be constraining expansion in Canada because it affects return-on-investment calculations and projected profitability. Modern plants easily cost $100 million or more, giving an advantage to global companies that also produce compound feeds. Plant breeders are trying to help by developing varieties with an average 28% protein and some companies are trying to drive farmers to focus on protein by offering premiums.

Fractionation demand is not significant relative to the quantity of pulses produced, but it increases competition for the product from farmers. As competition to buy from farmers increases, the average price paid to farmers also tends to increase, ultimately affecting export asking prices.

Improved demand is expected to result in an overall reduction in residual stocks of pulses before the next harvest. The question is whether farmers will respond by increasing how much they plant this year.

continued on page 15

Manitoba is Serious About its Protein Potential

Toban Dyck, Director of Communications, MPSG

MANITOBA IS SERIOUS about its protein potential, which, right now, seems almost limitless.

The idea of having a one-on-one with the Honourable Blaine Pedersen, Manitoba's Minister of Agriculture and Resource Development, seemed like a long shot. But what if he said yes? What if he'd be willing to introduce himself to our members and talk to us about where he sees agriculture going in Manitoba?

He said yes.

"Up until recently, we've been reluctant to market ourselves," said Pedersen. "As a government, we keep reminding all of our stakeholders to stop being so humble and start talking about the things that we have. It's happening now."

What is your vision for agriculture in Manitoba?

The vision for government is the food-processing industry. The more we can do secondary processing in Manitoba, the better it is for the agricultural community and the economy. It's the farmer in me that makes me an eternal optimist. There's really a bright future for Manitoba and for agriculture.

There are environmental benefits to growing pulses and soybeans. How do pulses and soybeans fit into the province's green plan?

It fits in with our protein strategy. Whether it's using the plants in a plant-protein base or as a protein supplement for the animal protein side, pulses are there and soybeans are, too.

What is the latest on the province's protein strategy?

Minister Eichler, back in September when he was Agriculture Minister, had the Manitoba Protein Advantage Strategy kick-off. We have just appointed what we call our protein consortium. It's made up of advisors out of—not only producer groups—but industry, academia, and the food industry.

We're asking them for their advice on how, as a government, we can move forward to enhance the protein industry here in Manitoba.

Pulses seem to dominate the protein/processing discussion. Is there room for soybeans to be a part of that, as well?

Soybeans and pulse crops form an integral part of crop rotation. Both have tremendous potential for further processing right here in Manitoba.

How big is the protein industry going to get in Manitoba and how will the province deal with it?

We think this is just the start. We have abundant water capacity. We have electricity. We have transportation and we're no different than any other jurisdiction when it comes to a skilled workforce. I liken it to the big box mentality: as we're building our industry here, more will come.

The markets have been poor for soybeans and pulses. Is there something the province of Manitoba can do to support farmers during times like these?

We made some small changes to crop insurance. We know that agriStability has its challenges. Business risk management programs are all federal-provincial agreements. This current agreement runs out in 2023, so if we're going to make changes to anything, we need to be working on that now. We are looking at some changes.

On the marketing side, as a government, we are becoming much more aggressive on getting out there.

It's our role to be out there promoting our clean, green environment and building trust between governments. We all know how governments can get in the way of trade agreements. It's government's role to step back the political side of it and keep the science in trade.

What is the province going to do to maintain good roads and good infrastructure around transportation?

Let's make sure our trade corridors are in good shape. The hub and spoke mentality—If this is the hub, how do we make sure the roads leading to it are good. We are increasing spending on roads. We look at the return on investment when we invest in roads.

Pedersen was clear that he wants to hear from farmers and farm groups and work in harmony with them on solution-based approaches to the ag industry's challenges. On behalf of Manitoba's pulse and soybean growers, thanks, Minister Pedersen, for taking the time. ■

continued from page 14

2020 MARKET OUTLOOK SUMMARY

Though trending upward, the average gross potential income from pulses is not as competitive with other crops as it has been in the past. That could change if farmers continue to see an upward trend in bids through February and March. Most already know how much land they will dedicate to pulses based on crop rotations. Depending on market signals in February and March, the amount of land used and how much of each type of pulse sown will be adjusted.

At the moment, it seems likely land in lentils will be little changed, while farmers could reduce land in peas and Kabuli chickpeas while planting more dry edible beans. Even so, supply and demand outlooks for the 2020–21 marketing campaigns in net exporting countries suggest prices for pulses could resume their upward trend after setting their harvest lows. ■

He Revolutionized Manitoba's Bean Industry

Dr. Robert Conner

Toban Dyck, Director of Communications

DR. ROBERT CONNER is a research scientist. His first computer was a TRS-80 (look it up). He volunteers at the Pembina Valley Humane Society, where he earned the trust and friendship of Simon, an abused rescue dog that arrived terrified and distant. And Dr. Conner was instrumental in revolutionizing the bean industry and he will be retiring this year.

"I've been with Agriculture and Agri-Food Canada for 38 years and I turned 65 last fall, so I figured now would be a good time," he said. "I've spent half my time at the Lethbridge Research Centre – 19 years there and it'll be slightly over 19 years here (Morden, Manitoba) by the time I retire."

It was the '70s. University of Manitoba plant pathologist and professor Claude Bernier was teaching a third-year course in plant disease control. Conner thought it would be interesting. He took it, and then he took some more like it and then he forever changed Manitoba's dry bean industry.

Anthracnose hasn't been detected in years. Cultivars with resistance to common bacterial blight (CBB) are now available in several market classes of dry beans and new sources of white mould resistance are starting to enter the picture.

I spent two hours with Conner, but that wasn't enough. A picture started to emerge of a man whose depth not only resided in his scientific contributions to Manitoba's and Canada's agricultural industries but also in his character.

Conner has worked closely with Manitoba Pulse & Soybean Growers (MPSG) over the decades. He even sat on MPSG's board of directors in an advisory capacity for several years.

This article should be about science, but if I am to write about what I took away from my time, I'd be ignorant not to mention the fact that Conner is a role model of a human being. His responses to my questions were paced, thoughtful and had the gravity of someone who cares.

If it weren't for my pressing, Conner would have happily spent the entire time talking about how the successes MPSG was attributing to him actually belonged to his colleagues, farmers and funding partners.

He views his contributions to agriculture as the result of relationships, collaborations and the steady march of scientific progress. I would add that his focused, inquisitive and dedicated mind played a pivotal role, as well.

I asked him to recount a eureka-moment in his distinguished career. His answer was unexpected.

"A few years ago, the Canadian Journal of Plant Pathology did a series of articles by senior plant pathologists and I was reading one by an old instructor of mine. He said he never had a eureka-moment. I found the same to be true. It's an incremental improvement. I can't think of anything specific where I knew that I had discovered something that nobody else had ever thought of."

When Conner arrived at the Morden research station on April 2, 2001, anthracnose was at about its worst in navy and pinto beans.

How did you tackle anthracnose?

The late Allister Duncan, owner of Duncan Seeds in Manitoba, made a big impact on the bean-growing industry here in Manitoba. For a while, Duncan was coming to the research station every week to talk to us about the different ideas he had. We had an industry meeting in the early '80s and he had a whole list of ideas seed companies should be doing to control anthracnose. I think all of the major bean-producing companies decided to follow his protocol.

He was probably in his 60s and he would go into the fields after they'd been swathed and inspect them for anthracnose. I'm sure in the long run, it meant that millions of dollars had been saved. Duncan was bouncing ideas off of me. He had the respect of everyone in the seed business, so it didn't sound like someone from an ivory tower was coming up with solutions.

What has your research focused on during your time at Morden AAFC?

I've worked a lot on common diseases in beans. Recently, we've worked a lot on CBB. There are new sources of resistance to that disease that seem to be really effective and that's our most widespread foliar disease, even when anthracnose was a problem. We still see the blight in almost every field.

Resistance has come from a related species called tepary bean. There are a number of genes in that species that breeders have been using, and some provide more complete resistance than others do, so we've been working with breeders to screen their material, to see which lines have a high yield and good resistance.

CBB can reduce your yields—especially in wet years—by about 25–35 percent and it discolours the seed, so it affects the market value of the seed you do harvest. It's a big one. Beans are prone to quite a

continued on page 17

continued from page 16

few diseases, but anthracnose and CBB are the big ones.

We've also been working with Debra McLaren at the AAFC station in Brandon on root diseases. She's had a couple of post-docs working on molecular methods of detection for the various root rot pathogens. We're hoping that this will enable farmers to bring in soil samples or root samples into a lab and they can be told what the risks are of growing a crop on that field.

They're taking the same approach to soybeans and field peas, as well.

What are you most proud of in your career?

Because anthracnose was such a big problem when I came, we learned a lot about it in the first 10–12 years I was here. The breeders were really serious about trying to get resistant varieties for that. So, I'm quite pleased. And the fact that we could get resistance to CBB. The emphasis over the last number of years has been to combine resistance to both those diseases, because, from a yield standpoint, they are probably the industry's biggest threat.

In the long run, root diseases may be a larger problem. The fungi that cause those diseases produce different kinds of spores that can survive in the ground for long periods of time and some of them have broad host ranges.

We have done some research in trying to identify sources of resistance and we have found some lines that are not entirely resistant but are not as bad as the worst varieties that are out there.

That's been gratifying.

I'm connected to people in Ontario, Saskatchewan and Alberta. I also received great support from Dr. Ken McRae, a statistician in Nova Scotia, several scientists in North Dakota and the wonderful, ongoing help from my two technicians, Waldo Penner and Dennis Stoesz. It's been a really good group of people. It's meant that we could get so much more done in a short period of time and help everybody.

That's been a real benefit.

What is your relationship with MPSG – first memories?

I was always impressed with MPSG. Back in those years, they were looking at establishing new markets in Mexico. There were several trade missions that went down to Mexico and I think our bean breeder at the time went down with them at least once and was able to connect varieties being developed in Morden with these new Central American markets.

The pulse tour here is always a treat. MPSG is a remarkable group.

What was your first computer and how has technology helped your discipline?

It was a TRS-80. It was a stand-alone thing. It was pretty rudimentary, but it was good to learn on. There was kind of a giant leap forward when computers became much easier to use. Statistical programs became much easier to run. In the old days, if you

continued on page 18

continued from page 17

had just one incorrect word, the program would just shut down and you couldn't do any more processing.

The same technology used to identify the coronavirus is being used to identify some of the pathogens that we're working on. The only thing is going to be cost. When you have a huge pandemic, then you're willing to spend a lot of money. Money becomes hard to find on diseases on what are considered minor crops.

Now, the rapid sequencing of genomes is so much better and so much cheaper.

Where do you think research dollars should go?

Programs like the Canadian Agricultural Partnership and Growing Forward have allowed us to match and sometimes triple the money we get from groups like, say, MPSG. I think the members of MPSG receive great returns on the money they have invested in the development of new dry bean cultivars with multiple disease resistance and the development of field peas with resistance to root rot.

I think we're really going to see the benefits of this work in the coming years. People will be able to send in their samples and get a full idea of risks—rapid disease identification.

How has the discipline of pathology changed over the years?

It's become much more rapid and precise. It's getting better all the time. The kinds of studies they're doing now are getting really complex—you almost need to google some of the terminology.

What are the big challenges in agriculture?

They are finding ways to improve yield, and they'll need to find ways to be more sustainable. Pulses fit into that. One of the biggest producers of greenhouse gases is fertilizer production, so if you have plants that are efficient in fixing nitrogen, then that cuts down a lot in that regard and it makes pulses and soybeans a great choice.

We need better rotations and better understanding. There's always a worry that new pathogens will surface or dormant ones will become active. If global warming is something that is happening, we could see things like new insects and diseases become more severe early in the growing season.

What do you enjoy doing when you're not at work and what are you going to do when you retire?

I volunteer at the Pembina Valley Humane Society. I do chores twice a week. I go there on Wednesday and Thursday, after work and I close up the place on Saturday and Sunday. It's been quite gratifying. You get your favourites and I'm always happy to see when a dog or a cat gets adopted.

Sometimes they come in and they're frightened if they've been abused. We had this dog, Simon, who was terrified. He hid in a corner the first week he was there. I would always give him a treat. Now, after about three weeks, he'll follow me outside and he sticks close to me. It's been a real positive thing.

Also, lately, I have been studying my family history. I'll take some time and put it all together. I'd like to do that. ■

Coverage Protection Peace of Mind

AgriInsurance provides you with production and quality guarantees against losses on over 70 grain, oilseed and forage crops, including reseeding benefits and the inability to seed due to excess moisture.

NEW FOR 2020

- Yield Trending for 8 crops
- Contract Price Option
- Novel Crops reseed benefit
- Organic insurance for fall rye

DEADLINE TO APPLY

March 31, 2020 is the last day to apply for AgriInsurance or change your coverage or crop selections.

To create your customized insurance plan, contact your MASC office or visit **masc.mb.ca**.

@MASC_MB

MASC
Manitoba Agricultural Services Corporation

CANADIAN AGRICULTURAL PARTNERSHIP

Manitoba

Canada

Fitting Pulses and Soybeans Into Your Crop Rotation

The Bean Report
Your source for soybean and pulse crop agronomy and research.

Cassandra Tkachuk, MSc, PAg, CCA, Production Specialist, MPSG

THE RECOMMENDED PRACTICE to combat many agronomic issues is to diversify your crop rotation. But what is considered a "good" rotation and how do pulse and soybean crops fit in? We ask this question because soybeans are still relatively new to our cropping systems in Manitoba, peas are making a comeback and dry bean acres are expanding in some regions.

CROP SEQUENCE VS. ROTATION

First, it's important to define terms like sequence and rotation. A crop sequence is the order of crops grown throughout one phase of a longer-term crop rotation. An example of a four-year crop sequence in Manitoba may be spring wheat–soybeans–oats-canola. Many different sequences can make up a rotation.

Plenty of research has been conducted over the years on crop sequences and rotations. The tricky part is applying the results to your farm. This is mainly because specific crop sequences were tested under specific conditions across different studies.

The goal of this research is to generate principles that can be adopted and experimented with on your farm over time. The keywords here are "your farm" and "time." The ideal crop rotation will look different for everyone and the benefits or detriments of a given rotation will evolve over the long term.

CROP ROTATION PRINCIPLES

Here is a list of principles that have held true over time and apply to you right now:

Adapted from Dr. Dwayne Beck's list of crop rotation rules (Dakota Lakes Research Farm, South Dakota State University).

- Rotations that are not consistent in either crop sequence or crop interval will guard against shifts in pest species and minimize the probability of developing resistant, tolerant or adapted pest species. In other words, more diversity equals greater resilience against pest pressure.
- At least a two-season interval between growing a given crop or crop type is preferred. Some broadleaf crops require more time.
- Rotations should be sequenced to prevent volunteer plants of the previous crop from becoming a weed problem. This includes sequencing crop herbicide systems that are now available to farmers (e.g., Roundup Ready, Xtend or Enlist soybeans).
- The use of forage or flexible forage/grain crops and cover crops enhances your ability to adjust rotational intensity.
- Perennial plants grown in rotation offer greater long-term sustainability. Incorporation of perennials into a crop rotation is easier when livestock are a part of the system.
- Soil moisture storage is affected by surface residue amounts, the duration between crops, snow trapping ability of the stubble, rooting depth characteristics, soil characteristics, precipitation patterns and other factors.
- In drier regions, reduced- and no-till systems favour a more diverse array of crops.
- The desire to increase diversity and intensity needs to be balanced with profitability.

At MPSG's 2019 Soybean Management and Research Transfer (SMART) Day event, farmers were asked which factors are important to them when planning their crop rotation. From the list of eight considerations provided on the questionnaire, 88% of the 32 total respondents checked off weed pressure, 84% yield potential, 78% economics, 59% disease pressure, 56% residue management, 50% soil health and 41% market access and insect pressure.

Outside of this list, farmers also listed chemical residue and rotation, prevention of pest resistance, residual N and P levels, manure management, time to maturity of a crop and opportunities after harvest, intercropping opportunities, flood risk, past and present weather events and workload (i.e., planting and harvesting capacity). What ranks as most important clearly varies by farm.

BREAK INTERVALS AND SEQUENCES

A diverse crop rotation in Manitoba is considered to employ at least four different crops over a four-year period. Growing at least three different crop types over a three-year period is the minimum amount of diversity necessary to achieve crop-rotation benefits.

Four years is the minimum break interval recommended between pea crops due to the potential impact of *Aphanomyces euteiches* root rot. If this disease is known to be present in your fields, a longer break period between pea crops (6–8 years) is recommended. According to crop insurance data in Manitoba, we see a yield benefit from growing peas every 4+ years and yield penalties from growing them more frequently (Figure 1). That is in line with what most farmers are already doing in Manitoba, according to our SMART Day questionnaire.

Recent research on soybeans has proven their flexibility within Manitoba crop rotations. Studies led by Dr. Yvonne Lawley at the University of Manitoba and Dr. Ramona Mohr at Agriculture and Agri-Food Canada (AAFC) – Brandon have looked at soybeans in rotation, including the impact of preceding crop on soybean performance and the impact of soybeans on subsequent crops.

Dr. Lawley's two-year crop sequence trial (2013–2014) at Carman, Portage and Kelburn confirmed that the preceding crop had a minimal or inconsistent effect on soybean yield. Corn, wheat or canola as a preceding crop to soybeans produced consistent yields, whereas yield

continued on page 21

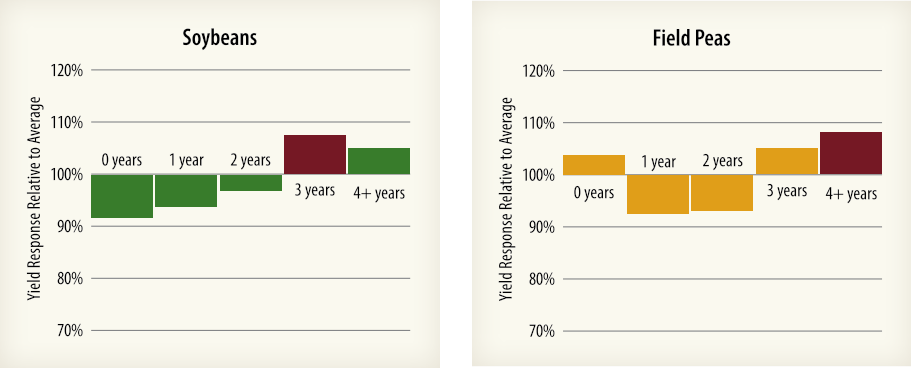


Figure 1. Average relative yield of soybeans and field peas grown after different break intervals between crops (2000–2010). Source: Manitoba Agricultural Services Corporation (MASC).

was penalized in the soy-soy sequence in one out of the five site years. Soybean N-fixation was highest in the corn-soy sequence and lowest in the canola-soy sequence. Arbuscular mycorrhizal fungi (AMF) colonization was greatest in the corn-soy and soy-soy sequences.

An additional study on crop rotation was launched by Dr. Lawley comparing continuous soy, corn-soy, canola–soy and wheat–canola–corn–soy rotations over a four-year period (2014–2017). To date, little to no differences in yield and soil health factors have been observed among rotation treatments. However, these results could change over time.

In Dr. Mohr's crop sequence study at Brandon and Morden, various combinations of soybeans, wheat and canola were tested over a three-year period. These sequences had a minimal impact on yield, root rot severity and seed quality. In a six-year rotation study (2011–2016) continuing certain combinations of soy, wheat and canola, root rot pressure increased under the canola–soy rotation compared to soy–wheat–canola rotation. By the final year, wheat and soybean yields remained consistent regardless of preceding crop, whereas canola yields benefited from greater crop diversity.

For more details on these or other related studies, visit our research database at manitobapulse.ca. Continuations of these studies have also been launched to learn about the long-term effects of soybeans in rotation. We will be staying tuned for the results.

According to our SMART Day questionnaire, farmers often listed more than one crop option when asked what they typically plant before soybeans. Cereal crops were listed in 72% of responses, canola in 47%, corn in 25%, soybeans in 16% and other crops like sunflowers and tall fescue were listed in 3% of responses. When asked how often they grew soybeans, most said every 2–3 years. According to MASC data, the best yields resulted from waiting at least three years before growing the next soybean crop (Figure 1).

WHAT IS UNIQUE ABOUT PULSES AND SOYBEANS?

N-P-K Nutrition

One benefit of pulse and soybean crops in rotation is their ability to fix atmospheric nitrogen (N) with the help of Rhizobium bacteria. This means they require less N-fertilizer than other crops. However, the ability of each crop to fix N varies. On average, faba beans can fix 84% of their total N-requirement, lentils and soybeans 58%, and peas 52%. Dry beans currently rely on N-fertilizer. However, this may be changing soon, thanks to ongoing research and inoculant products coming on the market.

The "N-credit" of pulses to succeeding crops is often promoted. Pulses can indeed increase the level of available N in the soil through microbial decomposition of roots, root exudates and old nodules. But the amount of N provided to the next crop is difficult to measure. The potential for an N-credit also depends on the crop type. Faba beans, lentils and peas can provide a small N-contribution to the next crop, whereas soybeans result in a neutral or negative N-balance due to the amount removed in harvested grain.

On the flip side, these crops are heavy users of phosphorus (P) and potassium (K) and efficient at extracting these nutrients from the soil. Due to low safe rates of seed-placed P and K for pulse and soybean crops, adequate amounts of these nutrients cannot be placed with the seed and must be balanced throughout the rotation (i.e., built up in crop years that can handle it, like cereals).

Growing Season Length

Field peas, certain dry bean market classes (navy, pinto and black beans) and lentils generally have a shorter growing season (~90–100 days to maturity). This offers flexibility at both seeding and harvest time. Peas and faba beans can be seeded earlier due to their frost tolerance, providing even greater flexibility. Early harvest of short-season crops that have ceased evapotranspiration allows for more significant soil moisture conservation and creates an opening for fall-seeded cover crops.

Pests

Except for a few common pathogens, pulse and soybean crops are hosts to a different range of diseases than other crops grown in Manitoba (Table 1). This means their presence in a rotation can reduce the impact of certain diseases. This is indicated by the missing checkmarks in Table 1.

Common pathogens like Fusarium, Rhizoctonia and Pythium root rot have potential to infect many crops, although they may not be an issue in all crops. Other diseases like Aphanomyces and Phytophthora root rot have a narrower host range, remaining exclusive to pulses and soybeans, respectively. A disease like Sclerotinia can infect many broadleaf crops, but its development is interrupted by cereals and corn.

There are two important disclaimers for this table:

1. it is a listing of soybean and pulse diseases only and
2. some of the diseases in this table are listed only at the genus level, meaning certain diseases may not infect all check-marked crops at the species level. In other words, this table was created on the cautious side when depicting common pathogens among crops.

continued on page 22

continued from page 21

Table 1. Pulse and soybean pathogens common to different crop types grown in Manitoba.

Disease	Soys	Dry Beans	Peas	Faba Beans	Lentils	Chickpeas	Wheat	Oats	Barley	Corn	Canola	Sunflowers	Flax
FUNGAL DISEASES													
Fusarium spp.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rhizoctonia solani	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pythium spp.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Aphanomyces euteiches		✓	✓	✓*	✓	✓							
Phytopthora root rot (*P. sojae*)	✓												
Ascochyta blight (*Ascochyta* spp.)			✓	✓	✓	✓							
White mould (*Sclerotinia sclerotiorum*)	✓	✓	✓	✓	✓	✓					✓	✓	✓
Septoria brown spot (*Septoria glycines*)	✓												
Downy mildew (*Peronospora* spp.)	✓		✓										
Powdery mildew	✓		✓	✓	✓								
Rust (*Uromyces* spp.)***	✓**	✓	✓	✓	✓								
Septoria leaf blotch (*Septoria pisi*)			✓										
Anthracnose (*Colletotrichum* spp.)	✓	✓		✓	✓								
Frogeye leaf spot (*Cercospora sojina*)	✓												
Pod and stem blight (*Diaporthe/ Phomopsis* spp.)	✓											✓	
Phomopsis seed decay (*P. longicolla*)	✓												
Chocolate spot (*Botrytis* spp.)				✓	✓	✓							
Phyllosticta leaf spot	✓												
Alternaria			✓	✓								✓	✓
Charcoal rot (*Macrophomina phaseolina*)	✓**									✓		✓	
Stemphylium blight					✓								
Septoria leaf spot					✓								
BACTERIAL DISEASES													
Bacterial blight (*Pseudomonas/ Xanthomonas* spp.)	✓	✓	✓				✓			✓			
Halo blight		✓											
Bacterial wilt		✓											
NEMATODE DISEASES													
Soybean cyst nematode	✓	✓											

* Crop species has partial resistance to pathogen. ** Not yet identified in Manitoba. *** Rusts that infect pulses and soybeans are distinct from one another.

These crops also have a different and narrower range of insect pests than other crops. Refer to MPSG's new and updated insect and disease scouting calendars for field peas, dry beans and soybeans at manitobapulse.ca.

Soil Quality

Past research has linked pulses to improved soil quality. This means physical properties such as improved soil workability, reduced soil hardness and increased soil moisture retention. Pulses have also been shown to improve biological factors such as an increased soil microbial population and diversity, and greater colonization of roots by AMF, which helps mycorrhizal crops access and take up soil P.

IN THE RESEARCH PIPELINE

Several new studies on crop rotation involving pulses and soybeans have been launched recently across western Canada (Table 2). ■

Table 2. New studies on crop rotation involving pulses and soybeans launched recently across western Canada.

Research Lead	Project Info	Duration	Funder
Dr. Yvonne Lawley, University of Manitoba	**Frequency of soybean in Manitoba crop rotations** • Continuation of a previous rotation study • Continuous soybeans compared to other rotations, including canola, corn and spring wheat. • Two other companion projects looking at rhizobium survivability and disease pressure.	2018–2023	Integrated Crop Agronomy Cluster (including MPSG)
Dr. Ramona Mohr, Agriculture and Agri-Food Canada	**Economic and agronomic performance of emerging cropping systems for western Canada** • Continuation of a previous rotation study. • Crop rotations involving soybeans and corn grown in non-traditional areas.	2018–2023	Integrated Crop Agronomy Cluster (including MPSG)
Kristen MacMillan, MPSG/University of Manitoba	**Effect of preceding crop type and residue management on dry bean productivity** • Pinto beans seeded into wheat, corn, canola, pinto bean and oat stubble.	2017–ongoing	MPSG – Agronomist-In-Residence program
Dr. Charles Geddes, Agriculture and Agri-Food Canada	**Management of glyphosate-resistant (GR) kochia in western Canadian cropping systems** • Impact of crop diversity (two and four-year rotations), crop life cycle and integrated cultural controls on GR kochia	2018–2023	Integrated Crop Agronomy Cluster (including MPSG)
Dr. Yantai Gan, Agriculture and Agri-Food Canada	**Optimizing systems productivity, resilience and sustainability in the major Canadian ecozones** • Nutrient use efficiency, system resiliency and long-term soil health using contemporary crop rotations.	2018–2023	Integrated Crop Agronomy Cluster (including MPSG)

For more information on these studies, visit the Western Grains Research Foundation (WGRF) website (westerngrains.com).

TagTeam® LCO

RESULTS FOCUSED

The power of three.

We can optimize your soil health and plant growth on every acre, from start to finish.

TagTeam LCO is a triple-action inoculant that builds a better crop by:

- Nitrogen fixation (*Rhizobium*)
- Early season phosphate availability (*Penicillium bilaiae*)
- Earlier nodulation development - LCO (lipochitooligosaccharide)

NexusBioAg will help maximize your pulse crop results with TagTeam LCO. Call your NexusBioAg rep today.

Your solution for crop nutrition. **nexusbioag.com**

NexusBioAg

Status of Root Rot Diseases in Soybeans, Peas and Dry Beans in 2019

Research by Dr. Debra McLaren, Dr. Yong Min Kim, Dr. Robert Conner at Agriculture and Agri-Food Canada and adapted by Laura Schmidt, MPSG

SOYBEANS

In 2019, 68 soybean crops were surveyed in Manitoba for root diseases. Root rot was observed in all soybean crops that were surveyed. Root samples from 40 of 68 Manitoba fields were assessed in the laboratory for root pathogens and Fusarium root rot was the most prevalent root disease (Table 1). Rhizoctonia root rot (*Rhizoctonia solani*) was detected in one of the 40 Manitoba crops surveyed in 2019. Pythium root rot was not detected in any of the soybean crops surveyed. On a scale of 0–9, root rot severity ratings ranged from 2.7 to 6.2 with a mean of 4.3. Forty-one (60%) soybean crops had average root rot severity ratings above 4 (i.e., symptoms were present on 50% of the root system) and this would have had a detrimental effect on crop yield. Analysis of root tissue for detection of nucleic acid targets of multiple pathogens using droplet digital PCR (ddPCR) is ongoing and will provide additional information on the root rot complex of soybeans.

Five percent of the soybean crops (4/83) tested positive for the presence of Phytophthora root rot. Approximately 168 stems from Manitoba soybean plants, were plated on petri dishes to identify Phytophthora based on their morphological characteristics. Pathotype identification of the Phytophthora isolates will begin shortly.

Table 1. Prevalence and severity of root rot in 68 soybean crops surveyed (83 surveyed for PRR) in Manitoba in 2019.

		Disease severity (0-9)[a]	
Disease	No. crops affected (%)	Mean	Range
Root rot	68 (100%)	4.3	2.7–6.2
Fusarium root rot[b]	40 (100%)	4.2	2.7–6.2
Pythium root rot[b]	0	0	0
Rhizoctonia root rot[b]	1 (3%)	4.1	4.1
Phytophthora root rot[c]	4 (5%)	n/a[d]	n/a[d]

[a] All diseases, excluding PRR, were rated on a scale of 0 (no disease) to 9 (death of plant). Mean values are based only on crops in which the disease was observed.

[b] Based on isolations from 40 crops for Manitoba.

[c] Based on isolations from 83 crops in Manitoba.

[d] No disease severity ratings were available.

Review the risk factors and considerations to determine your risk of seedling diseases and root rots in each field (Table 2). Prevention strategies include fungicide seed treatments, crop rotation and genetic resistance of soybean varieties (if available). It is important to remember that seed treatment can only provide protection for two to three weeks beginning at the time of planting (not emergence). These diseases can also cause issues later in the season if conditions are conducive for infection; therefore, seed treatment is not a complete solution. Visit MPSG's *Seed Treatment Risk Assessment* and the On-Farm Network (OFN) article, *Thinking Spring Inputs*, on page 35 by MPSG OFN Agronomist Megan Bourns, to identify where seed treatments are most likely to be beneficial and provide a return on investment.

FIELD PEAS

A total of 45 pea crops were surveyed in Manitoba for root diseases. Two diseases were identified based on laboratory assessment of the roots collected—Fusarium root rot and

continued on page 25

Table 2. Disease risks in soybeans that may be reduced by a fungicide seed treatment.

***PYTHIUM* SPP., *RHIZOCTONIA SOLANI, FUSARIUM* SPP.**

Risk Factors	Things to Consider
• Moist to wet soil. • Cold soil is conducive to *Pythium* spp. • Warm soil is conducive to *Rhizoctonia solani* and *Fusarium* spp.	• Roots must be examined to help distinguish between these diseases. Pathogens should be confirmed by laboratory testing. • Soybeans are most susceptible to these pathogens during the early V-stages.

PHYTOPHTHORA ROOT ROT *(PHYTOPHTHORA SOJAE)*

Risk Factors	Things to Consider
• Warm, wet soil. • Frequent soybean production throughout the crop rotation cycle. • Susceptible varieties.	• Soybeans are susceptible to PRR at any growth stage. • Resistance genes are available for PRR races 4, 3, 25 and 28. Consult the MPSG *Pulse and Soybean Variety Guide* or *Seed Manitoba* for resistant varieties. • PRR may distinguished from other root rots by disease progression from the roots upward and wilted leaves remaining attached to the plant (see left).

Table 3. Prevalence and severity of root diseases in 45 field pea crops in Manitoba in 2019.

		Disease severity (0–9)[a]	
Disease	No. crops affected (%)	Mean	Range
Fusarium root rot	44 (98%)	2.9	1.2–5.7
Rhizoctonia root rot	0	0	0
Fusarium wilt (*Fusarium oxysporum*)	21 (47%)	2.9	1.7–5.5
Aphanomyces root rot	TBA[b]	n/a	n/a

[a] All diseases were rated on a scale of 0 (no disease) to 9 (death of plant). Mean values are based only on crops in which the disease was observed.

[b] Assessment of the 2019 samples for Aphanomyces is ongoing and results are pending at this time.

Fusarium oxysporum (Table 3). Fusarium root rot was the most prevalent, as in previous years, with *F. avenaceum* being the most predominant *Fusarium* species. Of all crops surveyed, root rot severity ratings ranged from 1.2 to 5.7 with a mean of 2.9. Rhizoctonia root rot (*Rhizoctonia solani*) was not detected in any of the crops sampled. Four (9%) pea crops had average root rot severity ratings above four (i.e., symptoms were present on 50% of the root system) and this would have had a detrimental effect on crop yield. *Fusarium oxysporum*, an efficient root colonizer known to cause Fusarium wilt of pea, was detected in 21 of the 45 crops sampled for fungal isolation and identification. Assessment of frozen samples for root pathogens using a rapid, molecular test (ddPCR) is planned for the near future.

Root samples collected from a total of 105 pea fields in 2016 (30), 2017 (30) and 2018 (40) indicated that Aphanomyces root rot (*A. euteiches*) was present in 77%, 47% and 56% of these fields, respectively. Aphanomyces root rot is favoured by wet, poorly drained soils and is most severe under flooded soil conditions. Seasonal precipitation in many of the pea growing regions of Manitoba in 2016 was above normal, which would have contributed to the increased incidence of Aphanomyces root rot. Drier conditions prevailed in 2017 and 2018. The 2019 PCR assessment for *A. euteiches* is ongoing and results are pending at this time.

DRY BEANS

A total of 40 bean crops were surveyed for root diseases in 2019. Fusarium root rot was detected in all 40 of the dry bean crops surveyed, with severity ratings ranging from 2.3 to 5.8 (average of 3.8) (Table 4). It has remained the most prevalent root disease of dry beans for several years. A number of Fusarium species, including *F. redolens*, *F. oxysporum*, *F. acuminatum* and *F. avenaceum*, were isolated from symptomatic root tissue. Rhizoctonia root rot (*Rhizoctonia solani*) and Pythium root rot (*Pythium spp.*) were not detected in any of the crops surveyed based on microscopic examination and morphological characterization. Use of molecular technology (ddPCR) for the detection of root pathogens from additional root samples collected per crop is ongoing.

Fourteen crops (35%) had average root rot severity ratings above four (i.e., symptoms were present on 50% of the root system and plants were stunted) and this would have had a detrimental effect on yield. There were more surveyed crops with average root rot ratings above four in 2018 (68%) and 2017 (63%). However, in 2016, a much wetter year, 93% of bean crops had severity ratings above four, which represents the highest percentage of bean crops surveyed with yield-robbing root rot severity ratings over the past six years.

Table 4. Prevalence and severity of root diseases in 40 dry bean crops in Manitoba in mid- to late-July in 2019.

		Disease severity	
Disease	No. crops affected (%)	Mean	Range
Fusarium root rot[b]	40	3.8	2.3–5.8
Rhizoctonia root rot	0	0	0
Pythium root rot	0	0	0

[a] Means are based on an average of the crops in which the diseases were observed.

[b] Root diseases were rated on a scale of 0 (no disease) to 9 (death of plant).

Saturated soils from last fall increase the expected risk of root rot diseases during spring 2020. It is important to scout for these diseases early in the growing season. To help farmers and agronomists identify which diseases and insects they should be looking for and when, MPSG has created new scouting calendars for field peas and dry beans, and has updated the calendar for soybeans. ■

Call to Participate

- Do you have a new product or management practice that you want to test on your farm?
- Are you wondering if your inputs are providing a return on investment?

Join the MPSG On-Farm Network

on-farm network

PARTICIPATORY • PRECISE • PROACTIVE

The On-Farm Network is a network of on-farm research related to pulse and soybean crops that is fully funded and directed by Manitoba Pulse & Soybean Growers (MPSG). All research in this network is based on three important principles:

1. **Participatory** – Actively engages farmers in the research process.
2. **Precise** – OFN trials produce robust and statistically sound data.
3. **Proactive** – Results from the OFN guide management decisions, aiming to improve productivity and profitability of the farm operation.

Benefits

As an On-Farm Network participant, you will benefit from producing results directly on your farm and applying the knowledge to guide management decisions that will increase your profitability. MPSG benefits by producing reliable results across a wide range of environments, allowing us to make robust production recommendations for Manitoba's pulse and soybean farmers.

Requirements of the Farmer

- Keep in contact with MPSG on timing of field operations and field records
- Be equipped with GPS technology
- Establish replicated strip trials comparing the treatments as outlined in the trial protocol
- Harvest strips into an MPSG weigh wagon or your own grain cart for accurate results
- Must be a member in good standing with MPSG

Responsibilities of MPSG

- Provide technical and logistical support
- Be present at trial establishment and harvest when needed
- Provide in-season data collection to support your results
- Provide the farmer with a single-page report of results
- Report data in a confidential manner that is not linked back to the farmer
- Minimize work for farmers

2020 TRIAL TOPIC IDEAS FOR PULSE AND SOYBEAN CROPS

- Seed Treatments
- Seeding Rates
- Row Spacings
- Inoculants
- Fertility
- Biologicals
- Fungicides
- Residue Management
- Field Rolling
- Intercropping

MANITOBA Pulse Soybean GROWERS

To participate in the trials, sign up at **www.manitobapulse.ca/on-farm-network**

For more information, please contact **Megan Bourns 204.751.0439 • megan@manitobapulse.ca**

Message from Director of Research and Production

Daryl Domitruk, PhD, PAg, Director of Research and Production, MPSG

A BIG PART of MPSG's mission is to provide production support to farmers. Frequently, this means finding and translating scientifically valid answers to agronomic questions. One challenge we share with growers is that the well of made-in-Manitoba answers is, in some cases, quite shallow. This is because our history of pulse and, especially, soybean production and research is relatively short. Questions pile up fast; good, useful answers take time. MPSG's research committee deals with this reality by setting priorities and patiently sticking with them.

In the current round of new research projects, we've maintained that approach. We have six questions to answer about yield and quality, including the need to understand what our options are to increase soybean crude protein. On the overall question of containing pest control costs, we've funded work to get a handle on glyphosate-resistant weeds. The plan to improve soil quality will be helped by research to understand how soil pathogens respond to annual legumes. And, with the burgeoning market for plant protein, it's time to answer the question of how our crops can be made into various forms of tofu. Step by step, the well is getting deeper. ■

2020 Funding Approved for Research†

RESEARCHER	PROJECT	START	END	MPSG FUNDING	TOTAL VALUE
	CROP YIELD AND MARKET QUALITY				
MPSG – MCVET	Evaluating Yield, Disease Resistance and Protein in Pulse and Soybean Varieties	1990	ongoing	cost recovery	cost recovery
AAFC – Hou	Evaluation and Selection of Adzuki Beans for Adaptation and Production in Manitoba	2017	2020	$108,000	$108,000
AAFC – Mohr	Management Practices to Optimize Establishment and Early-Season Growth of Soybeans	2017	2021	$73,462	$144,022
IHARF				$35,280	
CMCDC				$35,280	
U of M – Lawley	Cover Crop Strategies for Dry Bean and Soybean Crops in Manitoba	2017	2022	$195,444	$195,444
U of M – Lawley	Predicting Soybean Phenology in Manitoba	2017	2020	$73,600	$147,200
AAFC – Morrison				$22,800	$45,600
AAFC – Mohr	Sustainable Soybean Cropping Systems for Western Manitoba	2017	2022	$98,325	$196,651
U of M – MacMillan	Soybean Seeding Windows	2017	2019	In 2016, MPSG committed $400,000 per year for five years to support applied research at the University of Manitoba. Under this program an Agronomist-in-Residence conducts research, extension and student training. Projects are reviewed annually to ensure they align with farmer priorities.	
U of M – MacMillan	Soybean Seeding Depth Assessment	2017	2019		
U of M – MacMillan	Soybean Iron Chlorosis – Variety Screening	2017	ongoing		
U of M – MacMillan	Effect of Preceding Crop and Residue Management on Dry Beans	2017	ongoing		
U of M – MacMillan	Optimizing Nitrogen Rates for Dry Bean Production	2017	ongoing		
U of M – MacMillan	Novel Pulse Cropping Systems	2017	ongoing		
U of M – Lawley	Optimizing the Frequency of Soybeans in Manitoba Crop Rotations	2018	2022	$172,931.25	$417,796.50
PAMI	Assessment of Pre- and Post-Emergent Rolling in Non-Stony Fields	2018	2020	$58,780	$117,561
AAFC – Hou	Dry Bean Breeding for Early Maturity and Pest Resistance	2018	2023	$728,188	$1,456,376
AAFC – Bing	Pea Breeding for Yield, Pest Resistance and Flavour	2018	2023	$98,630	$2,776,828
AAFC – Han				$43,155	
AAFC – Cober	Short-Season Food-Type Soybean Breeding	2018	2023	$186,930	$2,368,188
AAFC – Cober	Meeting the Soybean Protein Meal Standard in Western Canada	2018	2023	$131,699	$658,500
MPSG – On-Farm Network	Soybean Response to Seeding Rate	2012	2020	OFN	OFN
MPSG – On-Farm Network	Evaluation of Single vs. Double vs. No inoculation Strategies for Soybeans	2017	2020	OFN	OFN
MPSG – On-Farm Network	Soybean Response to Biological Stimulants	2019	2022	OFN	OFN
MPSG – On-Farm Network	Soybean Response to Row Spacing	2019	2022	OFN	OFN
MPSG – On-Farm Network	Evaluation of inoculation Strategies for Peas	2019	2022	OFN	OFN
MPSG – On-Farm Network	Evaluation of Inoculation Strategies for Dry Beans	2019	2022	OFN	OFN
MPSG – On-Farm Network	Dry Bean Response to Nitrogen Fertility	2019	2022	OFN	OFN
MPSG – On-Farm Network	Intercropping with Soybeans	2019	2022	OFN	OFN
WADO	Intercropping Practices for Yellow Peas	2019	2022	$23,004	$69,012
AAFC – Mohr	Economic and Environmental Value of Peas and Soybeans in Rotation	2019	2022	$82,800	$160,560
U of M – Stasolla	Genetics to Overcome Drought and Salinity Effects in Soybeans	2019	2022	$139,725	$270,945
U of M – House	Overcoming the Discount for Low Protein: Genetics and Environment Effects	2019	2021	$48,875	$140,635

continued on page 28

continued from page 27

RESEARCHER	PROJECT	START	END	MPSG FUNDING	TOTAL VALUE
	CROP YIELD AND MARKET QUALITY continued				
U of M – Oresnik	A Superior Rhizobium Strain for N-Fixation in Soybeans	2019	2022	$188,830	$366,166
MPSG/MWBGA/MCGA	Tools and Techniques to Manage Extreme Moisture	2019	2022	$120,000	$823,000
	REDUCE THE COST OF PEST CONTROL				
U of M – Gulden	Rotational Effects and Optimized Plant Spatial Arrangement for Wheat Production in MB	2017	2022	$82,800	$349,140
U of M – Costamagna	Determining the Role of Crop and Non-Crop Habitats to Provide Sustainable Aphid Suppression in Soybeans	2017	2020	$107,838	$215,677
MPSG – On-Farm Network	Soybean Response to Seed Treatment	2017	2020	OFN	OFN
MPSG – On-Farm Network	Field Pea Response to Foliar Fungicide	2017	2020	OFN	OFN
MPSG – On-Farm Network	Dry Bean Response to Foliar Fungicide	2017	2020	OFN	OFN
MPSG – On-Farm Network	Soybean Response to Foliar Fungicide	2018	2020	OFN	OFN
U of M – Gulden	Optimizing Plant Spatial Arrangement and Weed Management for Dry Bean Production	2015	2020	$236,325	$236,325
AAFC – McLaren	Management of Root Rot in Peas in Manitoba	2018	2021	$0	$88,305
U of A				$45,404	
BU – Cassone	Evaluation of the Risks Associated with Wireworm to Soybean Production	2018	2021	$44,053.50	$157,090
U of M – Entz	Novel Mechanical Weed Control Tools for Integrated Weed Management in Narrow-Row Dry Beans	2018	2020	$68,200	$115,000
U of M – Entz	Combcut Control of Herbicide Escapes in Soybean	2019	2020	$13,570	$27,140
AAFC – Vankosky	Prairie Insect Survey	2018	2023	$20,000	$571,000
AAFC – Leeson	Prairie Weed Surveys	2018	2023	$25,000	$753,100
AAFC – Leeson	Prairie Herbicide-Resistant Weed Survey	2018	2023	$3,000	$88,000
* AAFC – Geddes	The Next Generation of Prairie Herbicide-Resistant Weed Surveys	2020	2023	$48,445	$96,890
AAFC – Turkington	Prairie Disease Monitoring Network	2018	2023	$45,000	$1,360,000
AAFC – Geddes	Glyphosate-Resistant Kochia – Rotation, Seeding Rates and Row Spacings	2018	2023	$15,000	$1,282,000
PAMI – Landry	Spray Drift Reduction with High-Clearance Sprayers	2018	2023	$30,000	$424,000
AAFC – Mohr	New Crop Rotation Economics	2018	2023	$35,000	$1,300,000
U of L – Leroy	Economics of Diverse Crop Rotations	2018	2023	$15,000	$351,000
AAFC – Chatterton	Optimizing Disease Management Strategies for White Mould and Bacterial Blights of Dry Bean	2018	2023	$61,951	$616,904
AAFC – Chatterton	Pea Root Rot – Resistance Genes, Crop Rotation and Intercropping	2018	2023	$30,679	$1,636,818
AAFC – Shirtliffe				$18,426	
U of M – Tenuta	Root Lesion Nematode Survey	2018	2023	$20,639	$853,813
AAFC– Chatterton				$4,975	
AAFC – McLaren	Strategies for Effective Management of Phytophthora and Root Rot Complexes of Soybeans	2018	2023	$75,506	$887,919
LU – Belanger	Root Diseases – Genetic Screening Methods	2018	2023	$44,657	$652,776
U of M – Daayf	Defining Pathogen-Related Soil Quality Targets for Annual Legumes to Pursue Through Crop Rotation	2019	2022	$88,172	$253,782
U of M – Daayf	Soybean Disease Survey	2019	2020	$60,000	$60,000
AAFC – Geddes	Integrated Weed Management to Mitigate Glyphosate-Resistant Weeds	2019	2022	$110,940	$309,984
* BU – Cassone	Development of Improved Diagnostic Tools for Pathogens of Soybeans	2020	2023	$87,804	$175,608
	GROW MARKET DEMAND				
U of G – Duncan	Cholesterol-Lowering Properties of Dry Beans	2018	2023	$136,431	$757,680
AAFC – Ramdath				$47,196	
U of S – Nickerson	Pulse Ingredient Processing for Improved Flour Quality	2018	2023	$103,802	$2,866,150
AAFC – Hou				$12,571	
AAFC – Balasubramarium	Dry Bean Cooking Quality	2018	2023	$15,942	$87,444
RRC – McRae	Manufacturing Tofu from Dry Beans	2019	2022	$39,928	$84,020
	IMPROVE SOIL QUALITY				
U of M – Lobb	Agronomic and Environmental Impacts of Land Rolling in Soybean Production	2018	2020	$49,450	$91,727.40
U of M – Lawley	Cover Crops – Establishment Windows, Soil Health and Yield	2018	2023	$40,000	$1,519,772.15
MPSG – On-Farm Network	Field Rolling in Soybeans	2018	2021	OFN	OFN
* U of M – Tenuta	Validating an Available On-Farm Soil Health Test Method	2020	2022	$84,695	$168,426
			On-Farm Network (OFN)	$431,000	$431,000
			Total Project Funding Commitments	$4,634,138	$28,899,975

*** Indicates new projects**

† At time of printing.

AAF – Alberta Agriculture and Forestry
AAFC – Agriculture and Agri-Food Canada
BU – Brandon University
CMCDC – Canada-Manitoba Crop Diversification Centre
IHARF – Indian Head Agricultural Research Foundation
LU – Laval University
MCGA – Manitoba Canola Growers Association
MCVET – Manitoba Crop Variety Evaluation Trials
MPSG – Manitoba Pulse & Soybean Growers
MWBGA – Manitoba Wheat and Barley Growers Association
PAMI – Prairie Agriculture Machinery Institute
RRC – Red River College
U of A – University of Alberta
U of G – University of Guelph
U of L – University of Lethbridge
U of M – University of Manitoba
U of S – University of Saskatchewan
WADO – Westman Agricultural Diversification Organization

FMC An Agricultural Sciences Company

Yield robbery is a crime. It's time for justice.

AUTHORITY SUPREME HERBICIDE

Authority® Supreme herbicide delivers two powerful modes of action, Group 14 and 15, to control bromes, foxtails, resistant kochia, cleavers and the rest of the gang. Applied pre-emergent, with or without glyphosate, Authority® Supreme herbicide gives you both effective control and sound resistance management. **Authority® Supreme herbicide. Stopping yield crime.**

PEAS | CHICKPEAS | SOYBEANS

Save on Authority® Supreme with FMC Grower CashBack.

@FMCAgCanada
FMCcrop.ca | 1-833-362-7722

Getting it Right 2020
CROP PRODUCTION MEETING

On January 29, Manitoba Pulse & Soybean Growers (MPSG) hosted their sixth annual *Getting it Right* soybean and pulse production meeting at Portage la Prairie. The 75 farmers in attendance were able to ask researchers and extension agronomists questions directly and hone in on how research results can be applied to their farm.

In response to the discovery of soybean cyst nematode (SCN) in Manitoba in 2019, MPSG invited **Dr. Seth Naeve**, an extension agronomist and associate professor from the University of Minnesota, to present on his experience and research with this pest. His applied research focuses on enhancing soybean yield and seed quality.

Seth covered how to scout for this pest and integrated management tools that are effective at reducing SCN numbers. He also discussed recent research he's conducted on the interaction between IDC and SCN. The good news from this research is that it appears we can manage IDC and SCN independently.

A presentation by **John Heard**, Manitoba Agriculture and Resource Development, addressed soil fertility challenges this spring and managing saturated soils. **Mac Ross**, Pulse Canada, provided the audience with an update on pulse market access and **Megan Bourns**, MPSG On-Farm Network Agronomist, synthesized MPSG's early-season OFN research results on inoculant, seed treatments and plant populations.

The afternoon was filled with *Table Talk*s, where participants chose to attend four of the seven workshops available. These topics ranged from pests of concern identified in 2019 and research updates from across Manitoba on a variety of MPSG-funded projects.

RESOURCES FROM THIS EVENT CAN BE FOUND AT MANITOBAPULSE.CA/EVENTS/GETTING-IT-RIGHT

Figure 1. Soybean cyst nematode

Soybean Cyst Nematode

A potential threat to dry beans

Berlin Nelson Jr., Professor, Department of Plant Pathology, North Dakota State University

UNTIL RECENTLY, THERE was little concern about the effect of soybean cyst nematode (SCN) (Figure 1) on dry bean production in the United States since most dry beans were produced in areas where SCN was not reported or not common. However, as SCN moved into North Dakota and northern Minnesota, where the majority of dry bean production is centred, research was conducted to determine if SCN was a threat to production. Even though dry beans have been known as a host since the 1930s, there was limited research on the effects of SCN on dry bean yield.

In research conducted at NDSU since 2005, SCN was shown to cause significant reductions in dry bean yield under conditions favourable for infection and nematode activity. In addition, SCN reproduced on various classes of beans and that, in general, most dry bean types were not as susceptible to SCN as soybeans. This research was conducted with HG type 0 (the old race 3), which was the most common type found during that time. However, with the introduction of HG 0 resistant soybeans into the area after 2003, new HG types began appearing, such as HG 2.5.7, which can reproduce on soybean varieties resistant to HG 0. We know that HG 2 types can be more virulent on dry bean that have some resistance to HG 0. So, the changes in HG types in the region will have an effect on how serious SCN becomes on dry bean production. There is still considerable research that is needed to answer many of the questions relating to SCN and its effects on dry beans.

An example of yield loss in pinto bean is shown in Figure 2. The plant in the middle is growing in soil with no SCN, while the plant on the left is growing in soil with 5,000 eggs/100 cc of soil and the one on the right with 10,000 eggs/100 cc of soil. Notice the plant on the left has no obvious above-ground symptoms other than it is not as robust and has fewer pods than the plant in the middle. The plant on the right is significantly stunted and has no pods. The yield loss in that experiment at 5,000 egg/100 cc of soil was about 50%. These are high egg levels, but we have fields that are infested at those levels and even higher. An important point about SCN is that you can have a yield loss without any obvious above-ground symptoms. The same is true in soybeans. It is one of the reasons that SCN is often not detected in the early stages of infestation until there is serious damage to the crop with more obvious above-ground symptoms.

There is resistance in dry bean to SCN and we have shown there are sources of high levels of resistance to both HG 0 and HG 2 types. We also know that among dry bean varieties within a bean class such as in pinto and navy, there can be large differences in susceptibility or resistance of varieties. Susceptibility in dry beans has been measured against a susceptible soybean and the use of a female index (FI). For example, we use a very susceptible soybean called Barnes, and we inoculate the soybean and a dry bean variety with the same number of SCN eggs, under the same conditions in the greenhouse. Then, 40 days later, we count all the SCN females produced on the soybean and the dry bean roots. We then divide the number produced on dry bean by the number produced on soybean times 100 to get a female index. If the number on the Barnes was 250 and on the dry bean it was 60 then the FI for that dry bean would be 24. At present, we consider an FI of 10 or less to be a high level of resistance. That may change as we conduct more research on the SCN x dry bean interaction.

There are, within bean classes, varieties that have high to moderate levels of resistance based on the female index. The goal of the bean breeding program at NDSU is to bring high levels of resistance into the breeding material with the thought that in the future, resistance may be an important characteristic of varieties that growers will need to manage SCN. At present, in North Dakota most bean fields are not yet infested with the nematode, but SCN is spreading throughout the bean production areas. In 2019, a survey of 116 bean fields found 16% with evidence of SCN. However, most had low egg levels.

continued on page 32

Figure 2. Yield loss in pinto beans due to SCN.

growing in soil with no SCN

growing in soil with 5,000 eggs/100 cc of soil

growing in soil with 10,000 eggs/100 cc of soil

continued from page 31

Several things to keep in mind about this nematode are that high populations in the soil can develop when conditions are favourable for reproduction and the nematode survives very well during our cold winters. Warmer soils and lighter soils favour reproduction by SCN, but we have seen good reproduction even in heavy clay soils, although it takes longer in those soils to build up higher populations. A key factor in damage to dry bean or soybean is the level of eggs in the field. The higher the egg level, the more likely the damage to the plant. There are no threshold egg levels we can use to determine damage to plants because there are numerous other factors involved in disease development, such as susceptibility of the variety and the weather conditions during the growing season.

The most important practice a grower can do is first determine if you have SCN in your fields. That means sampling the soil and sending the soil sample to a laboratory that can determine the egg count. Generally, this is reported as eggs per 100 cubic cm of soil. Once you know a field is infested, then you want to determine if the egg levels are increasing after you grow a susceptible crop such as dry beans. If you can, avoid growing the bean crop in that field. Rotation to non-host crops such as small grains, corn or other row crops, can help reduce egg levels. The longer the rotation, the better, but even a one to two-year rotation is helpful. Once you have SCN, it is almost impossible, even with long rotations, to eliminate it from a field. The best advice for preventing damage to dry beans by SCN is to grow a resistant or less susceptible variety if such information is available and maintain the egg levels as low as you can in the field. Highly resistant dry bean will likely tolerate levels of SCN over 1,000 eggs/100 cc of soil, but at some higher levels, there could be damage to the plants. There are also commercial products for seed treatments that may have future use in managing SCN on dry beans.

There are numerous websites with information on the basic biology of SCN and how to sample soils for determining egg levels if additional information is needed (www.thescncoalition.com). NDSU made a video about the threat of SCN to dry beans with information on various aspects of the disease: www.youtube.com/watch?v=abOt45qj_2E ■

Do you have a production question related to pulse or soybean crops?

Maybe you're looking for an opinion or advice?

Write to us!

Email Cassandra Tkachuk
cassandra@manitobapulse.ca

A Practical Alliance

University and industry benefit from agronomist-in-residence

Crystal Jorgenson, Communications Specialist, University of Manitoba, Faculty of Agricultural and Food Sciences

Kristen MacMillan with Diploma students in the soybean field agronomy course.

IT HAS BEEN three years since Manitoba Pulse & Soybean Growers (MPSG) and the University of Manitoba (U of M) joined together to create the Agronomist-in-Residence program, an applied research position designed to help bridge the gap between classroom and farmers' fields.

The goal: to hire a research agronomist focused on pulse and soybean production issues who would not only advance the university's research expertise, but also share that knowledge with industry and students. And since she joined the Department of Plant Science in the Faculty of Agricultural and Food Sciences in late 2016, Kristen MacMillan has not only checked off all those boxes, she has far surpassed the high expectations of this innovative program.

"The Agronomist-in-Residence program is completely unique — no other university in Canada, and possibly in North America, has taken this specific type of approach," said Martin Scanlon, Dean of the Faculty of Agricultural and Food Sciences.

"Agronomic research represents a continuum from basic scientific exploration to the practical extension of best practices to farmers. Kristen has been a key fulcrum in the interplay between basic research and near market science. She has also contributed immensely to our experiential learning programs by providing hands-on opportunities and challenging our students to solve real-world problems."

PROTEIN DEMAND BOOMING

The idea of a resident agronomist was conceived to help build applied research capacity, and today it is especially relevant with the escalating demand for protein in Canada and around the world. The Manitoba government has signaled its interest in growing this capacity through the Protein Advantage Strategy, a consultative plan aimed at facilitating growth and investment in protein production and processing, and the research and development which supports these sectors. One such investment is the $400 million pea protein processing facility under construction by food ingredient company Roquette at Portage la Prairie.

Daryl Domitruk is the Director of Research and Production for MPSG, which represents more than 4,000 farmers in Manitoba who grow soybeans and pulses, including edible beans, peas, faba beans, lentils and chickpeas. He says MPSG's collaboration with the U of M was partly driven by the need to add capacity in order to sustain the production of pulses and soybeans, which are so critical to a successful protein industry.

"MPSG members are very keen and determined to see their research dollars generating practical results," he added. "Meeting growers' needs is at the heart of the Agronomist-in-Residence program and, in fact, drives everything MPSG does. The other factor at play for MPSG was the relative scarcity in Manitoba of research capacity dedicated fully to pulses and soybeans. The existing research community was doing all they could for our crops, but their time quickly becomes fully committed across a wide range of crops.

For Kristen, coming to work at the U of M has meant coming full circle. She received her Diploma in Agriculture, B.Sc. (Agronomy) and M.Sc. (Cropping Systems) from U of M, and then in 2013 joined MPSG as their first production specialist where she advised farmers and agronomists on soybean and pulse production. Kristen also took on the role of director of research and production, and led the development of the organization's first strategic R&P plan. She is also involved in crop and livestock production on the family farm near Marquette where she gains valuable insight and aims to practice her own advice. So when the Agronomist-in-Residence was created, she was the natural choice for the job.

CONNECTING RESEARCHERS WITH PRODUCERS

One of the principal requirements of Kristen's position was to design a robust applied research program, engaging scientists, industry and farmers throughout the province and contribute to the development of best agronomic practices for growing soybeans, edible beans and field peas in Manitoba.

"Currently, some of the areas I'm exploring are seeding practices and seed quality in soybeans, nitrogen management in dry edible beans, designing new pulse intercrop systems and next year, I will be initiating new work on field peas. Overall, I'm interested in studying agronomic practices and systems

continued on page 34

continued from page 33

that address productivity, profitability and sustainability goals in our farming systems," said Kristen.

Working with crop research centres and farmers, she has trial plots stretching from Melita and Dauphin, and from Carman to Portage and Arborg. Kristen, along with her team of research technicians and summer students, has conducted multi-year studies on varying management systems and environments. The results of her studies are integrated into award-winning fact sheets and visual guides, news articles and reports to assist farmers and agronomists in decision making. In addition to informing regional crop production practices, her work is also supporting policy and providing new data on western Canadian soybeans to the scientific community.

And when she isn't on campus or out in the field, she is at producer meetings and conferences, connecting with the people that utilize and inform her research program.

"One of the challenges in the general scientific community is the time gap between research and adoption," said Kristen. "For agriculture in Manitoba, the network of outreach and extension is evolving to better connect research and those practicing in the field."

For part of that network, Kristen has harnessed the power of social media (you can find her on Twitter at @kpmacmillanUM). She can instantly reach her 1,500+ followers to share research results, post photos of field plots and plants, and encourage dialogue with farmers and crop advisors on real-time issues.

William Pallister is a Portage-area dry bean farmer who connected with Kristen at the winter bean meetings. He is also a Faculty alum, graduating with his Diploma in Agriculture in 2015 and his B.Sc. (Agribusiness) in 2017. William describes the Agromonist-in-Residence as "a resource that combines both practicality and research."

"Kristen has been an excellent agronomist and researcher on behalf of bean growers. We are able to make decisions on our farm with greater confidence knowing that her research is behind us," he said. "She has also been great for bumping ideas off of when we are trying out new things on the farm."

LEARNING BY DOING

While research and outreach are significant activities for Kristen, a third dimension of the Agronomist-in-Residence is as educator, understandable considering its setting at the U of M. She has guest-lectured in courses such as *Crop Production Principles and Practices* and *Advanced Cropping Systems*, where she provides case studies and real scenarios for students to analyze.

"Kristen has been a pioneer in our experiential learning program and is focused on learning outcomes. She can see the value in introducing students to applied research and extension," said Michele Rogalsky, Director of the School of Agriculture. "Many of our students are farmers and farm managers, and she is preparing them for their own operations and for the future of the industry."

Last summer Kristen designed and launched a *Soybean Field Agronomy* course for diploma students that helped develop critical thinking skills while practicing integrated crop management, one of the first experience-based curriculums offered in the Faculty. Each student monitored a soybean field, developed crop scouting skills and applied their knowledge to make sound agronomic decisions. They also developed an understanding of the knowledge transfer process, a model she has coined "From Theory to Practice," by touring her agronomy research plots at Carman and attending an industry field day. The course is now in its second summer with eight students honing their analytical and communication skills.

FROM THEORY TO APPLICATION

In reflecting on her progress so far as the university's first Agronomist-in-Residence, Kristen sees a common theme emerging: the demand for and appreciation of experience-based learning and practical application.

"In the classroom, I can see the enthusiasm when students connect theory to application. When speaking with farmers, they appreciate my approach as a scientist, agronomist and farmer and involving them in the process through conversation at extension meetings. When collaborating with research colleagues, we strike a balance with understanding fundamental mechanisms and their value in the field and how they might sometimes be different."

As the program approaches the end of its third year, Kristen continues to break ground on new ways to help students, researchers and farmers explore the opportunities created by the heightened demand for protein sources.

"Pulse and soybean farmers are seeing the research results at the farm level and they can be proud to know that the reach of this program has been gone beyond that to the university and industry level, which will provide a cascading impact on how we approach discovery and application of agronomic research," she said. ■

Dates to Remember 2020

SMART Day
Wednesday, July 15
Brandon, MB

Crop Diagnostic School
July 7–10 • July 14–16
Carman, MB

Crops-a-Palooza • July 28
Carberry, MB

Thinking Spring Inputs

Setting soybeans up for success

on-farm network
PARTICIPATORY • PRECISE • PROACTIVE

Megan Bourns, On-Farm Network Agronomist, MPSG

SPRING INPUT DECISION-MAKING can be stressful. Decisions about soybean seeding rate, inoculant and seed treatment can all affect yield, and certainly your bottom line. At what rate should soybeans be seeded? Do I need double inoculant or single inoculant? What about seed treatment? What factors should be considered in making decisions on each of these inputs? MPSG production knowledge and On-Farm Network (OFN) research offer information to help guide these decisions.

SEEDING RATE

Seeding rate, while an essential aspect for all crop production, is of particular importance in soybean production given the high cost of seed. It's important to note that the seeding rate, target population and plant stand are not the same. Seeding rate should be based on your target population, or 'ideal plant stand,' factoring in seed survivability. That means your seeding rate will be greater in seeds/ac than what you are targeting for plants/ac since not all of the seed will survive, germinate and grow into a yield-producing soybean plant. Plant stand is the actual number of plants/ac that you determine by doing plant counts in the field.

Farmers may want to try out lower seeding rates to reduce seed costs. When making seeding rate decisions, it's important to keep in mind the competitive ability of the crop, yield potential and economic return. The MPSG Bean App has a seeding rate calculator that can help guide this decision, determining the economic optimum plant population and seeding rate. Typically, the Bean App's recommended populations range from 140,000 to 160,000 plants/ac and will depend on seed cost, expected yield and grain price.

Soybean seeding rate research through MPSG's OFN has been ongoing. Typical seeding rates compared in these trials include 130,000 seeds/ac, 160,000 seeds/ac and 190,000 seeds/ac. Results from these trials are in the process of being analyzed and information on the results will be available soon. You can view single-site reports for these trials

continued on page 36

continued from page 35

at manitobapulse.ca/on-farm-network/on-farm-research-reports/.

INOCULANT: DOUBLE? SINGLE?

One of the great attributes of a soybean crop is its ability to produce its own nitrogen—if provided with the correct tools to do so. *Bradyrhizobium japonicum*, the bacteria that create a symbiotic relationship with soybean to form the N-fixing nodules, is not native to Manitoba soils and therefore must be introduced. Dr. Ivan Oresnik, at the University of Manitoba, found that after introduction to the soil, the rhizobia population decreased over time, but the population did not reduce to zero. That indicates there is some persistence in the population. The question for farmers is what are the implications for their inoculant strategies. Does a double inoculant practice become redundant after a certain number of soybean years in a field? How much of a yield benefit does single inoculant provide, once soybean history has built up?

In 2013, questions started to surface about the benefits of doubling up on inoculant after soybeans had been grown on the same piece of land for a couple of years. That is when the OFN began investigating soybean inoculant practices. Double vs. single inoculant trials were set up in fields where there were at least two years of soybean history in the last ten years. There have been a total of 36 double vs. single inoculant trials since. Only two trials had a significant yield increase with double inoculant compared to single inoculant. For the other 34 trials, there was no significant yield difference between double and single inoculant strategies.

As soybean production history in the province continued to expand, the OFN began investigating a second inoculant question—comparing single vs. no inoculant in soybean fields where there were at least three years of soybean history in the last 10 years. Since starting these trials in 2016, there have been a

continued on page 37

Figure 1. Double inoculant yield results for each site-year. Numbers above bars indicate yield differences between double and single inoculant treatments.

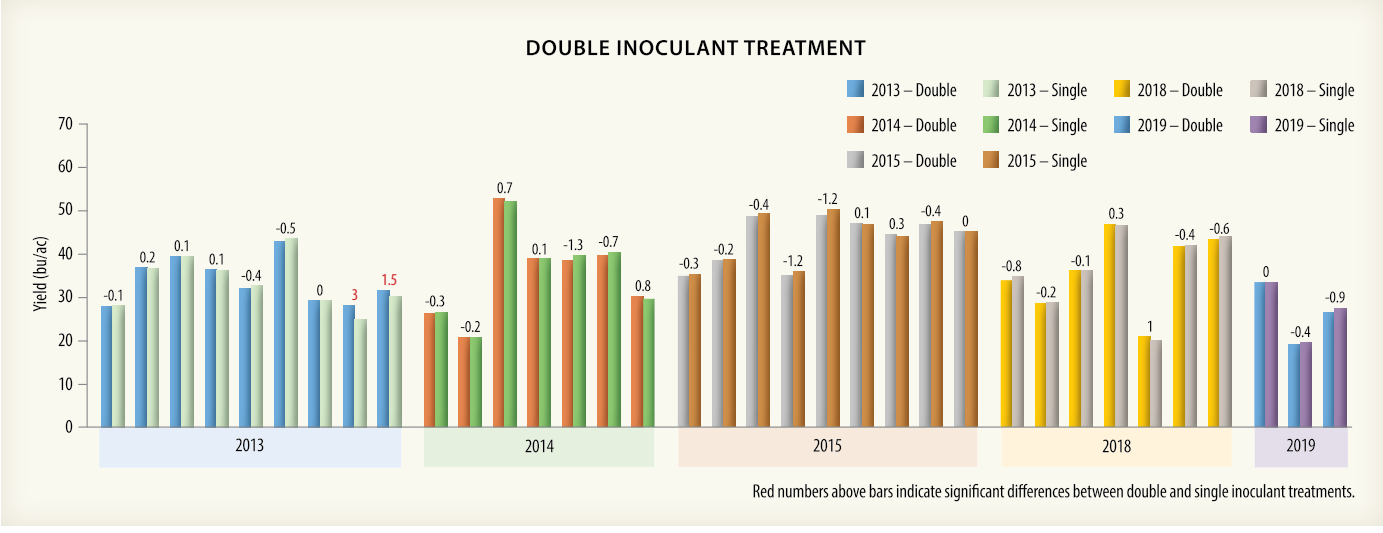
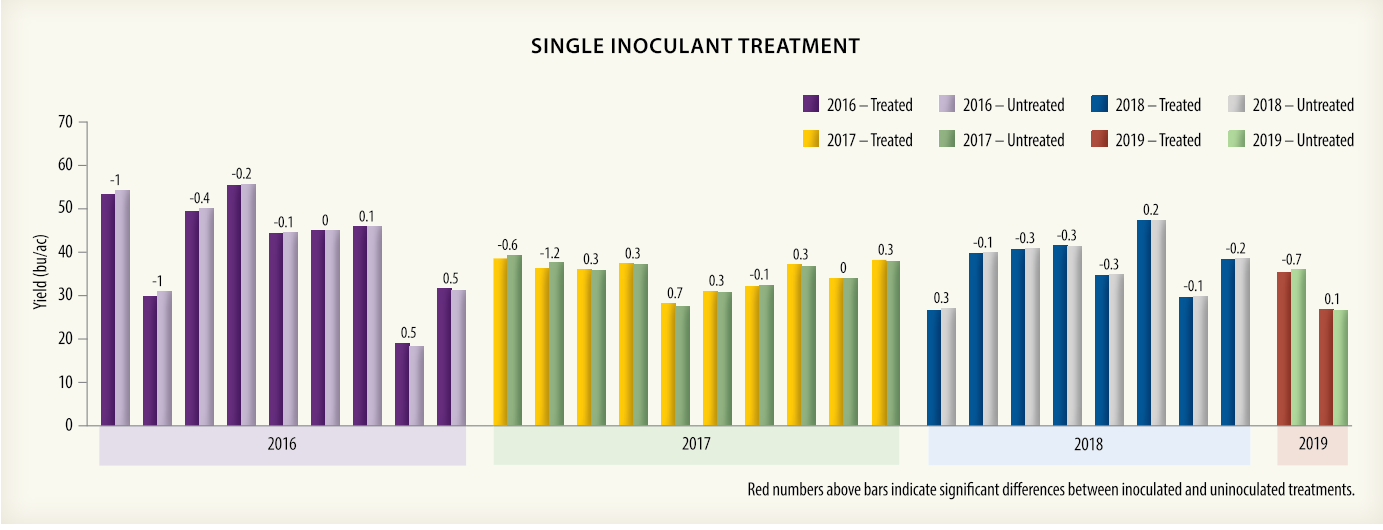


Figure 2. Single inoculant yield results for each site-year. Numbers above bars indicate yield differences between inoculated and uninoculated treatments.



SINGLE INOCULATION CHECKLIST

- ○ Field has had at least two previous soybean crops
- ○ Previous soybean crops have nodulated well
- ○ Most recent soybean crop within the past four years
- ○ No significant flooding or drought
- ○ All four above criteria have been met

total of 29 single inoculant trials through the OFN. To date, there has been no significant yield response to single inoculant compared to no inoculant in these trials.

Although it doesn't seem as though there is a significant benefit to double inoculating soybean when there has been an established soybean history, or even single inoculating once that history increases, it is very important to keep in mind that successful nodulation depends on several factors. Crop nutrition, environment and soil conditions, in addition to the *B. japonicum* population, play into successful nodulation. MPSG has developed a checklist to help guide the decision on double vs. single inoculant (see above). We don't have a similar checklist designed for making a single vs. no inoculant decision, however, the trial data is being explored to determine if a reliable list should be developed. Before making a widespread inoculant management change across the farm, it would be wise to test out the new practice in one or two fields—perhaps even setting up an on-farm trial to compare strategies, to check nodule formation and yield.

SEED TREATMENT: IS IT EFFECTIVE? IS IT NECESSARY?

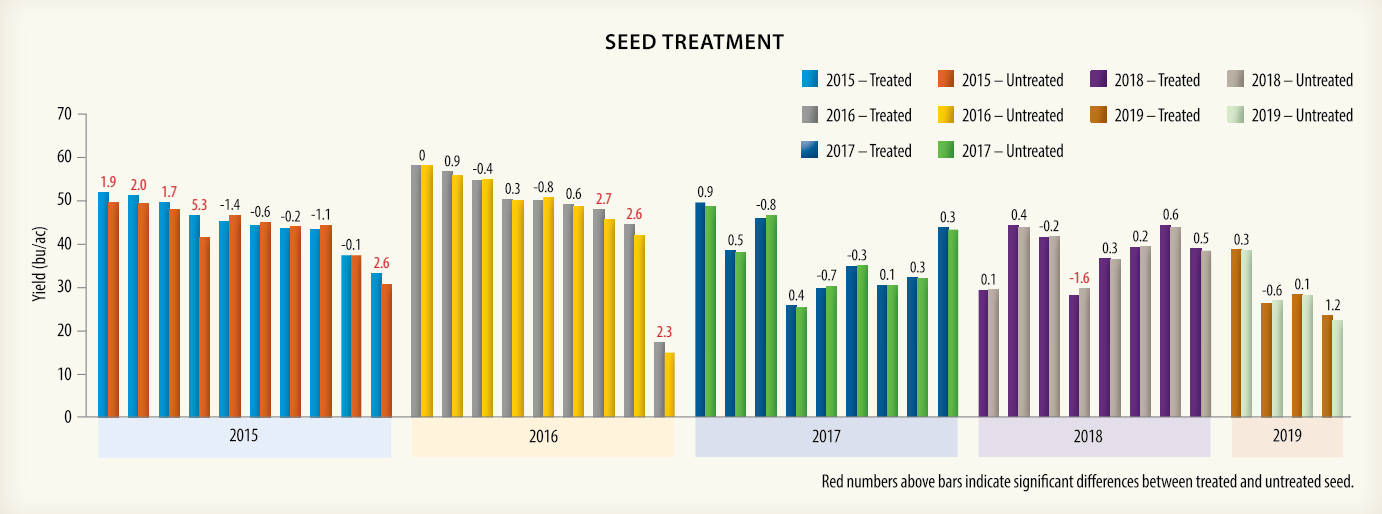
The OFN began comparing soybean yield with and without seed treatment in 2015. We now have five growing seasons of data, with a total of 41 sites. Out of all 41 locations, there have been eight statistically significant yield increases, and one significant yield decrease, for soybean with seed treatment compared to soybean without seed treatment (Figure 3). Most of the responsive sites were from 2015 and 2016, likely due to the seeding conditions in 2015 and 2016 vs. 2017, 2018 and 2019.

Making seed treatment decisions can be tricky. Right now, there are no rapid methods available for farmers or agronomists to quantify the fungal pathogen and insect pressure pre-seeding that could help guide a seed treatment decision. The OFN results across the 41 sites indicate that some of the time, seed treatment does result in a yield increase, but not all the time. Considering seeding conditions and knowledge of early-season fungal and insect pressure in past years can be helpful. As with most agronomic decisions, the best verification method is to get your boots on the ground and scout. Digging up seedlings shortly after emergence to look at the roots for symptoms of fungal disease, sifting through the soil to search for wireworms, these are things that can give you clues about the necessity, or lack thereof, for seed treatment on your soybeans. While there isn't a reliable, rapid method to quantify the extent of seedling pest pressure in your fields yet, the qualitative observations are still very informative.

WHEN IN DOUBT, GET OUT TO SCOUT

Spring input decisions can make or break your crop. Drastic, farm-wide changes in spring input decision making are probably not the smartest choice. Instead, look to test changes you're interested in trying in one or two fields, either independently or through the OFN. Part of testing those changes and evaluating their efficacy means getting boots on the ground—you can never go wrong with getting out to scout. It may be too late to make a change for that growing season, but your observations can inform you for the next one. Take plant stand counts to determine how your seeding rate is stacking up to your target population. Dig up seedlings and look for disease on the roots and insect pests in the soil. Look at roots mid-season to check how your inoculant strategy is working for nodulation. If you don't look, you don't know. Combining data and visual observations give you powerful tools to guide decision making on your own farm. ■

Figure 3. Seed treatment yield results for each site-year. Numbers above bars indicate yield differences between treated and untreated seed.



We've captured it!

3 modes of action, 1 powerful product.

Turns out, you really can capture lightning in a bottle when you re-think what's possible in pulse disease control. Say—like putting together three high-performing modes-of-action for the first time. Count on new Miravis® Neo fungicide to deliver consistent, long-lasting control so you can set the stage for healthier-standing, higher-yielding, better quality pea and chickpea crops.

Lightning in a bottle?
More like, "a better crop in the bin."

Miravis® Neo

syngenta®

For more information, visit Syngenta.ca/Miravis-Neo-pulses, contact our Customer Interaction Centre at 1-87-SYNGENTA (1-877-964-3682) or follow @SyngentaCanada on Twitter.

Minor Use Pesticide Program Helps Farmers Gain Access to Pest Management Solutions

Colleen Flynn, Manitoba Agriculture and Resource Development

CANADIAN FARMERS PRODUCE high-yielding, top-quality crops and the effective use of pest control products in an integrated pest management system can contribute to this success. The Minor Use Pesticide Program can add new or improved pest management tools to the toolbox, improving farmers' ability to address current pest issues.

WHAT IS A MINOR USE PESTICIDE?

A minor use pesticide is a pest control product (herbicide, insecticide, fungicide, nematicide or biopesticide) that is used in such small quantities that the sales potential is not sufficient enough to persuade a manufacturer to register and sell the product in Canada. The use of a pest control product could be considered a minor use because the area seeded is small on a national or regional basis. In addition, a minor use may be registered on a major crop (i.e., canola, wheat, soybeans, corn) because the use may be needed only occasionally, or is limited to a small percentage of the total crop area.

WHAT IS THE MINOR USE PESTICIDE PROGRAM (MUPP)?

The Pest Management Centre's (PMC) Minor Use Pesticide Program is a joint initiative between Agriculture and Agri-Food Canada (AAFC) and the Pest Management Regulatory Agency (PMRA). AAFC and PMRA provide regulatory advice that supports growers and grower associations in identifying priorities for new minor use registrations in Canada. PMRA works with the provinces to assist in addressing regional minor use needs. They provide information about the data necessary for registration. The U.S. has a similar minor use system called the Interregional Research Project # 4 (IR-4).

WHY ARE MINOR USE PESTICIDES IMPORTANT TO FARMERS?

The objective of the Minor Use Pesticide Program is to increase farmers' competitiveness by improving access to new and effective pest control options. These benefits should be available regardless of the area seeded to the crop on a national or regional basis.

Farmers should provide feedback on pest management issues to their commodity groups, registrants and Pesticide Minor Use Coordinators (PMUC). Collaboration with growers across Canada and the US have benefited farmers across North America, not only improving awareness of common issues, but helping to secure much needed pest control products on minor and specialty crops.

continued on page 40

continued from page 39

WHAT DATA IS REQUIRED TO REGISTER A MINOR USE PRODUCT?

The Minor Use Pesticide Program uses field and greenhouse trials from AAFC research centres as well as data generated by registrants, universities and private researchers and provincial specialists. Data typically collected and analyzed includes information on product efficacy, crop tolerance, residue data and occupational exposure. Data and results are then submitted to PMRA for review. The time frame for a product making it all the way through the minor use system is usually three to five years, but sometimes it is longer.

MAXIMUM RESIDUE LIMIT (MRL) DATA IS ALSO COLLECTED – WHY IS THIS IMPORTANT?

"A maximum residue limit (MRL) is the maximum amount of residue that is expected to remain on food products when a pesticide is used according to label directions. These are set at levels well below the amount that can pose a health concern and are established for each combination of pesticide and treated agricultural product" (Health Canada, 2019).

Canadian crops have to meet the MRLs set by destination countries to avoid trade disruptions. Pulse Canada clearly outlines market considerations of crop protection choices for use on pulse crops as part of the *Keeping It Clean* initiative (visit www.keepingitclean.ca).

There are several ways farmers can manage their own MRLs, including:

- Only use pesticides that are registered for the crop in Canada, so it will not create trade concerns.
- Talk to your grain/seed buyer to make sure the products you are using are acceptable to both domestic and export customers.
- Always read the product label and follow the directions for use and precautions for pest control products. Follow the label for rate, timing, application intervals and pre-harvest interval (the number of days that must pass between the application of a pesticide and crop harvest) to make certain residues in the harvested product won't exceed the MRL.

WHAT IS THE ROLE OF YOUR PROVINCIAL MINOR USE COORDINATOR (PMUC)?

All provinces have a provincial minor use coordinator that represents user interests on pesticide registrations. They work with the commodity associations that have a stake in minor use. The issues raised in our consultations provide a basis for Manitoba's priority list. Our PMUC records Manitoba's priorities on the National Minor Use Needs list. All stakeholders then review the national list at the annual Canadian Pest Management Priority Setting workshop. At the meeting, stakeholders decide which priorities move forward. Attendance by Manitoba's PMUC helps ensure Manitoba's priorities are

continued on page 41

recognized. The minor use coordinator provides a role in the discussions and the selection of priority projects. Each region can have several grower groups participate in the National meetings and the PMUC coordinates their attendance.

Under special circumstances, Provincial Minor Use Coordinators can request consideration for an Emergency Use Registration (EUR) from PMRA. That can be used when no other effective method of control exists to address a pest infestation. In almost all cases where an emergency use registration exists, there should be either Minor Use Pesticide Program effort or registrant effort underway to secure a full minor use registration so that the emergency use is not repeated.

WHAT HAPPENS AT THE NATIONAL CANADIAN PEST MANAGEMENT PRIORITY SETTING MEETING?

This year's priority-setting meeting is on March 24–26, 2020, in Gatineau, Quebec. There are representatives from provincial and national commodity associations, crop protection companies, US IR-4, PMRA personnel, researchers and provincial crop specialists. It is an opportunity for commodity associations to lobby for the necessary research to support minor use submissions that address the pest issues facing their sector. Minor use priority projects are selected to be funded by AAFC and the PMC for eventual submission to the PMRA. Each day is a different session covering entomology, pathology and weeds. Biopesticides and organic priorities are also included in the priority-setting process.

WHAT IS INVOLVED IN LABEL EXPANSIONS WITHIN THE MINOR USE PESTICIDE PROGRAM?

User-Requested Minor Use Label Expansion (URMULE) requires registrant support and the manufacturer must be willing to add the new use to the product label. The product must also be registered in Canada on at least one crop and in a similar use-site category such as field-grown crops or greenhouse-grown crops. A crucial requirement for label expansions is to determine if crop residue data is required for the registration of a specific active ingredient. If residue data is needed for a particular pest/crop combination, this URMULE goes on the national priority list, where it can be chosen at the priority setting meeting. The URMULE is only considered if the products are efficacious and there are acceptable levels of risk. Note that registrants can also add new minor uses to their product labels by making submissions directly to PMRA.

For more information visit: http://www.agr.gc.ca/eng/science-and-innovation/agriculture-and-agri-food-research-centres-and-collections/ontario/pest-management-centre/minor-use-pesticides-at-the-pest-management-centre/?id=1286197216280[LS1] and http://www.omafra.gov.on.ca/english/crops/minoruse/aboutminoruse.html

WHO IS THE PRAIRIE PESTICIDE MINOR USE CONSORTIUM?

On the prairies, we also have a Prairie Pesticide Minor Use Consortium (PPMUC). The purpose of the PPMUC is to facilitate, coordinate and procure pest management solutions for grower organization members. They work with members to gather additional information specific to grower group priorities and feed into AAFC's Minor Use Pesticide Program. They collaborate with AAFC, PMRA and Provincial Minor Use Coordinators. Manitoba Pulse & Soybean Growers is currently one of the many members of this organization.

In summary, the Minor Use Pesticide Program attempts to increase grower competitiveness by improving access to new and effective crop protection tools. It is important that farmers participate in this system by providing feedback on pest management issues to their commodity groups, registrants and Provincial Minor Use Coordinators. ■

UPDATE ON AUTHORITY HERBICIDE

Authority 480 (sulfentrazone) is a group 14 herbicide from FMC that is registered in soybeans, field peas, faba beans, chickpeas, sunflowers and flax. It is a residual, soil-applied, pre-plant or pre-emergent product desirable for its control of broadleaf weeds. These include kochia, redroot pigweed, waterhemp, lamb's quarters, wild buckwheat, cleavers and others.

There has been widespread interest in getting this product registered in dry (edible) beans, particularly for its control of kochia, but a few factors have held back registration. A data package showing the efficacy of this product was submitted to the minor use system in 2016 but did not move to the review stage. This is partially because of its phytotoxicity to beans.

Extensive research conducted by Dr. Peter Sikkema (University of Guelph) in Ontario determined that there was not an adequate margin of crop safety to support the use of sulfentrazone for weed management in dry beans. This work also identified that dry bean market classes differ in their response to sulfentrazone.

In one study, sulfentrazone was applied pre-emergence (PRE) at 420 and 840 g.a.i./ha to various market classes. The lower rate caused visible injury (7–12%) to all market classes but did not reduce yield. The higher rate caused 30% visible crop injury and reduced yields of white, black, cranberry and otebo beans by 52, 47, 44 and 26%, respectively. Pinto, kidney, yellow and brown bean yields were not reduced.[1] In another study, four PRE application rates (140, 210, 280 and 420 g.a.i./ha) were tested on different market classes. At the highest rate, white bean plant height, density and yield were reduced by 28%, 29% and 29%, respectively, adzuki bean height, density and yield were reduced by 51%, 34% and 57%, respectively, and kidney and small red Mexican beans were unaffected.[2]

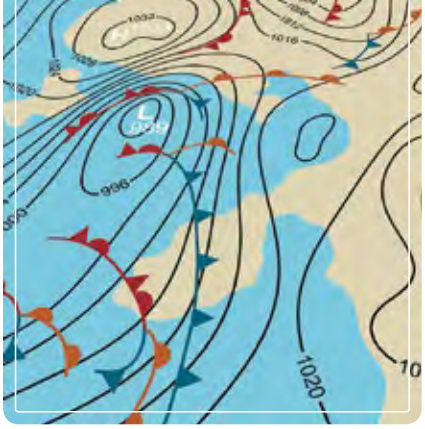
According to this research, Authority 480 is still promising as a PRE weed control product in market classes like pinto, brown, kidney and small red Mexican beans. At this time, further research is required in Manitoba before registration could be considered.

References

[1] Hekmat, S., C. Shropshire, N. Soltani and P.H. Sikkema. 2007. Responses of dry beans (*Phaseolus vulgaris* L.) to sulfentrazone. Crop Protec. 26: 525-529.

[2] Taziar, A.N., Soltani, N., Shropshire, C., Robinson, D.E., Long, M., Gillard, C.L. and Sikkema, P.H. (2016) Tolerance of Four Dry Bean market Classes to Pre-Emergence Applications of Sulfentrazone. American Journal of Plant Sciences, 7, 2248-2256. http://dx.doi.org/10.4236/ajps.2016.715198


BAYER
Trilex®
EverGol®
Trilex helps you grow.
Trilex® EverGol® seed treatment lets you control how you want to treat your seed and protect your crop.
cropscience.bayer.ca | 1 888-283-6847 | @Bayer4CropsCA | #AskBayerCrop
Always read and follow label directions. Bayer, Bayer Cross, EverGol®, SeedGrowth™ and Trilex® are trademarks of the Bayer Group.
Bayer CropScience Inc. is a member of CropLife Canada. ©2019 Bayer Group. All rights reserved.
Bayer SeedGrowth™



The 2019 Weather Pendulum

Swings from dry to wet in the same growing season – *a case study from Morris, Manitoba*

Dr. Timi Ojo, Agricultural Systems Modeller, Manitoba Agriculture and Resource Development

ASK ANYONE WHAT their most intriguing weather-related story is and most likely, you will not hear about snowmelt in the spring, first fall frost in late September, half-inch of rain over a 24-hour period or -15°C air temperature in January. These normal weather occurrences in Manitoba do not often captivate our attention because they happened as expected. However, when weather events deviate from normal, we get intrigued and it catches our attention. The World Meteorological Organization defines *Climate Normal* as the averages of climatological data computed for successive 30-year periods, updated every ten years. These averages are considered as the centre of the pendulum, removes year-to-year variability and are the baseline for comparing which side of the pendulum each year falls.

Data trends over the last three *climate normal* periods (1961–1990, 1971–2000 and 1981–2010) showed that *climate normal* is a moving target. Some areas such as Arborg, Pilot Mound and Morris have had increasing *climate normal* precipitation over the three periods (Figure 1). The current *climate normal* data is computed from 1981–2010 weather data and the average precipitation for the growing season in agro-Manitoba from May to September ranges from 12.0–4.5 inches (305–368 mm). Morris is one of the locations with the highest growing season normal precipitation at 14.1 inches (357 mm). There is an even split in the number of years with above- and below-normal precipitation in the last 10 years (Figure 2).

Across agro-Manitoba, there is often a good correlation between the leading cause of post-seeding loss and the side of the pendulum *climate normal* precipitation falls. According to the data in the Manitoba Agricultural Services Corporation Annual Reports of 2016[1], 2017[2] and 2018[3], excess moisture accounted for 71% of post-seeding losses in 2016, which was a year that received

continued on page 44

continued from page 43

above-normal precipitation. Drought and heat dominated the next two years at 51% and 74%, respectively, and both years had below-normal precipitation (Figure 2). Similar to 2016, the 2019 growing season ended with above-normal precipitation, especially at many locations in the southwest, central and southeast regions. Does this make 2019 a wet year?

At St. Jean Farm Day in January, a room filled with over 50 producers mostly from areas around Altona, Morris and St. Adolphe were asked if they considered 2019 a dry or wet year. Over half of the respondents were unsure where to categorize the past growing season because it was both wet and dry! Temporal analysis that observed precipitation changes over time at Morris showed that the 2019 growing season precipitation pattern was similar to 2018 (dry year) until late August when record amounts of rain in September ensured that the season wrapped up on the wet-end of the pendulum (Figure 3). Unlike 2016 that had above-normal precipitation almost throughout the entire season, focusing only on the above-normal total precipitation at the end of the season would lead to inaccurate assessment of the 2019 growing season precipitation. From mid-July until late August, Morris received two-thirds of an inch (17 mm) over six weeks. For long-season crops like corn and soybeans, the dry period coincides with the timing of peak water consumption. For example, soybeans and peas use one-quarter to one-third of an inch of water per day (6–8mm/day) to meet crop water demand during pod formation and seed filling in August. Water deficit during this time will affect yield.

The *climate normal* precipitation around the Morris area for the month of September is 2 inches (49 mm). However, the location received 7.6 inches (194 mm). Despite the precipitation coming a little too late to make a remarkable difference in yield, it was useful in recharging the depleted soil moisture reserve after two consecutive dry years. Manitoba Agriculture and Resource Development's fall soil moisture information[4] shows that almost all areas in agro-Manitoba are at 80–100% of available water holding

continued on page 45

Figure 1. Climate Normal precipitation from May to September at various locations in Manitoba.

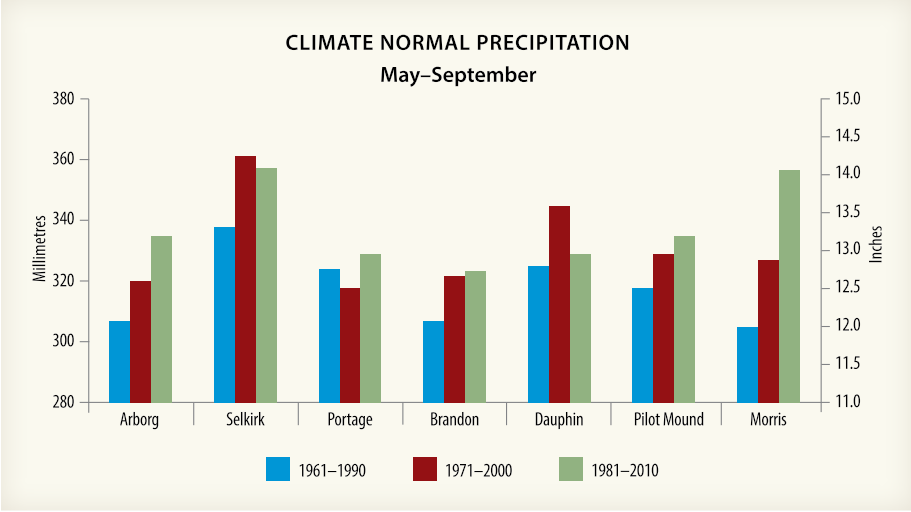


Figure 2. Total precipitation over the last 10 years from May 1 – Sept. 30 at Morris, MB. The thick black line is the 30-year Climate Normal (historical average) for the location.

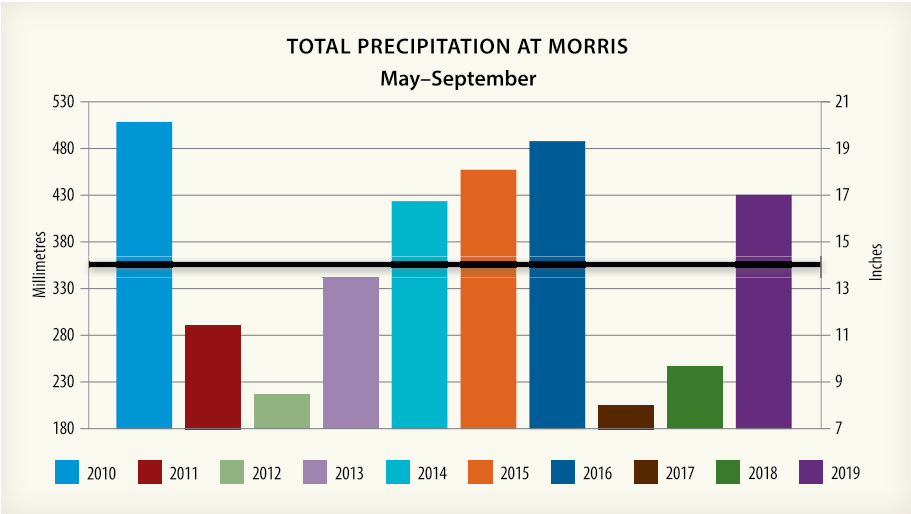
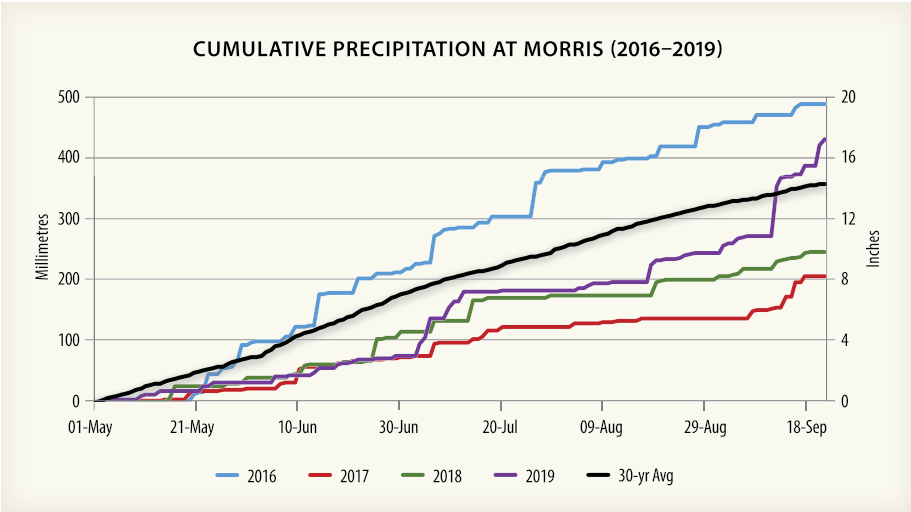


Figure 3. Cumulative precipitation from May 1 – Sept. 30 at Morris, MB. The thick black line is the 30-year Climate Normal (historical average) for the location.



What Challenges Will Producers Face This Upcoming Spring?

Brunel Sabourin, Antara Agronomy Services Ltd.

AT ST. JEAN Farm Days this year, Dr. Timi Ojo, meteorologist with Manitoba Agriculture and Resource Development, asked producers whether they thought 2019 would be remembered as a dry year or a wet year.

If we look at the growing season, for many areas, it was a record dry year. Although we received average rainfall overall, most of the rain fell too late to help this year's crop and made a mess of the second half of harvest. For all the problems the rains caused, though, it may turn out to be a blessing in disguise for the 2020 growing season.

Many producers were able to finish harvest and are happy to put 2019 behind them. But for others, there will still be some crop to harvest ahead of the 2020 planting season. Many more will have residue, ruts and compaction to deal with. Add the fact that little to no fertilizer was fall-applied across western Canada and the upper midwest region of the U.S., and fertilizer supply problems may add another degree of complexity to an already challenging spring.

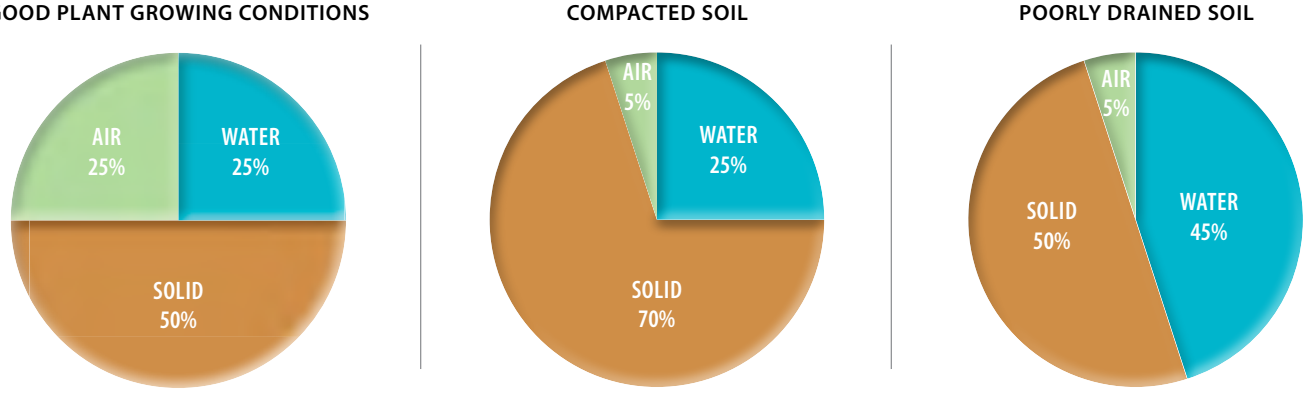
There are five important factors that producers will need to consider on a field by field basis as they plan their spring: weather, equipment, soil test levels, residue and unique field characteristics.

One of the first factors to consider is whether the field has any residue that will need to be managed. There is usually a price to pay for spring fieldwork. It tends to dry out soils and in the case of heavy clays, cultivating wet soils causes compaction and can wreak havoc on seed to soil contact and good emergence. Imagine the effects of stepping on a loaf of bread and squeezing the air out of it. It will eventually rebound somewhat, but never to its original state (Figure 1).

I recently read a book on the history of Lake Aggasiz in which geologists point out that much of Manitoba is still decompressing from the last Ice Age. It is believed that the Red River will eventually reverse its flow and head southwards, albeit not in our lifetime. If you are interested in the history of how the landscape in Manitoba was formed, I highly recommend the book titled *Lake Agassiz, The Rise and Demise of the World's Greatest Lake* by Winnipeg author, Bill Redekop.

continued on page 46

Figure 1. Healthy soils need a balanced mix of air, water and solids. This promotes optimal biological activity, nutrient availability and root respiration. Compacted or poorly drained soils inhibit root growth and reduce microbial activity.



continued from page 44

capacity before soil freeze-up in the fall. This moisture will be available for crop-use in the early part of the 2020 growing season. However, soil moisture build-up may not be helpful if above-normal precipitation is experienced in the spring. Where will the 2020 pendulum swing?

Manitoba Agriculture and Resource Development runs a network of 108 weather stations that monitors air temperature, relative humidity, wind speed and direction, maximum wind speed, solar radiation, soil temperature and soil moisture (at 5, 20, 50 and 100 cm depths). Each station page updates every 15 minutes during the day and hourly at night (7 pm–7 am) from April to October. The reporting schedule changes to hourly from November to March. Data from the network is used to provide valuable information such as crop disease risk, heat unit accumulation and crop water demand. The information from each station is publicly available at https://www.gov.mb.ca/agriculture/weather/current-ag-weather-conditions.html. ■

[1] https://www.masc.mb.ca/masc.nsf/annual_report_2016_17.pdf

[2] https://www.masc.mb.ca/masc.nsf/annual_report_2017_18.pdf

[3] https://www.masc.mb.ca/masc.nsf/annual_report_2018_19.pdf

[4] https://www.gov.mb.ca/agriculture/environment/soil-management/manitoba-fall-soil-moisture-survey html

continued from page 45

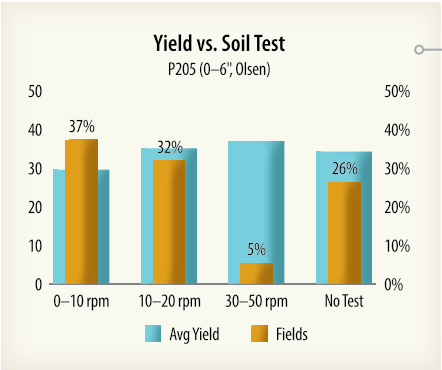


Figure 2. Benchmark data trend showing increased yield in soybeans of almost five bushels on fields with soil test phosphate levels of 10 ppm or better.

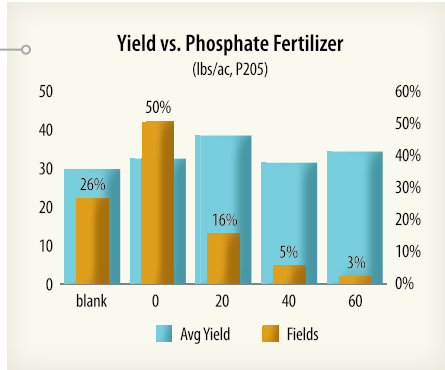


Figure 3. Benchmark data in soybeans showing a trend of increased yields with the addition of phosphate fertilizer.

The 20 lb/ac rates were likely banded with or near the seed row and more efficient than the 40–60 lbs rates (likely broadcast the previous fall).

Corn residue will present the biggest challenge this spring. Burning may be an option considered by some if we are unable to incorporate it properly. If the field was wet when harvested, there will also be ruts to contend with. Vertical tillage tools and highspeed discs work excellent at sizing residue in the fall when conditions are dry. However, they may not work as well in the spring, especially if you are trying to stay shallow to avoid disturbing too much soil. Loamy or sandier soils are a lot more forgiving than clay soils.

Shallow cultivation will also have a limited effect on the compaction of last year's harvest. We might be able to cover the ruts somewhat, but they will still reduce yields. Producers will have to weigh the negative effects of tillage against the negative effects of the ruts. Do you live with partial ruts on 20% or less of your acres to realize the full potential on the other 80%? Or do you risk affecting yields across the entire field?

The second factor to consider is what are the nutritional needs of the crop. Ultimately, we need to determine how much fertilizer we need to apply and what is the best placement. Fertilizer quantity will depend on the crop, yield goals and residual soil test levels. If field levels are healthy and/or you as a producer have fertilized aggressively in the past, you may be able to reduce rates or afford less optimal placement methods. See Figures 2 and 3 for a few related examples from our agronomy benchmarking program.

That leads us to our third factor, which is equipment. We have already mentioned vertical tillage tools and highspeed discs to incorporate residue, but we must also consider fertilizer applications. Available equipment options will dictate how we place our fertilizer, seed safety and logistics. Today's higher yields require more fertilizer that push the limits of what can safely be placed with or near the seed. Mobile nutrients can be broadcast, but nutrients like phosphate or potash will significantly lose their effectiveness if not placed in or near the seed row. Can we apply our fertilizer needs before, during and/or after planting? The golden standard of efficiency is to band fertilizer near the seed row, but the trend towards narrower openers and wider row spacings often mean little to no fertilizer can be placed in the seed row. There are many specialty fertilizers on the market today that increase nutrient efficiency and seed safety, giving us more options in a tough spring.

The final two factors are closely tied together—weather and unique field characteristics. These can affect timely field operations and how to tackle them. When it comes to weather, the big question generally is whether it will be an early or late spring? Will it be wet or dry? Ideally, every producer wants an early, dry planting window followed by nice spring showers that warm up soils and get the crop growing. This spring, we will have

continued on page 47

Field Pea Scout ANSWERS

A – Damaged seed coats

Not all seed damage is visible to the naked eye. Like soybeans and dry beans, peas are also susceptible to seed coat damage. A soak test was conducted on these pea seeds, where a set number of seeds were soaked in water for five minutes and the percentage of peeled seed coats was calculated. Seeds with a peeled coat will not germinate. Damage is more likely to occur when seed is dry (<14% moisture). These seeds were at 11–12% seed moisture with 20% seed coat damage. Pea seed must be handled gently to prevent damage and seedling disease.

B – Reduced plant stand

All yellow pea varieties grown in Manitoba are semi-leafless varieties, meaning they do not branch out. Instead, they rely on a high enough plant population to knit their tendrils together to form a competitive plant stand. All pulse crops are generally poor competitors against weeds, but peas are the least competitive. The recommended target plant stand for peas is 80–90 live plants/m² (350–400,000 plants/ac). Adjust your pea seeding rate (lbs/ac) for expected survival (including germination and soak test results) and seed weight, which can vary widely.

continued from page 46

the challenge that soils were saturated at freeze up. Although we have below-average snowfall in much of Manitoba, producers in some parts may still have to contend with spring flooding due to higher snowfall amounts south of the border. Rainy weather will compound this effect, delaying seeding, and add further strain to the fertilizer supply chain.

Unique field characteristics, such as soil texture and topography, will also affect your plans. Work in fields prone to spring flooding or standing water will likely be delayed. Heavy textured soils stay wetter, longer. We will have to plan the logistics of spring operations accordingly. Maybe a light cultivation could help with drying out soils in certain cases. I realize this contradicts a few of the points I made earlier, saying spring cultivation is bad, but there are exceptions and grey areas to every rule.

At the end of the day, producers should be prepared with a plan to tackle whatever scenario ends up playing out. This may mean having a plan A, B, and C at the ready. Many retailers and agronomists are encouraging producers to take home fertilizer now if they can to help mitigate the risk of a supply chain disruption. With our short growing season, the optimal planting window is small in a good year and even smaller in a challenging one. A successful season begins with planning long before the seed is in the ground. ■

A few of MPSG's farmer-members were asked what their plans are to manage specific challenges on their farm this spring.

1 What are the main challenges you will be dealing with this spring as a result of last fall's weather conditions?

2 What are your plans to manage those challenges? *— e.g., ruts, compaction, crop residue or fertility*

OUR MAIN CHALLENGE is going to be time management. We have the equipment to manage the field conditions from last fall, but it's going to be a challenge to get in the field for tillage and seeding in a timely manner. It's going to require a lot of man-hours during what is normally a really short window.

We generally do all our tillage in the fall and put all our fertilizer down at seeding. So, our fertility plans are the same, but this year we will have some tillage equipment running ahead of the seeder in fields that we didn't get to in the fall. We plan to seed right into last year's canola stubble, which is a first for us. We started direct seeding into soybean stubble a couple of years ago and have wanted to do more of that. This fall gave us a good reason to. Our soybean fields need the most work following the wet harvest. We will be tilling them in spring when we usually wouldn't. We generally seed wheat after soybeans, so these are also the fields we want to be seeding first. The potential for spring tillage drying out the seedbed is a concern as well.

One other thing is that we let our pea harvest losses continue to grow through the fall as a cover crop, leaving a mat of residue. We will see what that looks like in spring.

— Bryce MacMillan, Marquette, MB

I DON'T FEEL like we have any challenges going into spring.

We purchased combine tracks in the fall to leave as few ruts as possible. So right now, our fields are in good condition.

We did not get any fall tillage or fertilizer done like normal. This shouldn't be a problem because we seed with a disc drill. We will just become zero-tillers for 2020. Fertilizer not going on in fall isn't a huge problem. We will just adjust the type of fertilizer we use (granular and liquid) and apply it at a different time in spring.

Unworked corn should work out fine. We are planning on burning 160 acres to make room for navy beans. There are new herbicides that we are planning to use for weed control. The rest of the corn ground will all be seeded to canola straight into standing trash. We took the blades off our chopping corn head in fall to leave trash as tall as possible to reduce the mat of stalks on the ground that needs to dry in spring.

There are some challenges that we have been proactive on. And some that we just need to adjust this upcoming spring. But all in all, we are sitting just fine. We should have some nice moisture to get things going in spring.

— Jason Voth, Altona, MB

I THINK YOU got the issues, i.e., ruts, fertility, possibly wet soils with unworked clay soils and excess crop residue.

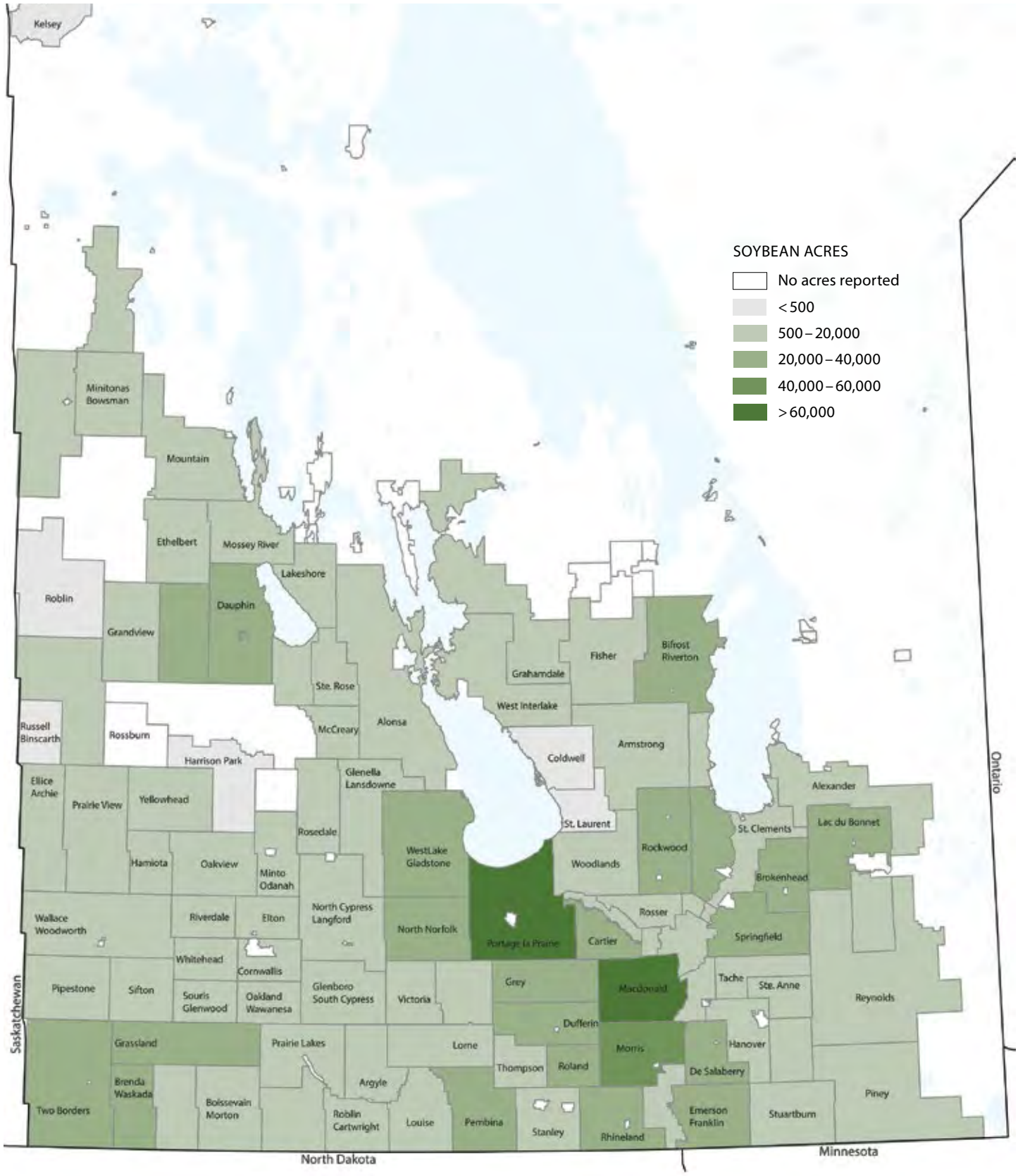
Our solution to ruts was to combine at a 6-degree angle to the way we want to seed. We hope that the freezing and thawing will soften the soil and we can seed across them. I think we will lose less seedbed that way than trying to work the ruts down.

We didn't get any NH_3 down this fall, so we switched to urea and brought it all home in bins. We also bought a fertilizer spreader, as I think custom spreading or renting a spreader will be impossible to get on a timely basis in spring. We are also considering getting a scale to weigh what's being applied. An auger to fill the spreader from the tandem is also being considered.

A match may also have to be used if the soil is too wet to seed. The last resort, as we are trying to build up our organic matter.

— Cal Penner, Elm Creek, MB

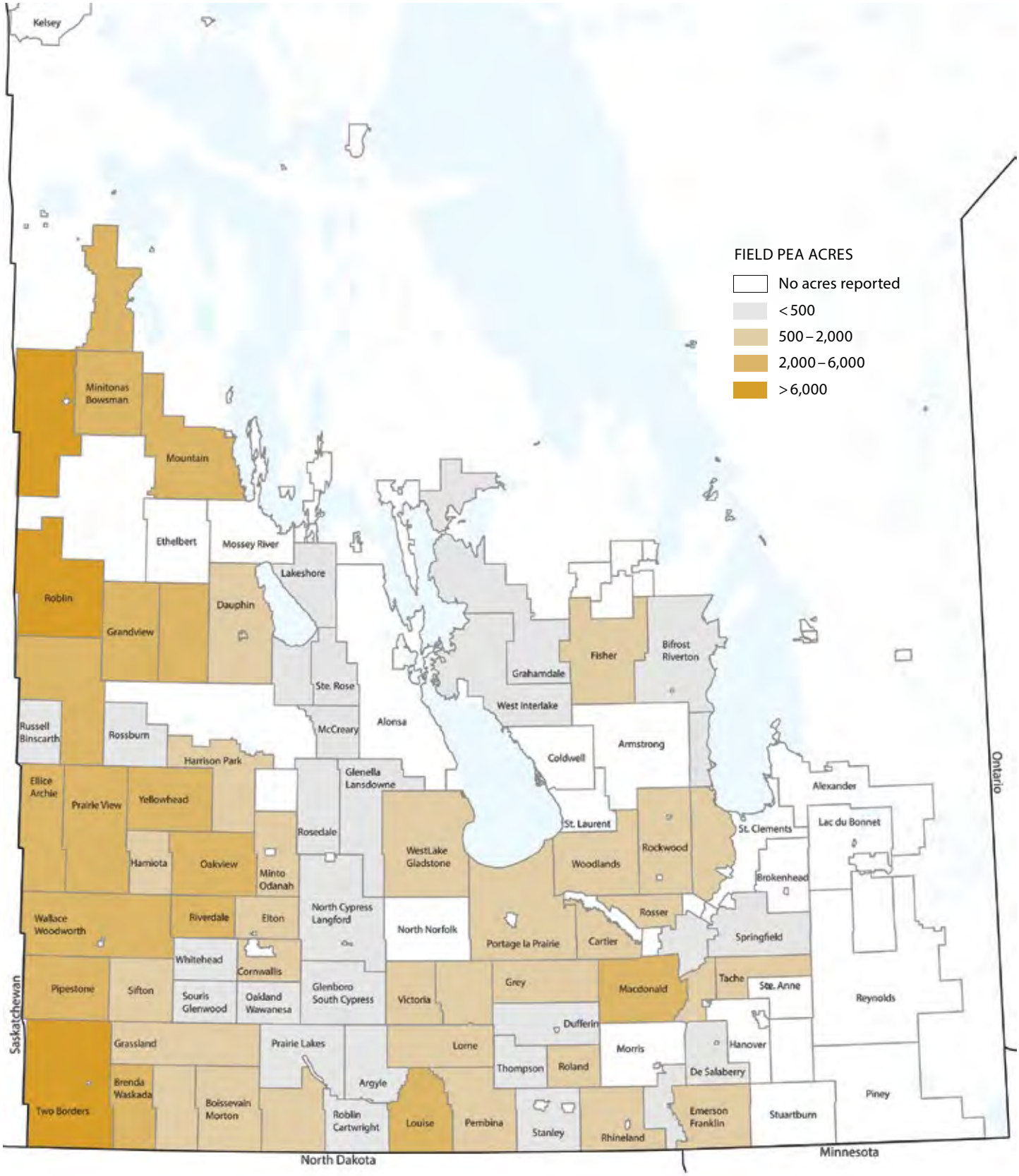
2019 Soybean Acres



MANITOBA Pulse Soybean GROWERS

MASC Manitoba Agricultural Services Corporation

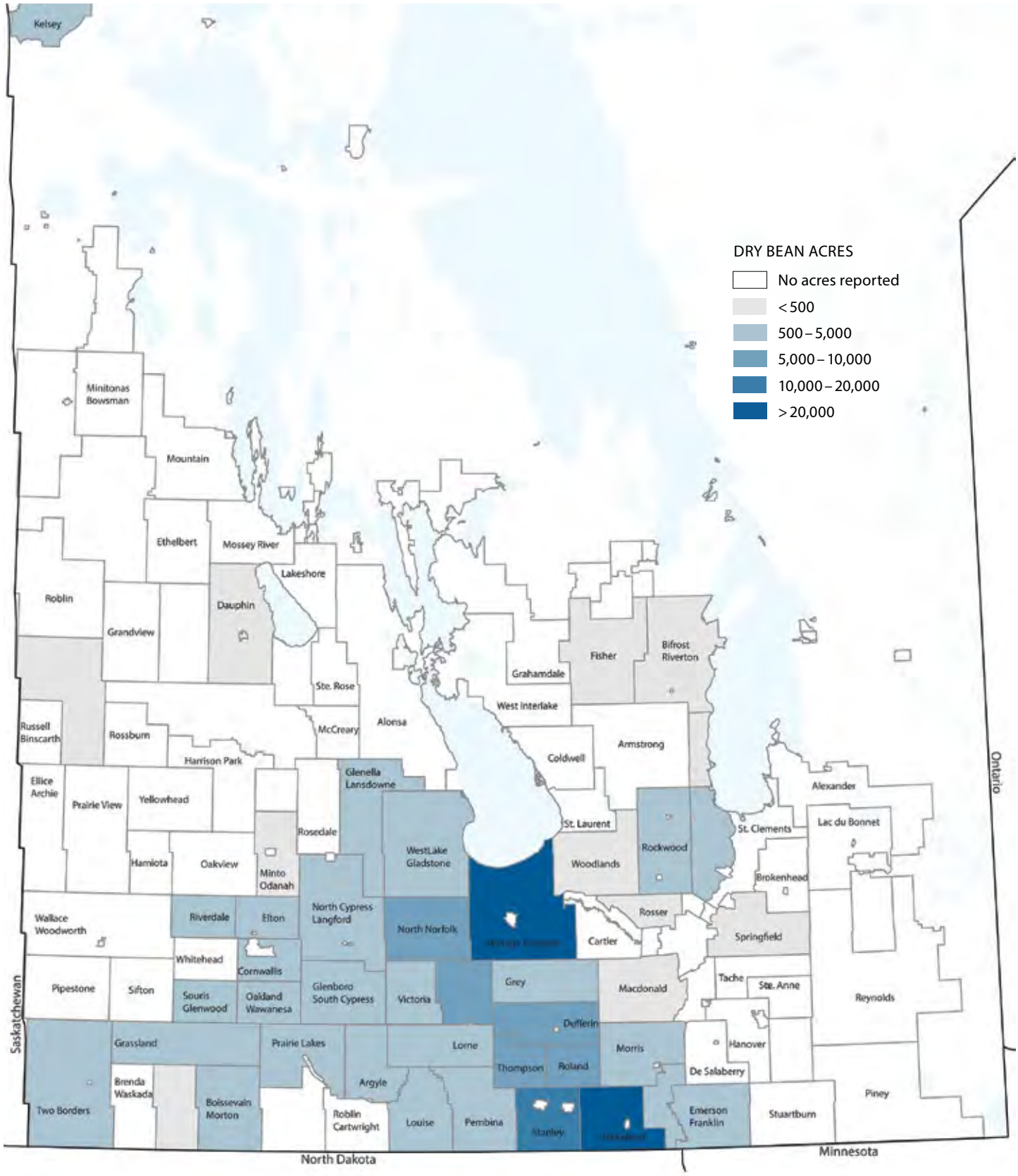
2019 Field Pea Acres



MANITOBA Pulse Soybean GROWERS

MASC Manitoba Agricultural Services Corporation

2019 Dry Bean Acres



MANITOBA Pulse Soybean GROWERS

MASC Manitoba Agricultural Services Corporation

Manitoba Pulse and Soybean Buyer List – March 2020

COMPANY	EDIBLE BEANS	FABA BEANS	LENTILS	PEAS	SOYBEANS	PHONE	LOCATION	CGC REGULATED
Alliance Pulse Processors Inc. dba AGT Foods Canada	✓	✓	✓	✓	✓	306-525-4490	Regina, SK	✓
• AGT Foods St. Joseph	✓		✓	✓	✓	204-737-2625	St. Joseph, MB	✓
All Commodities (AC) Trading Ltd.			✓	✓		204-339-8001	Winnipeg, MB	✓
Avena Foods Ltd. dba Best Booking Pulses Inc			✓	✓		204-857-4451	Portage la Prairie, MB	✓
Belle Pulses Ltd.		✓		✓		306-423-5202	Bellevue, SK	✓
Besco Grain Ltd.		✓		✓		204-745-3662	Carman, MB	✓
Brett-Young Seeds				✓	✓	204-261-7932	Winnipeg, MB	
BroadGrain Commodities Inc.	✓	✓	✓	✓	✓	416-504-0070	Toronto, ON	✓
C.B. Constantini Ltd.				✓		604-669-1212	Vancouver, BC	✓
Cargill Ltd.					✓	204-947-6219	Winnipeg, MB	✓
CHS Inc.					✓	204-942-3796	Inver Grove Heights, MN	✓
Columbia Grain Inc. (CGI) (Walhalla Bean Co.)	✓					701-549-3721	Walhalla, ND	✓
Delmar Commodities Ltd.	✓		✓	✓	✓	204-331-3696	Winkler, MB	✓
G3 Canada Limited				✓		204-983-0239	Winnipeg, MB	✓
Gavilon Grain LLC					✓	816-584-2210	Omaha, NB	✓
Global Grain Canada Ltd.	✓					204-829-3641	Plum Coulee, MB	✓
Hensall District Co-op	✓			✓		204-295-3938	Winnipeg, MB	✓
Horizon Agro Inc.					✓	204-746-2026	Morris, MB	
J.K. Milling Canada Ltd.				✓		306-862-5401	Regina, SK	✓
Knight Seeds			✓	✓		204-764-2450	Hamiota, MB	
Kalshea Commodities Inc.			✓	✓		204-272-3773	Winnipeg, MB	✓
Linear Grain Inc.	✓	✓		✓	✓	204-745-6747	Carman, MB	✓
Louis Dreyfus Company Canada ULC				✓	✓	403-205-3322	Calgary, AB	✓
Marina Commodities Inc.			✓	✓		204-937-2300	Roblin, MB	✓
Masterfeeds		✓		✓		403-327-2555	Lethbridge, AB	
McDougall Acres Ltd.	✓	✓	✓	✓	✓	306-693-3649	Moose Jaw, SK	
Monsanto					✓	–	Winnipeg, MB	
Natural Proteins Inc.					✓	204-355-5040	Blumenort, MB	✓
Nutri-Pea Ltd.				✓		204-239-5995	Portage la Prairie, MB	
Nu-Vision Commodities	✓			✓	✓	204-758-3401	St. Jean Baptiste, MB	
Parrish & Heimbecker Ltd.				✓	✓	204-987-4320	Winnipeg, MB	✓
Paterson Grain	✓			✓	✓	204-956-2090	Winnipeg, MB	✓
• FeedMax Corp.				✓		204-523-0682	Killarney, MB	✓
Pipeline Foods, ULC				✓	✓	204-997-2480	Winnipeg, MB	✓
Providence Grain Group			✓	✓	✓	780-997-0211	Fort Saskatchewan, AB	✓
PS International, LLC DBA Seaboard Special Crops		✓	✓	✓		306-565-3934	Regina, SK	✓
Richardson International Ltd.				✓		204-934-5627	Winnipeg, MB	✓
• Richardson Pioneer Limited				✓	✓	204-934-5627	Winnipeg, MB	✓
• Tri Lake Agri Limited				✓		204-523-5380	Killarney, MB	✓
Rudy Agro Ltd.	✓		✓	✓		306-867-8667	Outlook, SK	✓
Scoular Canada Ltd.	✓	✓	✓	✓		403-720-9050	Calgary, AB	✓
Seed-Ex Inc.		✓	✓		✓	204-737-2000	Letellier, MB	✓
Shafer Commodities Inc.	✓	✓	✓	✓	✓	204-822-6275	Morden, MB	✓
Simpson Seeds Inc.			✓			306-693-2132	Moose Jaw, SK	✓
Southland Pulse Inc.			✓	✓		306-634-8008	Estevan, SK	✓
Thompsons Limited	✓				✓	519-676-5411	Blenheim, ON	✓
Vandaele Seeds Ltd.		✓		✓		204-665-2384	Medora, MB	✓
Vanderveen Commodity Services Ltd.				✓	✓	204-745-6444	Carman, MB	✓
Viterra Inc.	✓		✓	✓	✓	Contact your local Viterra sales representative		✓
Wilbur Ellis Company of Canada Ltd.	✓		✓	✓		204-867-8163	Minnedosa, MB	✓
Zeghers Seeds Inc. o/a Zeghers Canada	✓	✓	✓	✓		204-526-2145	Holland, MB	✓

The Canada Grain Act requires some elevators and grain dealers to have a Canadian Grain Commission (CGC) license and post-security to cover their liabilities (what they owe) to farmers. Grain dealers and operators of primary, terminal and process elevators in western Canada are licensed by the CGC. Seed cleaning plants that do not purchase grain and feed mills do not have to be licensed.

It is the responsibility of farmers to satisfy themselves that any company they deal with is financially sound.

Questions regarding licensing and security should be directed to the CGC at 800-853-6705 or 204-983-2770. MPSG's pulse crop buyers list contains the names of companies actively purchasing pulse crops in Manitoba. For a complete listing, please visit our website manitobapulse.ca.

Recipe Corner

Salt Cod and White Bean Brandade

Servings: 6–10 Prep time: 15 minutes Cook time: 1.5 hours Total time: 1.75 hours

Ingredients

1 lb salt cod

2 sprigs thyme

1 pod star anise

4 cups 2% milk

1 cup dried white beans (or 2.5 cups canned white beans)

4 cups (water

1 medium onion diced

2 tbsp butter

5 cloves garlic chopped

1½ cups heavy cream

1/2 cup parsley chopped

3 tbsp canola oil

salt and pepper to taste

Method

Soak dried white beans in cold water overnight and in separate container soak cod in cold water overnight.

Sweat onion, garlic in the butter and add the hydrated white beans. Cover with the water and cook for approximately one hour or until beans are completely cooked and soft. Add the cream and cook an additional 10–15 minutes. (season and set aside but keep warm)

Remove cod from water, rinse and poach in the milk with the star anise and thyme. Once cooked, approximately eight minutes, strain and incorporate into the warm bean mixture by flaking all the cod and stirring vigorously.

Finish with the canola oil and parsley, adjust seasoning and enjoy with some nice crunchy toasted baguette rounds. Alternatively, refrigerate overnight and shape into fish cakes bread and fry!

Recipe featured on Great Tastes of Manitoba – www.greattastesmb.ca

Barley Lentil Soup

Ingredients

1 tbsp canola oil

1 large onion, thinly sliced

1 large garlic clove, minced

1/3 cup pearl barley

6 cups sodium-reduced chicken or beef stock

1 – 19 oz can lentils, drained and rinsed

2 cups chopped fresh spinach, packed

2 medium tomatoes, chopped

pepper to taste

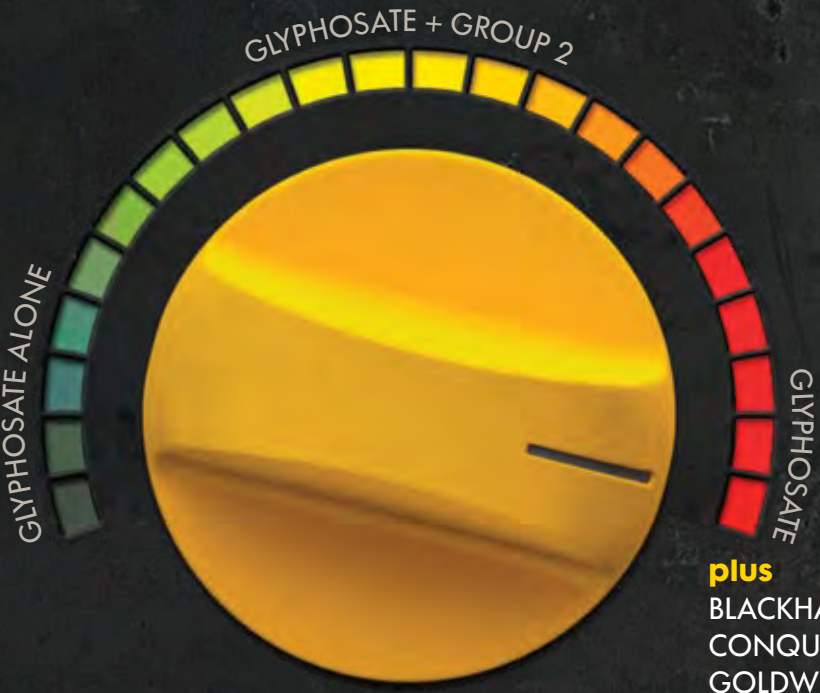
Method

Pour canola oil into a large saucepan and place over medium-high heat. Add onion and garlic and sauté for 4–5 minutes until onion softens.

Stir in barley and stock. Bring to a boil. Reduce heat and simmer for 25–30 minutes or until barley is cooked.

Stir in remaining ingredients and heat through, about 5 minutes.

Recipe courtesy of Manitoba Canola Growers Association



plus
BLACKHAWK®
CONQUER® II
GOLDWING®

Turn up the burn.

If you're still using glyphosate alone for pre-seed burndown, or choosing a Group 2 herbicide as a tank-mix partner, you may not be getting the early weed control you need. Nufarm's burndown products have multiple modes of action that deliver the power you need to stay ahead of tough weed pressures – giving your canola, cereal, pulse and soybean crops a cleaner start in the spring.

Amplify your pre-seed weed control with Nufarm.

BlackHawk® CONQUER® II GoldWing®

Ask your local retailer for more information.

1.800.868.5444 | Nufarm.ca | NufarmCA

MIX IT UP™
Brought to you by BAYER

Always read and follow label directions.

67196-05-12/19

Nufarm
Grow a better tomorrow

Elite® soybeans from BrettYoung take pod height to a new level, delivering higher yields.

brettyoung.ca/Soybeans

Roundup Ready 2 YIELD SOYBEANS

AMIRANI R2	NOCOMA R2	KARPO R2	AKRAS R2
2150 CHU | 000.5 RM	2250 CHU | 000.8 RM	2350 CHU | 00.2 RM	2375 CHU | 00.3 RM

CANADA BEST MANAGED COMPANIES

BrettYoung™
DISTINCT BY DESIGN