MANITOBA Pulse Soybean GROWERS

pulsebeat

Issue 95 • Spring 2022

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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 2022 Board of Directors and Staff

ELECTED FARMER DIRECTORS

Chair – Melvin Rattai – *Beausejour*
Vice Chair – Brendan Phillips – *Hartney*
Alex Burgess – *Minnedosa*
Bryce MacMillan – *Marquette*
Ben Martens – *Boissevain*
Bryce Pallister – *Portage la Prairie*
John Preun – *St. Andrews*
Frank Prince – *Waskada*
Garrett Sawatzky – *Altona*
Ernie Sirski – *Dauphin*

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Communications Coordinator – Elisabeth Harms – *elisabeth@manitobapulse.ca*

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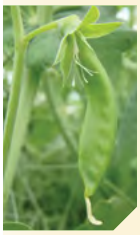
Agronomist – On-Farm Network – Leanne Koroscil – *leanne@manitobapulse.ca*

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




MANITOBA Pulse & Soybean GROWERS 2022 AGM Annual General Meeting SUMMARY

February 16 saw the Manitoba Pulse & Soybean Growers (MPSG) Annual General Meeting (AGM) occur in virtual format for the second consecutive year. About 60 people registered for the event. MPSG members heard that despite a drop in soybean production, the organization's financial position remains solid. The pandemic has taken its toll on in-person extension events, but staff and their research and extension partners have developed new ways of delivering information to members. Programs such as regional variety testing and the On-Farm Network remain popular. Policy has taken up a more significant proportion of MPSG resources since the board increased the organization's emphasis in this area. Partnerships with sister commodity and farm organizations at the provincial and national levels are key going forward.

Staff are the most important resource and MPSG members heard their organization is in a good spot with the team of skilled and dedicated staff currently on board. This was board chair Cal Penner's final meeting as he is stepping down after several years of service. Cal reflected fondly on the people he's met and the experiences he gained while serving on the board. Newly elected board member Alex Burgess of Minnedosa hit the ground running, signing up to sit on several committees, including the very active research committee.

In the 2021 tax year, MPSG members can take advantage of a 23.82 percent credit under the federal Scientific Research and Experimental Development (SR&ED) tax credit. There is currently about $7.4 million in funding committed to a wide range of research projects. Presentations at the AGM showed how the research program is complemented by a strong focus on extension and evaluating management practices through the On-Farm Network.

Manitoba Pulse & Soybean Growers 2022 Committees and Representatives

MPSG COMMITTEES – *The first named is chair*

Executive – M. Rattai, B. Phillips, E. Sirski

Governance/HR – B. MacMillan, F. Prince

Policy – B. Phillips, A. Burgess, B. Pallister, E. Sirski

Finance/Audit – J. Preun, B. Phillips, M. Rattai

Resolutions – G. Sawatzky, A. Burgess

Nominating – G. Sawatzky, A. Burgess

Communications/Member Relations – G. Sawatzky, A. Burgess, B. MacMillan

Market Development – J. Preun, B. Martens, B. Pallister

Research – F. Prince, A. Burgess, B. Martens, B. Pallister, M. Rattai

U of M Research Agronomist Advisory Committee – F. Prince, J. Preun

MPSG REPRESENTATIVES

Canadian Grain Commission Pulse Sub-Committee – G. Sawatzky

Grain Growers of Canada – B. Phillips
- **Trade and Marketing** – E. Sirski
- **Business Risk Management** – B. Phillips

Keystone Agricultural Producers
- **General Council** – D. Domitruk
- **Pulse/Oilseed Sub-Committee** – D. Domitruk
- **Commodity Group** – D. Domitruk

MCVET – Staff

PGDC/PRCPSC – D. Domitruk

Pulse Canada – B. Martens, J. Preun

Soy Canada – E. Sirski, M. Rattai

Soybean Scout

Can you identify these problematic weeds?

Answers can be found on page 46

Message from Board Chair

Calvin Penner, Chair, MPSG

AS I SIT and think about what I will write for this message, it is snowing and the wind has switched back from the north after blowing from the south. These unpredictable winds seem to be filling every nook and cranny of our farm with snow. That's a good thing, and it's also a good thing that there is no dirt blowing off of our fields. Things are looking much brighter than they did at this time last year.

Right now, we have slightly above average snow accumulation, which is what we will need to be able to start recharging the soil moisture deficit. It is a good starting place and who knows what will happen between now and spring. We will still need a good, slow melt to allow all of this to soak into the soil, as well as timely rains in order to recover from the drought.

I've enjoyed the last six years at Manitoba Pulse & Soybean Growers (MPSG), but I have decided to step back to make way for new board members. It has been a great experience to sit on the MPSG board and then be asked to chair the board. We have an exceptional board and staff at MPSG. I have learned a lot about boards and soybean and pulse research, as well as how farmers farm in different areas of the province. I have also been able to meet researchers from across the country and see the research that supports MPSG's vision statement, which states "sustainably producing profitable, quality pulse and soybean crops."

I look forward to seeing the continued results of research on pulses and soybeans. There is so much good work that happens that is unseen by the casual observer.

The 2022 board election results are in and I want to congratulate Alex Burgess on being elected. I would encourage everyone to make time and consider sitting on a board at some time in their lives. You can make a difference no matter what type of board it is. You will also learn about how boards work, as you provide leadership and direction to whatever organization you choose to engage with. You will learn a lot about human nature, as well as meet new and interesting people.

Over the past six years, I have enjoyed seeing all the work that MPSG has done. I am proud of the work that MPSG is doing on behalf of Manitoba farmers.

I want to wish you a good 2022 crop. ■

— Calvin

Message from Executive Director

Daryl Domitruk, Executive Director, MPSG

THE ROLLER COASTER of sentiments felt by growers this crop year is leaving its mark in the Manitoba Pulse & Soybean Growers (MPSG) office. In addition to anxiety over drought and input prices, the absence of in-person extension events has tested the spirits and patience of our ag professionals. After all, Cassandra, Laura, Ian and, most recently, Leanne signed up with MPSG to deepen their experience in face-to-face exchanges with farmers. Disappointing as times have been, it's not only the prospect of returning to in-person events that imbue staff with optimism. Discovery of virtual extension formats has MPSG experimenting with new, innovative and cost-effective ways to serve our members. The possibilities presented by evolving forms of communication are fuel for the optimism that continues to drive MPSG staff.

It's in that frame of mind I relay some of the latest happenings in the world of MPSG.

NATIONAL CAMPAIGN

I'm pleased to report we've participated with Pulse Canada and our provincial sister groups in a national campaign to promote beans to Canadian consumers. It's a professionally orchestrated social media and TV campaign featuring influential chefs. So intrigued were we by the potential to increase recognition of Canada's bean farmers, we've stepped up our consumer outreach program. In February, we contracted a communications consultant in part to carry forward the bean campaign with a Manitoba flavour.

SCIENCE CLUSTERS

A big deal lately has been planning for the next round of five-year federally funded "science clusters." With fewer funds compared to the last round in 2017, there are some tough decisions to make. Much of the research in science clusters involves genetics, and as a result, the fruits of the research are ten or more years away. These projects compete with quick return projects such as fungicide performance, On-Farm Network trials and the Agronomist-in-Residence program. We're putting the MPSG-funded dry bean breeding program at AAFC–Morden under the microscope and have polled the bean industry and growers on their thoughts for the future.

RESEARCH STRATEGY

A new national research strategy for pulses described in this edition of *Pulse Beat* helps guide our research decisions. It was very satisfying working on the development of this strategy with colleagues from across Canada. Canadian pulse growers have a strong team working for them. Overall, a good balance was achieved between national aspirations and provincial grower needs.

SOYBEANS

Encouraging signs are coming out of national discussions on soybeans as well. Soy Canada convened a Northern Soybean Summit in January (see Brian Innes's article on page 15). Prairie expansion is a big focus for the industry. The summit was an honest discussion on the challenges we'll have to overcome to sustain soybean acres in Manitoba, let alone expand westward. For one, competition from the canola juggernaut is substantial. As with pulses, there's a strong sense of national mission that seeks success by meeting regional needs. On the heels of the summit, the national soybean science cluster began reviewing project ideas for a 2023 start. Industry is generating varieties for the prairies at an impressive pace. However, they're challenged to improve drought tolerance and protein, two traits critical to soybean's success in our region. This may be the role of public science; accelerate advancements not immediately achievable in private research programs.

VARIETY TRIALS

By comparison, the annual planning of regional variety test (RVT) trials is uncomplicated. MPSG is again preparing

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 2021 tax year, 23.82% 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 2001–2021 MPSG SR&ED tax credit rates are available on the MPSG website manitobapulse.ca.

for a full program of tests across Manitoba. Often under the radar, the RVT program is one of our most ambitious. The results remain popular with members. Last year, a member request for a site in the Holland area became a reality and we're enthusiastic to hear more feedback from members.

ROQUETTE

I hope some members caught the November virtual grand opening of Roquette's Manitoba plant. As informed pulse advocates, we can look beneath the glitz and appreciate the industry-defining event this was. Indeed, plant protein has ruffled some feathers and is under scrutiny by competitors. In the final analysis, the positive impact of pulse protein on Manitoba is clear. We continue to work with Roquette on research and extension.

KEEP IT CLEAN

With leadership from Pulse Canada, MPSG continues to contribute to the *Keep it Clean* product advisory. Ensuring our products don't exceed Maximum Residue Limits (MRL's) for pesticides is critical. It's also tricky because while growers are finicky about pesticide application, it only takes a minor deviation from the accepted standard to raise the alarm among customers. MRL's are the first place where the desire for purely science-based actions meets the reality of market demands, especially when pre-harvest glyphosate is the subject. It's a constant tug-of-war. A lengthy, often controversial discussion that is made more difficult by the variety of crops, markets and geographies encompassed by pulses. The same process in soybeans is relatively straightforward.

POLICY

Grain Growers of Canada embarked on a mission to achieve net-zero emissions by 2050. This is an ambitious and necessary undertaking in which MPSG is a full partner. Simultaneously, Pulse Canada has prepared the science and policy pieces to support the essential role for annual legumes in Canada's climate strategy. Pulses and soybeans are no less critical for Manitoba to meet its objectives. However, if our prairie neighbours are a measure, we have some catch-up to do in carbon sequestration. It seems the broad adoption of zero-till in Saskatchewan and Alberta combined with extensive acres of pulse crops have enabled growers out west to already be at or near net-zero. With our lower acreage of legumes, more intensive tillage and increasing application of fertilizer, Manitoba is some distance behind. Our goal is to work across commodities to find the win-win combination of profitable and carbon-conserving farming practices that work for Manitoba. Undeniably, pulses and soybeans are a great place to start.

ASSINIBOINE COMMUNITY COLLEGE

Speaking of starts, Assiniboine Community College (ACC) continues to build its capacity for applied research in crop production. MPSG has an eye on expanding research in Westman and is working with ACC to implement a crop protection product screening project so that Manitoba growers have access to practical pest control information similar to growers in Ontario.

STAFF

MPSG received a shot of enthusiasm at the start of 2022 when Leanne Koroscil joined MPSG's On-Farm Network team and Cassandra Tkachuk assumed responsibility for the research program. As an executive director, it is reassuring to see we continue to attract and develop talented ag professionals.

If innovative extension methods are the fuel for MPSG staff, the spark is provided by the regular news of good things coming from pulses and soybeans. There's big picture news like recognition of the essential role our crops must play in agriculture if we're going to reduce carbon emissions. At a regional scale, we're learning about the competitive advantage of critical amino acids in Manitoba-made soybean meal. Attention is being brought to the potential for non-GM soybean production in Manitoba as well as the potential to produce lupins. Even at the micro-scale, the news is encouraging; genes essential for drought tolerance in Canadian soybeans are, in fact, within our reach. One gets the sense that something very positive is possible with pulses and soybeans. Our job is to limit distractions and effectively marshal our resources to achieve some extraordinary things. ■

— Daryl

News from the Office

Leanne Koroscil

MPSG would like to welcome **Leanne Koroscil** to the team as our new On-Farm Network Agronomist.

Leanne is from a farm near Sandy Lake, Manitoba, where she was first introduced to grain and oilseed production. Her interest in agriculture led to the completion of a Bachelor of Science (Ag) degree majoring in agronomy at the University of Manitoba (U of M). Summer experiences in the industry and on the farm sparked her interest in agronomic research, which fuelled her pursuit of a Master of Science degree in Plant Science at the U of M. Her research focused on the effect of spatial arrangement on dry bean development and yield.

When Leanne's not in a field, she enjoys videography and Ukrainian dancing, but she would rather be in a field most of the time. She's looking forward to working at MPSG and wants to wish everyone a safe and prosperous season ahead!

Cassandra Tkachuk

MPSG is pleased to announce that **Cassandra Tkachuk** has moved into the position of Research Specialist.

For the past five years, Cassandra has served MPSG in the role of Production Specialist, focusing most recently on the eastern half of the province. She has delivered research-based information to you through *The Bean Report*, extension events, articles and production resources. She has also spent an extensive amount of time interacting with farmers – responding to questions, visiting fields and developing strategies to address agronomic challenges.

In this new position, she will be focusing her efforts on MPSG's dynamic research program that is exclusively aimed at the needs of farmers. She will continue to stay in touch with the challenges you face and the opportunities you envision on the research front.

Elisabeth Harms

Elisabeth Harms joins MPSG after acting as marketing specialist for Manitoba Egg Farmers. Her passion for food led her to complete a degree in Human Nutritional Sciences from the University of Manitoba. Working at the Farm and Food Discovery Centre helped her use her knowledge of food to bridge the gap between how our food is produced and where we get our food from. Since then, Elisabeth has worked hard in the agriculture sector, working at Manitoba Beef Producers as their food expert on *Great Tastes of Manitoba*.

Elisabeth returned to school to receive a Creative Communications diploma from Red River College Polytechnic. Combined with her food and nutrition knowledge, Elisabeth has a unique set of skills that she is excited to put to work for MPSG.

Elisabeth also loves to cook and bake in her free time. She can be found hiking and enjoying the outdoors in the summer with her husband, Tyler, and her dog, Loki.

Shannon Says Farewell

Shannon Beddome-Lorenz

Imprint Media Services – *Pulse Beat*

Yes, the decision has been made. Going into my 25th year on *Pulse Beat*, I've decided it is time for new adventures and this edition will be my last.

I am grateful for having been entrusted with the design and production of MPSG's flagship communication piece for all that time. Dedicated staff are the backbone of this publication and presenting their contributions in *Pulse Beat* has been most fulfilling.

Advertising revenue has sustained the successful publication of *Pulse Beat* and I thank the many long-time supporters. It's been a pleasure getting to know many of you. For some of us, our children have all grown up during that time. And some of us are grandparents now!

There are too many people to mention individually, but if you remember me, I guarantee that I will remember you, and I thank you.

Finally, no words can describe my appreciation for my family's support. Without that, it would not have been easy to meet some of the deadline challenges and deliver a product to be proud of.

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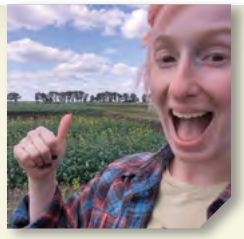
Say Hello to MPSG's 2022 On-Farm Network Summer Students

Mikayla Melnick

My name is **Mikayla Melnick**. I'm from Winnipeg, but I moved west with my family to Vancouver Island 10 years ago. I am currently a student at the University of Guelph, where I major in biomedical toxicology and minor in agriculture. I want to learn as much as I can about field research and crop production while working with Manitoba Pulse & Soybean Growers. I love the idea that the research is done with the specific intent to help farmers and I cannot wait to play a part in it. I am really looking forward to spending time outdoors this summer! Fun fact – I am currently training for an 85 km trail run later this summer!



Chloe Hodgson

My name is **Chloe Hodgson**. I am originally from Winnipeg. I recently received my Bachelor of Science degree in the Faculty of Agricultural and Food Sciences at the University of Manitoba (U of M). This summer, my goals are to learn more about soybean and pulse production, and to get more hands-on, in-field experience before completing a master's program in plant pathology at the U of M. I also hope to gain new agronomy-related skills while working with the Manitoba Pulse & Soybean Growers team and to become more familiar with pulses!

MPSG's 2021–2022 Scholarship Recipients

Manitoba Pulse & Soybean Growers (MPSG) has awarded two University of Manitoba agriculture students with bursaries for the 2021–2022 academic year. Boma Okorosaye-Orubite was the recipient of $1,000 through the MPSG Degree Scholarship, and Lacey Calder was awarded $1,000 through the MPSG Diploma Scholarship. Supporting students interested in pursuing an education in agriculture is a priority for MPSG and its farmer members, and we look forward to seeing how Lacey and Boma, both of whom you'll be introduced to below, will undoubtedly improve the industry.

My name is **Boma Okorosaye-Orubite**. I am a third-year animal systems student at the University of Manitoba (U of M). I moved from Nigeria to Canada about nine years ago and I have taken a rather unorthodox path to agriculture. My first degree is in nursing, but I have always been a farmer at heart. As a kid, I turned my parents' yard into a hobby farm where I kept both plants and animals.

I am interested in an integrated agricultural process – one that harmonizes the relationship between plants and animals. After graduating and getting some more experience, I would like to start my own farm. I also want to help educate people on the hard work farmers put into producing food.

I am looking forward to working on a farm this summer and I am grateful to Manitoba Pulse & Soybean Growers for this scholarship.

My name is **Lacey Calder**. I am a second-year agriculture diploma student at the University of Manitoba, majoring in general agriculture. I grew up on a grain and beef cattle operation in Carlowrie, Manitoba. It was there that I found my greatest interest, which is all things agriculture. From a young age, I've always been excited to learn more about our industry and how we as farmers can improve it, both economically and environmentally.

I am very thankful for the Manitoba Pulse & Soybean Growers scholarship that I was fortunate enough to receive. The funds are currently being put to great use to support my university education. This scholarship will help me further my ag education, which I will be forever thankful for. After graduating from university, I hope to return to my farm to work alongside my father.

Assiniboine Community College Sets Sights on Advancing Ag in Manitoba

Toban Dyck, Writer and Farmer

ASSINIBOINE COMMUNITY COLLEGE (ACC) in Brandon is increasing its commitment to agricultural programming, a trajectory that includes Manitoba Pulse & Soybean Growers (MPSG).

MPSG has committed $200,000 towards ACC's Prairie Innovation Centre for Sustainable Agriculture, which is part of the college's long-term goal of nearly tripling enrollment in its ag programs, increasing applied research and better aligning its course offerings with industry needs, including projected labour gaps. The Centre will include collaborative learning spaces, labs and much, much more.

The Centre represents a $65M capital investment — funds that the college hopes to raise through fundraising efforts, funding commitments from groups like MPSG and one-time donations.

"The Prairie Innovation Centre will not only address the current and developing gaps in the labour market in Manitoba's agriculture industry, it will also be a hub for agricultural innovation, encouraging engagement and collaboration with industry partners to address emerging situations and issues," said Derrick Turner, Director of Advancement and External Relations at ACC, in an article appearing in the *Winnipeg Free Press*.

In addition to this, MPSG has matched a $41,850 grant to support Dr. Baljeet Singh's research focused on white mould management in dry bean crops.

"The current study is developing a real-time weather-based Fungicide Application Decision Support Tool (FADST) using the ArcGIS/leaflet platform, weather data and a disease severity model," said Dr. Singh. "The benefit of the FADST is that it can predict the risk of disease development using local weather conditions. A producer can enter field agronomy information to narrow down the potential severity value of the disease for his/her farm. Based on this information, the grower can decide if fungicide application would be economically beneficial. A basic framework of the FADST has been developed and tested in the last growing season (2021). The testing results suggest that the FADST is working well and able to produce the white mould development risk to local producers."

MPSG is proud to support ACC and its commitment to furthering agriculture in Manitoba, as well as celebrate its desire to identify and address the challenges the sector is poised to face. ■

A Farm-to-Plate Partnership

Jolene Olive, Communications Manager, AITC–M

LAST JUNE, AGRICULTURE in the Classroom–Manitoba (AITC–M) and *Great Tastes of Manitoba* (GTOM) teamed up to create the *Farm to Plate: Recipes & Stories* series, featuring seven Manitoba commodities and many of the province's commodity organizations, including long-time GTOM partners, Manitoba Pulse & Soybean Growers.

Each recipe sheet contains a link to a video about a Manitoba farmer, facts and information about that commodity and a recipe featuring an ingredient from the farm that is being showcased.

The series has been so popular that AITC–M and GTOM are currently rolling out a new recipe for each commodity over the next few months.

"This series has been an incredible way for us to feature so many amazing farmers in Manitoba, and to partner with GTOM, who have so many wonderful videos," said AITC–M Executive Director Sue Clayton.

The 2021 recipe for pulses was Basic Black Bean Burgers and it featured former MPSG Director of Communications, Toban Dyck, and his wife, Jamie Dyck, along with facts about pulses and a link to the commodity group's website. A new pulse recipe will be available soon. ■

"We're so happy to partner with AITC–M and find another audience for the videos," said Donalee Jones, senior producer of Great Tastes of Manitoba. "It's been another avenue for us to promote the recipes and stories we create about farm families in Manitoba."

The *Farm to Plate* series is free to download from AITC–M's website.

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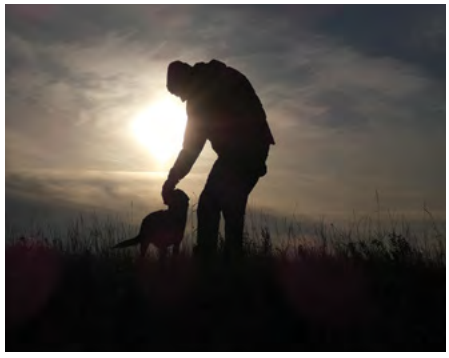
Manitoba Farmer Wellness Program Launched

HAVE YOU STOPPED doing the activities you normally enjoy? Are you feeling sad, angry or "not yourself"? Have your friends told you they're concerned?

As a farmer, there are many challenges every day. Whether they are operational, personal or business-related or as a result of a loss, sometimes they are overwhelming. Perhaps you have been thinking about seeing a counsellor for a while but really don't know where to go or who to see? That is what a new initiative called the Manitoba Farmer Wellness Program is aimed at addressing. Farmers can make appointments with qualified counsellors with a background in agriculture. They can have up to six, one-on-one, confidential counselling sessions with a counsellor that understands agriculture, can support them and meet on their schedule.



The grassroots non-profit of the Manitoba Farmer Wellness Program is spearheaded by Gerry Friesen (The Recovering Farmer), Marcel Hacault (retired executive director of Canadian Agricultural Safety Association, past chair of Manitoba Pork), Roberta Galbraith (farmer and past member relations manager with Manitoba Canola Growers), Kim Moffat (farm wellness consultant who worked with Manitoba Farm, Rural and Northern Support Services) and Dr. Briana Hagen (PhD in the Department of Population Medicine with Ontario Veterinary College).

The 2015 research study from the University of Guelph found that many farmers had high levels of stress. Further to that study, a 2020 report by Farm Management Canada found a direct link between mental health and business management. Marcel Hacault stated, "In my former job with agricultural safety, people who have been injured often cite things like "being tired" and "not being focused" when the incident occurred. Upon reflection, perhaps the overriding issue was mental health."

We know the mental health of farmers is top of mind this year. With the drought, unexpected trade barriers and rising costs alongside the pandemic, there are lots of stressors. The biggest difference is that now there is a service for those farmers that want support. This is not a government program, it is not a stress or crisis line, it is not a self-help service. This program fills a gap that has been identified by farmers who have sought out services. In essence, it is timely, focused, one-on-one counselling sessions that fill a direct need for farmers.

The Manitoba Farmer Wellness Program is built by farmers for farmers. Don't let stigma hold you back from seeking help. Go to our website, **manitobafarmerwellness.ca** and book an appointment. It is simple, quick and easy to access.

> If you or your organization wants to financially support this non-profit, reach out to one of the board members, or donate via the site. *There is no farm without the farmer.* ■

Cassandra Tkachuk, Research Specialist

WEED COMPETITION IN SOYBEANS

Soybeans are naturally poor competitors against weeds. Some might even call them wimps. This is especially troublesome as we watch the number of herbicide-resistant weed cases rise, including evolved resistance to glyphosate. I shudder at the arrival of weeds like palmer amaranth and tall waterhemp.

We have the opportunity to heed warnings from other regions and take action to minimize the spread of weed seed (I know, that's a tough one), identify herbicide-resistant weeds in our fields, destroy the buggers (physically) if we find them, use our chemicals wisely (use "pre" products, full rates, herbicide layering, avoid overuse of one type of chemical) and utilize cultural controls to boost the competitive ability of the crop.

One piece of valuable information comes from Dr. Rob Gulden's lab at the University of Manitoba, where they investigated the critical period of weed control (CPWC) of soybeans – the period of time in which the crop must remain free of weeds to prevent yield loss. They identified the CPWC (VE to V2–V4, on average) and found that planting soybeans in narrower rows reduced the CPWC by up to three development stages and higher plant populations by one development stage, on average. In other words, cultural controls have potential to save you time, money and a headache over the long term.

A closed soybean canopy can better compete against weeds.

Find the full results of this study in Pulse Beat – The Science Edition, Issue 3.

Clancey's Stats

2021 drought results in strong prices for pulses

Brian Clancey, Senior Market Analyst and Publisher, STAT Communications

THE REALITY OF last year's drought has been fully accepted by markets, resulting in unusually strong prices for many pulses. As a result, attention is switching to what will happen this year to seeded area and growing conditions.

Competition for acres will be strong in all areas where pulses are grown, with oilseeds such as canola attracting significant attention from farmers. So far this marketing year, the potential gross income performance of canola has outmatched all grains, pulses and specialty crops.

If you look at prospective gross income as a percentage of its previous three-year average, so far this season, future average gross returns for pulses are generally above that average versus wheat, barley and durum, but well under versus canola.

There is a relatively strong relationship between those numbers and whether seeded areas will rise or fall in most years. If prospective gross returns are above their previous three-year average, area tends to increase and when it is below, area tends to decrease.

Versus wheat, this has been true 78% of the time for all classes of lentils since 2001, 61% for peas and 83% of the time for chickpeas. Versus durum, 67% of the time for lentils, 72% for peas and chickpeas; versus canola, it held true 72% of the time for lentils, 56% for peas and 83% for chickpeas.

Stiff competition from canola for land use this spring will likely result in little overall change in total pulse area. At the moment, it could end up around 8.419 million acres, down from 8.746 million last year and below the recent five-year average of 8.836 million.

If yields are at their recent five-year average, total pulse production in Canada will advance from 4.337 to 6.327 million metric tons (MT), just below the recent five-year average of 5.356 million.

Looking at the United States and Canada as one zone, area in the two countries could advance from 12.245 to 12.285 million acres, but combined output might jump from 6.313 to 9.492 million MT. The impact this has on available supplies will be moderated by tight ending stocks in the region. It may advance from 7.976 to 10.0 million MT, well below the previous five-year average of 11.335 million.

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Overall disappearance is expected to return to more normal levels across the 2022–23 marketing year, suggesting the combined carry-over may only increase from 511,000 to 601,000 MT of all types of pulses.

Increases in residual supplies are expected for lentils, peas and coloured beans, while residuals for white beans and chickpeas could decline over the coming marketing campaign. Overall, prices paid to growers are expected to be lower on average than what has been seen in the 2021–22 marketing year.

That is not surprising. Prices offered to growers for most pulses are sitting in decile nine territory. This means they have been higher less than 10% of the time since 1988. That does not mean new record highs cannot be set. However, it indicates the risk of waiting for better prices is increasing over time.

The big issue facing growers is that most North American pulses are not competitively priced outside the region. Two factors had powerful influences on prices paid to growers between harvest and November. One was the need for processors and exporters to find enough product to cover sales commitments. The other was a bulge in North American domestic demand as the food industry strove to cover shortages of U.S. origin products and refill retail pipelines. Both needs are primarily covered, resulting in an overall decline in trading activity. The problem is asking prices for many North American pulses are too high to compete with products from other origins.

Weather is always a factor affecting both seeded area and the yield potential of fields. The fact several key areas in western Canada remain somewhat dry will be a factor in the minds of many growers, and last year's drought underscored the risks.

None of the long-term forecasts are looking for drought in western Canada. Some long-term forecasts call for cold and wet conditions through May in western Canada and parts of the northern United States, followed by unusually warm weather. If accurate, cold conditions may impact seeding progress for lentils, chickpeas and peas both there and in western Canada.

May is a critical month for seeding in western Canada. Historic weekly seeding progress data from Saskatchewan shows that, on average, 10% of the intended area for lentils is in the ground by the end of April, compared to 6% for peas and 2% for chickpeas. Progress typically passes 50% for peas and lentils by the middle of May and exceeds 93% by the end of May.

Wet weather delayed seeding in 2020, creating a lot of anxiety over the risk of frost before harvest. In the end, yields were above average and crop quality around average. Significantly, the delays did not have much impact on area, with land in all pulses jumping from 8.9 million acres in 2019 to 9.243 million in 2020.

The last time western Canada faced a lengthy drought period was between 2001 and 2003. Seeded area in those years dropped from 4.92 million acres in 2000 to 3.682 million in 2001 and 2.681 million in 2002 because dry conditions left farmers unwilling to risk seeding pulses.

The bottom line is as attractive as new crop markets are at the moment; if growers do not believe they have a chance at average yields, they may switch to crops with lower average costs per acre and/or higher income potential. ■

Reflections from the Summit

A view full of opportunity

Brian Innes, Executive Director, Soy Canada

WHEN YOU'RE YOUNG, like the soybean industry in Manitoba, you've got your whole future ahead of you. Add to that the fact that we're growing soybeans further north than anyone in the world in a time of change and you've got a pioneer spirit that's filled with optimism for what's to come.

That pioneer spirit was on full display during our recent Northern Soybean Summit that brought together people from across the value chain and across Canada. The afternoon session on the expansion and quality of northern soybeans was informative for how the whole value chain can make soybeans more valuable for Manitoba growers.

The Summit was a good example of how the industry can come together through Soy Canada to create value through collaboration. We naturally all know our own business the best, but we can often be inspired by others and find opportunities to make the sum greater than its parts when we come together. And while there's certainly more room for action for the soybean industry to bring more value to Manitoba, the information shared at the Summit was a good step.

There were a number of interesting discussions during the Summit worth sharing. Here are a few snippets:

A young industry with room for growth and rapid evolution – With only 20 years since soybeans were first grown in Manitoba and significant acres only coming 10 years ago, a number of speakers reflected on how new the crop is and how there's lots of room for growth. From agronomy and harvest management to having properly adapted seed genetics and having exporters connect with buyers who want to crush Manitoba beans, a lot has evolved and improved in a short amount of time. Speakers reflected on the lessons learned and how these experiences position the industry for more success in the future. One speaker shared how their western Canadian breeding program started in the late 2000s with ankle-high beans. With each variety taking about eight years to come to market, the genetics adapted to Manitoba have evolved rapidly — even since soybeans were a consistent rotation crop in 2015 when the early breeding programs started to bear fruit.

The weather in 2030 will change the landscape for soybeans in western Canada – Climate experts from Agriculture and Agri-Food Canada shared how dramatic the warming climate is for western Canada and how significant these changes will be for a crop like soybeans. With more heat, all areas will be able to grow longer season varieties — which will have a significant impact for places in western Manitoba, like Oakner where it's been more difficult to consistently grow a good crop of soybeans.

For example, when comparing average temperatures for 1985–2014 versus the predictions for 2015–2044, it means 500 more crop heat units on average. This means growers across the Westman region will be able to insert a 00 maturity group soybeans into their rotation, confident in their chance of success. Every farmer knows that weather is unpredictable, but understanding we're going to get more heat with similar moisture paves the way for higher performing soybean genetics to be a profitable fit for growers rotations more often.

Food-grade soybeans work in Manitoba and there are value-added opportunities for growers – There's renewed interest in expanding food-grade identity-preserved soybean production in Manitoba from both Prograin and Sevita, who are specialized exporters with a long history in the business. With premiums offered over commodity beans and improved genetics offering Manitoba growers more varieties, more acres means more opportunity for growers to increase their revenue from every acre. Strong international demand means Canadian exporters can expand our food-grade

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Farmers Deserve a Seat at Sustainability Table

Erin Gowriluk, Executive Director, Grain Growers of Canada

FOLLOWING OUR MOST recent federal election, it should come as no surprise that the conversation around sustainability and environmental stewardship has moved to the forefront.

While this is not a new phenomenon, it is no longer an option to face the future and the daunting prospects of climate change without a stated plan.

In Canada, our grain farmers are equipped for this conversation. Our farmers already sequester millions of tonnes of carbon in their soil and are constantly evolving to reflect the best practices for soil and environmental sustainability. But this does not mean that we can sit back or rest on our laurels.

The reality is that, with or without farmer input, our federal government is planning to implement policies aimed at reducing emissions, among their several other environmental objectives.

As the voice of grain farmers in Ottawa, our organization has already been planning for this and working with decision-makers and legislators to impart the message that farmers are part of the climate change solution — and should have a seat at the table when it comes to making policy.

The good news is that farmers across Canada already operate sustainably and, with continued investment in innovation, will be able to continually improve their environmental footprint in the decades ahead.

There is no solution to climate change that does not involve the stewardship of millions of acres of privately managed farmland. And it offers tremendous potential as a natural climate solutions provider if programs are designed alongside farmers for their mutual benefit.

Unfortunately, right now, the conversation on climate change policy in Canada is being led by groups that do not have the best interests of our grain, pulse and oilseed farmers in mind.

While not ideal, this is a natural consequence of the fact that the current government is more ideologically aligned with these groups. Secondly, and more importantly, they have provided the government with the political cover necessary to implement their ideas by providing more detailed, data-driven solutions for the government to embrace.

From our side, this has to change.

Farmers should be the ones driving forward practical solutions. They are the ones who should be aiding the government in implementing policies that achieve these shared environmental objectives, while

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production with varieties grown in Manitoba that meet end-user needs.

Unfortunately, yield, protein and agronomic traits don't naturally flock together – At the Summit, three of the main seed-breeding companies shared the challenges they face breeding high-yielding, agronomically adapted and short-season varieties for western Canada that have competitive protein levels. Unfortunately, yield suffers when selecting for protein and putting a package of germplasm together to make a variety fit in western Canada is a significant undertaking, especially given how new soybean production is mainly linked to western Canada. With the number one demand from growers being higher yield, breeders are focusing on yield and other traits that make soybeans more resilient.

There's a place for Manitoba beans in the global soybean market – Of western Canadian soybeans, G3 and Viterra, showed their commitment to the value chain and shared valuable insights about what our customers want and how Manitoba beans meet their needs. It's no secret that western Canadian soybeans have lower protein than other origins, and this can be a challenge for processors to meet the minimum levels required in soybean meal. What was interesting is that buyers in China, Bangladesh, Iran, Pakistan and North America request western Canadian beans when they have the ability to blend them with those from other origins — though the price needs to be right. Manitoba beans may not be a premium product in the marketplace, but at the right price and sold into the world market at the right time, they fill a global need that is significant and could easily take all that western Canada can produce.

It's a competitive landscape and soybeans need to compete for a place in a grower's rotation – Grower representatives from across the country, including Manitoba, provided the audience with a candid look at what it takes for them to grow soybeans. In some regions — even northern regions — it's a natural fit. One representative went so far as to say, "if they're not growing soybeans, they're not keeping up with the times." In other regions, such as parts of Manitoba, there is intense competition for acres right now and the profitability bar is set pretty high. However, profitability wasn't the only consideration, with rotational benefits and management factors like harvest timing also being very important.

There was a consensus that it's not just potential yield, but consistent yield under stress that is most important. With Manitoba often subject to stress from excess and limited moisture — sometimes in the same year — having varieties more resilient to moisture stress would be of significant benefit. ■

Pulses Benefit the Environment and the Economy

Denis Tremorin, Director of Sustainability, Pulse Canada

IF YOU LOOK at agricultural policies around the world, you will see very different visions for how the world feeds its people. More often than not, it feels like Canada's vision for the future of agriculture is under fire — but it doesn't have to be this way.

At Pulse Canada, our sustainability initiatives work to create conditions for growers, processors, and exporters to monetize global environmental sustainability commitments while establishing the Canadian pulse sector as a leader in providing food that decreases agriculture's impact on the environment. Consumers and the food industry continue to demand more transparency into the sustainability of products. This push for transparency — backed up by data — presents a very real opportunity for Canadian pulse growers.

Pulses have a naturally lower carbon footprint than most foods because they require little to no nitrogen fertilizer to grow. This is because they have a special relationship with certain soil bacteria that convert nitrogen from the air into a form usable to the growing pulse crop. Beyond that, Canadian farmers have adopted practices such as minimum tillage and reducing fallowing, which have been proven to sequester large amounts of atmospheric carbon into soils. This sequestration of soil carbon negates the carbon emissions of producing a pulse crop, creating a carbon-neutral or even a carbon-negative crop.

Science backs this up, meaning incorporating Canadian pulses into food products can reduce the carbon emissions, water use and land use of food.

Take cereal-based foods, for example. At Pulse Canada, we have led work to explore how pulses can increase the protein and fibre of foods like pasta or breakfast cereal while also reducing greenhouse gas emissions. Pasta reformulated with lentil flour produced a noodle with 31% fewer carbon emissions than traditional noodles. This gives companies an opportunity to show their commitment to the environment by re-thinking how they make their products. This new demand for sustainability claims also presents Canadian farmers with the opportunity to sell their pulses at a premium — a win-win.

The same can be done through cooperation with the livestock sector. Consumers today want choices, and they buy from the markets that offer them. As Canada is a global producer of both plant and animal protein, it makes sense that we put our heads together to meet this growing demand and capture more than our fair share of the revenue that comes from it.

That is why Pulse Canada led a study to examine the environmental and economic impacts of blending lentils with beef. As it turned out, a beef burger reformulated

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simultaneously aiding the profitability of grain growers — not hindering it.

Collaboration between industry, government and academia is the key component to reaching these climate goals.

A GLOBAL PERSPECTIVE

If you look to our friends across the Atlantic, you can see that these conversations are having a very real impact everywhere. These international examples also offer a way forward for us on this side of the pond — should we choose to act.

Perhaps the best example is in the United Kingdom (U.K.) with the National Farmers' Union (NFU)... "no, not the Canadian one." Their country's largest farmer advocacy organization experienced the same sentiments and made a place for themselves at the table.

By embracing a future-focused and solutions-based approach, the U.K.'s NFU created a plan that identified immediate opportunities, associated best management practices, and included a role for government to incentivize those practices. The plan fit under three pillars:

Pillar 1 — Boosting productivity and reducing emissions

Pillar 2 — Farmland carbon storage

Pillar 3 — Coupling bioenergy to carbon capture, utilization and storage

By being deliberate and anticipating the sea-change in sentiments, U.K. farmers changed the conversation and achieved widespread adoption of their aspirations for a net-zero contribution to climate change across the whole of agricultural production by 2040.

This was accomplished while leaving some flexibility in their approach for every farm to start the journey to net-zero from a different place and with their own unique action plan. Canada may differ greatly in both population and climate, but the circumstances are not all that different.

While farms across the country have been improving their sustainability and lowering their environmental impact for years, this government has no interest in rewarding work previously done. They care about the next 25 years — and so do we.

With that in mind, Grain Growers of Canada are ready to provide leadership as we move into this next phase and we will articulate the needs and wants of our members to create a framework that makes sense for everyone.

Either we lead the conversation about what it is coming or we risk having an approach dictated to us. Let's get to work. ■

Protein Industries Canada Utilizing Artificial Intelligence for Variety Development

Miranda Burski, Marketing and Communications Consultant, Protein Industries Canada

PEA BREEDING ISN'T a new venture for DL Seeds, a company situated in southern Manitoba. They have been selecting and breeding yellow peas for the North American market for more than a decade, with the goal of achieving improvements that benefit both farmers and consumers.

With the increasing demand for plant-based protein products, however, the company felt it could take its breeding program a step further. DL Seeds saw the need for a yellow pea variety that had a higher protein content than that in varieties already on the market, and felt the best way to develop this benefit would be through strategic collaborations that push the boundaries of tech and challenge the status quo.

"Genetic breeding challenges are at the forefront of our thinking," General Manager of DL Seeds Kevin McCallum said. "If we are going to develop new pea varieties through the Protein Industries Canada (PIC) project, DL Seeds is going to have to develop germplasm that pushes beyond traditional breeding techniques and open our minds to new ways of thinking how we can benefit peoples' lives."

In summer 2020, it was announced that DL Seeds was partnering with SeedNet and Sightline Innovation, with a co-investment from PIC, on a project that would use artificial intelligence and data-trust tools to develop new high-protein yellow pea varieties. The new varieties will be based on parent breeds chosen by DL Seeds; their higher-protein content and adaptation to Canada's climate will be achieved using Sightline's artificial intelligence and data trust tools, and SeedNet's network of partners will be utilized to produce and distribute the seeds.

The combined skill set makes for an improved variety development process that DL Seeds feels speeds up its usual process.

"Any tool that can be used successfully in selecting new varieties is valuable to a breeding program," McCallum said. "It could take up to 10 years to develop a new pea variety from start to finish. With the new AI learning, we are hoping to decrease that time by 20 to 30 percent, at least. That will allow new varieties and traits in those varieties to hit the marketplace faster than before."

New varieties on the market, he added, means good things for everyone along the value chain, from farmers, to processors, to consumers.

"We (want to) develop a high protein pea variety that the pea processing companies and our distributor SeedNet can contract directly with farmers in a closed-loop production program," McCallum said. "That way everybody in that value chain can benefit from each other based upon the extra value the higher protein content brings to the equation." ■

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with one-third lentils shows a significantly improved carbon footprint with 33% fewer greenhouse gas emissions. This is on top of having 12% fewer calories and costing 27% less. It's easy to see the potential. A lentil/beef burger isn't for everyone, and that's fine. But as long as consumers and companies want to lower the carbon footprint of their food, we want to make Canadian pulses a solutions provider and allow growers to reap the reward.

Lowering the carbon footprint of food can be accomplished beyond blends. Animal feed matters too — and pulses can help. In fact, research commissioned by Pulse Canada has shown that including peas into swine-feed rations can have a major impact on reducing hog production's environmental footprint. The findings were clear: through a change in hogs' rations towards a pea-based diet, producers can cut out 28% of the greenhouse gas emissions of the feed, which, in turn, lowers the end product's carbon footprint by up to 18%.

This is precisely the type of message we are taking to food processors and end-use manufacturers through our *Sustainability Campaign*. Launched in December, this campaign takes the latest data on the environmental benefits of pulses and targets food and feed manufacturers to leverage pulses in their products. While it's still early days, this campaign has seen strong performance in its first few months and we look forward to sharing the results with our members.

Solutions exist to help lower our carbon footprint within modern agriculture. In fact, to build on our success, we need market-driven policies that foster the growth of our innovative agricultural sector. This spring, Canada's pulse industry will launch an Environmental and Economic Impact Report that shows the Canadian pulse industry's important role in lowering our country's carbon footprint while increasing our economic output. This is a message decision-makers in Ottawa need to have top-of-mind as they work to create the next agriculture policy framework and as we advocate across the government for the policies necessary to grow our industry.

We will continue to work on your behalf to ensure sustainability is a market advantage for Canadian pulse growers. If you have any questions related to our work on sustainability, please don't hesitate to get in touch. ■

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Gwyneth Paltrow, Celebrity Chefs and the Role of Influencers in Agriculture

Toban Dyck, Writer and Farmer

I'LL ADMIT. I have a lot to say when it comes to "influencers." If you've never heard the term, perhaps you should consider yourself lucky, stop reading this and move on to the next *Pulse Beat* article. Don't do that. Trust me. I've got something to share with you.

The idea is simple: organizations like Manitoba Pulse & Soybean Growers, or its national sibling, Pulse Canada, identify a handful of people on social media who are respected, have large followings and who are outspoken champions of, say, in this case, pulses. These individuals are then contracted to promote a certain product, use a certain hash tag, make a certain dish to their respective audiences in the hope that doing so will further the organization's or industry's goals.

Many agricultural groups use influencers as a key part of their lobbying efforts. Pulse Canada is utilizing a stable of social media influencers, including chefs and dietitians, to help their consumer-based campaigns aimed at getting more Canadians to eat pulses.

Great. Simple, you say. This kind of stuff is done all of the time, you say. While you are correct that marketing is not a new concept and the idea behind harnessing the persuasive power celebrities seem to have in order to achieve various gains is as old as the printing press. However, the term "influencer" and how these people are used in the industry is not uncontroversial.

The agricultural industry is bent on improving its ability to communicate its messages to the public, farmers, politicians and other stakeholders. Contracting influencers to deliver these messages is an attractive option when a campaign's success is determined by audience reach, video views and/or social media engagement.

The metrics surrounding these influencer-driven campaigns are usually high and difficult to interpret. High numbers are impressive and make for an easy sell. Many people, who may feel an apprehension about such campaigns in their gut, feel too intimidated to speak out against initiatives that, on the surface, seem positive. Perspective is important — 10 decision-makers is better than 100 casual observers. Numbers don't tell the whole story.

Gwyneth Paltrow's gripes against genetically modified crops are well known. And presumably they've affected how some people eat and shop. Christopher Walken cast as Percy Schmeiser in the 2020 film *Percy*, which chronicles a Saskatchewan farmer's fight with Monsanto, ensured the movie's widespread distribution.

When messages that get things wrong hijack the airwaves, the agricultural industry is confronted with a choice: does it fight fire with fire and find its own celebrities to combat what it considers mis- or dis-information? Or, does it believe that the extension of research and science alone, without expensive celebrity endorsements, is enough to drive policy and consumer trends?

It gets murky. Many of us working in the ag industry would like to believe that data, science, research and just plain old hard facts provide the most solid foundation, from which effective policy can be developed and from which public support can be attained. I am in this camp. Or, at least, I was in this camp.

I recently worked on a national campaign that required the coming together of a diverse cross-section of groups under a singular cause that affected them all. I did not use influencers, believing this to be a foolish way to spend money.

Instead, I tried to go at it alone, utilizing old-school methods of message distribution, like newspapers, magazines, etcetera.

About three-quarters of the way through, I reluctantly reached to an influencer. Her response was quick and constructive. She immediately had great ideas for the campaign, in general. Her suggestions were tangible and intuitive. Their effectiveness seemed obvious to me. I wasn't expecting this. It skewed my impression of influencers towards the positive. Had I been in contact earlier, the campaign would have undoubtedly reached a larger audience.

As a farmer, you may find yourself either viewing such a campaign in the ag space or deciding whether or not to go green-light one. Keep your eyes and mind open. A large audience isn't the same as an engaged audience, nor is it the same as the right audience. But, the influencer I chatted with changed my mind. And I'm pretty stubborn. ■

Food-Grade Soybeans

Demystifying a profitable opportunity for Manitoba farmers

Toban Dyck, Writer and Farmer

Brent Kosie is Sevita International's sales and contracting manager for western Canada. He sells food-grade soybean seed to Manitoba farmers, contracting with them to feed what is a growing, global market.

The food-grade soybean market is growing, with stable and steady exports heading to Japan and now a growing number of shipments going to China to produce products such as tofu, soy milk, soy sauce, and more. The crop represents a real and profitable opportunity for Manitoba's farmers. Sevita has soybean varieties that are bred for Manitoba fields that have the qualities demanded from food manufacturers

If, like me, you've heard about food-grade soybeans and non-GM soybeans in relation to GM soybeans, there are some distinctions to be made. Food-grade soybeans are, indeed, a type of non-GM product, but with higher quality standards and traceability. Food-grade soys are pointed directly at the human consumption market and, because of this, some attention needs to be paid to the specifications around growing them.

Among these specifications is protein levels. The market for food-grade soybeans prefers higher protein levels surpassing 40 percent, which varieties are bred to produce and, as Kosie assures me, farmers have always achieved.

While Kosie represents Sevita International, a Canadian seed company with Manitoba distribution through Ceres Global Seeds, there are other food-grade soybean companies, such as Prograin, that also offer local contracts.

I've known about the opportunity to grow food-grade soys in Manitoba for a while, and I've even heard positive reports from the farmers here who have produced them. It is upon this sentiment where my chat with Kosie began.

"I THINK WHAT a lot of people don't realize is that this program even exists. Just because there's not a lot of people talking about it," said Kosie. "A lot of growers have gotten used to the Roundup-Ready 2 Xtend® system with soybeans, and it's working well for them. For somebody that is able to do a little extra management and a little bit more, say, record keeping, there's a nice premium for them at the end of the day."

Much of the criticism surrounding moving to a non-GM or food-grade soybean is the extra work it'll entail for farmers. In addition to that, many farmers are unaware and/or skeptical of the herbicides available for such crops.

"I think part of it is to educate growers on the opportunity. And it's one of the reasons that Sevita brought me on board," said Kosie. "We need somebody out here ringing the bell and saying, 'Hey, here's an opportunity we would like you to consider.'"

Introducing new crops into an established rotation can be tricky. Each type and each variety comes with its own set of considerations. Food-grade soybeans are no exception to this. But, as Kosie emphasized throughout our chat, it is not as difficult nor as disruptive as people might think.

When I think about growing something new and novel on our farm, I like the steps spelled out for me as clearly and as succinctly, as possible. Hoping that you, too, want to know exactly how to get into growing food-grade soybeans, I asked Kosie to walk readers through the process. "First and foremost, the most important thing to consider is field selection. We want to have a field that has a lower population of weeds. For example, kochia. We all know how nasty kochia can be. It can be a difficult weed to control in many special crops. So, we like to ask that growers plan ahead on what sort of field they're going to select for food-grade soybeans. We don't want it to be a last-minute decision where, 'Oh, I've just got this open 80 acres off to the side here that I haven't decided what I'm doing with yet; we'll just throw some food-grade soybeans in there and see what happens.'"

The food-grade and non-GM soybean market garners a knee-jerk response from some farmers, who may have doubts over the efficacy of the herbicides and pesticides approved for use on such a speciality crop. Glyphosate has set the bar quite high and its strong association with the words 'inexpensive' and 'effective' have made it hard for many farmers to take other chemistries seriously.

Weed management in food-grade soybeans requires some extra attentiveness, but not if you're used to growing speciality crops.

We have many more tools in the toolbox when it comes to weed control, compared to say 15–20 years ago. There are a number of pre-plant herbicides that can be sprayed on the soil before and after planting that are very, very effective at controlling weeds early, especially some of the hard to kill weeds like kochia, lambsquarters and red-root pigweed. There are herbicides that do a bang-up job of controlling those weeds.

Post-emergent chemistries have improved, as well, for food-grade soybeans. But they are still not going to be as effective as Roundup or dicamba. It's best to let the pre-plant herbicides do the heavy lifting for the in-crop herbicide. And if all goes right, you should have a very clean field and be off to the races.

The other nice thing about these new pre-emerge chemistries is that they belong to unique chemistry groups. They're in the 14 and 15 group of herbicides, which gives growers an opportunity to introduce unique modes of action on their farms.

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VARIETIES

Sevita and Prograin have varieties suitable for many of Manitoba's diverse growing conditions, from longer to shorter season offerings.

And, when it comes to yield, reports from the farmers in Manitoba currently growing them, suggest that bushels per acre are on-par with GM soys, if not slightly above.

When it comes to the extra record keeping and management Kosie referred to earlier on, there are only a few extra things that the growers need to do — clean out your seeding equipment and spend a bit of time on the combine to make sure that there's no potential GM contamination, and the same goes for your conveyors or augers, trucks and storage bins.

All of this, however, doesn't add up to any more work than if, say, you were growing pedigreed seed soybeans. It's a little bit of extra work most farmers are willing to do if it means receiving a premium price for their crop. Farmers have received anywhere from $2 to $2.50 per bushel more than the bid from their local elevator for growing a crop that, once all the numbers are crunched, doesn't cost any more to grow than GM soys.

In addition to being mindful of cross-contamination, there are only two reports that farmers need to fill out throughout the growing season: a pre-harvest report and a post-harvest report. The former being a declaration that you've cleaned your equipment, when you seeded and what and when you sprayed. The latter being a similar declaration of cleanliness related to combines and bins, as well as harvest dates and production estimates.

"When you think about it, it's not that big of a job," said Kosie. "They're one-pagers, and not anything that's going to be that difficult to do, and I haven't had anybody complain about it. Then we just need a map of the field, which could be drawn by hand or supplied through farm-management software."

While there are no notable agronomic challenges to growing food-grade soybeans in Manitoba, there are potential logistical hurdles for the seed and export company. Manitoba just doesn't receive as many shipping containers as, say, Ontario or Quebec. As most of the product is destined for the Vancouver port, Manitoba has the proximity advantage. It just needs more containers.

Kosie says overcoming this hurdle requires more planning on his end, a challenge he's well aware of and capable of tackling.

"We process it here. It gets packaged to the export customer's desire, and then we put it into a shipping container and then it heads west."

The premium, a stable market and the auxiliary benefits of introducing a diversified herbicide program on your farm make growing food-grade soybeans an opportunity Manitoba farmers should at least consider. ■

> If you're interested in growing food-grade soybeans, contact:
> **Brent Kosie** – brentk@sevita.com or
> **Shawn Rempel** – prograin@prograin.qc.ca

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Alex Burgess – Lawyer and Farmer

An MPSG director profile

Toban Dyck, Writer and Farmer

Alex and Brittany Burgess

ALEX BURGESS IS a lawyer. He is also a farmer and Manitoba Pulse & Soybean Growers' new director.

He and his father – who is also a lawyer and a farmer – operate a small law firm in Brandon and a sizeable farm in Minnedosa, where Alex and his family have lived since 2012.

His story is unique. It's not every day you meet a lawyer/farmer. It was a first for me. And it's not every day you meet a lawyer who likes to just "go with the flow." Alex's words, not mine.

He exhibited the casualness of someone who has control over the things in which he's involved with capacity to spare. Whatever the case, his outlook was refreshing and genuine.

Law seemed to be in Alex's cards. His father was a lawyer and becoming one himself was almost something he was predisposed to accomplish. But here is where the story gets quite unique.

Alex's father, scratching an itch he had for growing food and working the land, started a farm. From scratch. While practicing law.

"He started farming by himself," said Alex. "He didn't grow up on a farm, either. He just started dabbling in it. I think I was four or five when dad bought his first parcel of land."

Alex grew up helping out on the farm in the evenings and on weekends. It is at this point where the typical farmer profile segues to a colourful description of Alex's lifelong passion for farming.

That is not the direction this portrayal goes. Alex enjoys farming, and he moved onto the farm in 2012, not as an expression of his lifelong passion, but rather to fill a void left by the departure of the long-serving farm manager.

"Was the plan always to come back to the farm?" I asked.

"To be honest, I didn't have drawn-out plans for the rest of my life," said Alex. "Things can just kind of happen. I'm not really someone that has 10-year plans. Life takes you in weird directions. You just kind of got to go with the flow. There was somebody that was managing the farm, and he moved on. So there was a need, and I said I'd help out. That was how it started. I've been doing it since."

His operation has grown exponentially since his father started "dabbling." The Burgess farm has full-time employees and contracts seasonal help for the busy times.

This year, he's growing peas, barley, canola and fall rye. Peas, though, is a notable crop for Alex. Roquette and Merit Foods have created strong domestic markets for the crop, and they've also been able to provide the expertise needed to grow peas well.

Market demand for peas is strong. The growing conditions in his area are well suited for them, and the relative newness of the crop in Manitoba is something that Alex finds intriguing.

"Peas just seem to fit with the weather patterns here," said Alex. "There's very little knowledge on peas, you know, compared to many other crops, so learning about it is quite interesting."

Alex was elected to MPSG's Board of Directors by acclamation after observing its operations in a director-intern capacity over the past year.

"As an MPSG board member, I look forward to meeting new people," said Alex. "It's interesting to, you know, interact with farmers from all over. You learn things and I enjoy that. I also look forward to advancing ag policy that is favourable for farmers.'

I couldn't help but mention how exciting it would be for any board to have a lawyer in its ranks. Alex chuckled, saying that he doesn't have a predetermined idea of what he'd like to do as an MPSG board member and that he's happy to just do what is needed.

He remembers having hobbies and interests, but it appeared as though he had to think quite far back to retrieve for me what they actually are. His family is young. Alex and his wife have three children, ages five, three and one. "Skiing, boating, stuff like that," he said, after giving the question some thought. ■

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Always read and follow label directions.

National Pulse Research Strategy

Daryl Domitruk, Executive Director and Cassandra Tkachuk, Research Specialist, MPSG

MPSG IS A team player when it comes to research. We know our limitations in terms of funding research. We need partners who share our goals to improve the profitability of pulses. We also know what we need specifically in our province to propel pulses forward. Fortunately, this is familiar terrain for Pulse Canada and our sister provincial pulse groups across the country. There's a strong collaborative spirit among pulse groups. We respect each other's unique circumstances but are still able to arrive at consensus about what is good for Canada. We know a roadmap can be valuable when it comes to allocating finite research funds.

In 2021, pulse sector representatives from across Canada gathered to develop a National Pulse Research Strategy (NPRS) for field peas, dry beans, faba beans, lentils and chickpeas. The process to develop this strategy took place over several months and included interviews and a virtual strategy workshop in September 2021.

Articulating a national vision for pulse research is an important step in the coordination of research funding and programming to maximize efficiency, increase capacity and improve the ability to adopt new innovative technologies. Research and innovation will be key for Canada to remain competitive as a world leader in pulse production and take advantage of new markets and opportunities.

PURPOSE

The goal of this NPRS is to identify a medium- to long-term strategy, including national research priorities, to be used by the sector in the pursuit of research funding and to guide research investments. The scope of this strategy is all-encompassing for the pulse sector, from discovery to applied research.

continued on page 27

Strategic Outcomes	Key Drivers
1 Pulses are a profitable component of diverse crop rotations that enhance farm sustainability.	**Innovation drives step-change in yield gains and productivity.** • Yield, quality, sustainable production practices and costs of production contribute to profitable margins for growers. Pulse crop production is recognized as a key opportunity to meet Canada's environmental sustainability goals. • Pulses add to the sustainability of crop rotations through reducing carbon footprints, lowering greenhouse gas emissions and increasing water use efficiency. • Pulses add value to crop rotations through positive influence on following crops.
2 Growers produce a safe, reliable and consistent supply of Canadian pulse to meet growing demand.	**Stable and consistent yields of pulse crops adapted to biotic and abiotic stresses.** • Root disease has minimal impact on realized yields and on yield stability. • Integrated pest management practices and biotic stress resilience mitigate the risks of weeds, diseases and insects. • Climate change adaptation and abiotic stress resilience support yield stability, along with the expansion of pulse crop areas and crop options. • Canadian growers have reliable access to a high-quality seed supply. **Innovative products and sustainable management practices ensure a safe supply of pulses.** • Pest management options are safe and effective, and include alternatives such as biologicals, variety resistance and new advancements. • Continuous improvement in management practices and variety development enhances the harvestability of pulse crops.
3 Pulse crops achieve desirable end use quality for domestic and global customers.	**Quality Canadian pulses fulfill the value-added strategy for whole pulse, processing, flour and fractionation uses for domestic and export markets.** • Desired quality attributes for pulses are clearly defined, along with standardized analysis methods. • A quality program is established in Canada for pulses with publicly available data to ensure growers can make informed decisions on varieties and production practices that influence quality. • Varieties are developed that target the desired food safety, crop composition and end-use quality characteristics that are fit for purpose, supported by the management practices that optimize these characteristics. • Growers receive value for the products produced. • Research supports the pulse sector market strategy for human health, animal feed and processing objectives.

Spring Planning Priorities for Soybeans and Pulses

Laura Schmidt, Production Specialist – West, MPSG

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

POWER IN CROP DIVERSITY

In the broader prairie context, Manitoba farmers actually have pretty diverse crop rotations. When we first think of crop diversity, we probably think of a good mixture of broadleaf and grass crops, incorporating a legume for the nitrogen-fixation benefit. There's also an advantage to diversity in growing season length, and that came through in 2021. Soybeans shined in areas where they were able to capture and utilize August rains thanks to their longer growing season. In years with even a touch more moisture, peas tend to shine as one of the first crops to come off, freeing up time in fall.

MASC updated their yield response to crop rotation information last year (Table 1). Planting into pulse or soybean stubble has provided a yield benefit for several crops, most commonly for cereals. Of the three legumes in the table, planting into navy bean stubble commonly returned yield responses of 110% or more. Flax purports an astonishing 126% yield response to being sown into pea stubble.

It's not the best practice, but soybeans following soybeans still report 95% yield response (Table 1). Considering high nitrate fields last fall and that soybean fields are those testing lowest in residual N — soybeans on soybeans may be tempting for some farmers. If your fields have not had noticeable root rot disease pressure or significant weed concerns, this may be an option — but I wouldn't make it common practice. If this is the route you plan to take, consider that soybeans are also exporting quite a bit of phosphorus off-field in the seed. Plan your P rotation accordingly to maintain or build those levels over time.

FERTILITY – N & P

Fertilizer prices have been overwhelming this year. Pulse and soybean crops are obviously quite attractive right now, thanks to biological N-fixation. Soybeans, peas and faba beans can produce their own nitrogen if they are accompanied by their compatible rhizobia species (*Bradyrhizobium japonicum/elkanii* for soybeans, *Rhizobium leguminosarum* for peas and faba beans). But for N-fixation to take off, it is optimal that they are planted into low residual N soils (<50 lbs N/ac). That might be the challenge this year. Research observations suggest that soybeans going into fields with a history of soybeans are better able to still produce nodules under high-N environments. This may be true for peas, too. If you are planning to plant into higher N soils (50–100 lbs N/ac), consider a double inoculation strategy and include a granular form of inoculant to maximize nodulation potential and to ensure they are competitive at fixing N. Above 100 lbs N/ac, it will likely be more economical to

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VISION

- Pulses are a foundational choice for Canadian farms, human health, animal nutrition and environmental sustainability.
- Pulse research in Canada is on the forefront of new technology; it is nationally coordinated, collaborative and accelerates progress toward three strategic outcomes.

There are three strategic outcomes (see page 26) that make up the basis of this strategy. Then there are key drivers anticipated to be crucial in leading the progress toward each strategic outcome.

The group also identified a series of high-level research priorities that are linked to each of the strategic outcomes. Enabling activities that will accelerate the research progress and uptake of innovation along the value chain were also outlined as part of the strategy

For strategic outcome 1, research priority examples include increasing the yield potential and profitability of pulse crops through variety development, adoption of breeding innovations (e.g., development of traits that reduce the cost of production, like N-fixation or pest resistance) or expanding the adaptability of pulse crops to achieve sustainable production on every hectare of land (e.g., yield stability under variable environmental conditions).

Examples of research priorities linked to strategic outcome 2 include prevention or mitigation of damage from root diseases through a national, coordinated and focused approach (e.g., genetic resistance of peas to Aphanomyces and Fusarium sp.) or the identification of alternative control options for pests that reduce the reliance on pesticide.

Research priority examples linked to strategic outcome 3 include the development of a national quality testing system and market-specific quality goals (e.g., for current and emerging pulse ingredient uses) or monitoring and management of food safety contaminants to meet quality targets and maintain market access. ■

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Table 1. Yield response (percentage of 2011–2020 average) of Manitoba crops sown on large fields (>120 acres) of previous pea, soybean and navy bean crops (stubble) in rotation.

	Crop Planted											
Previous Crop	**Red Spring Wheat**	**Winter Wheat**	**Oats**	**Barley**	**Canola**	**Flax**	**Peas**	**Soybeans**	**Navy Beans**	**Sunflowers**	**Corn**	**Potatoes**
Peas	104	86	106	104	107	126	NSD	99	NSD	74	99	NSD
Soybeans	107	100	109	110	102	106	106	95	NSD	108	102	89
Navy Beans	111	NSD	114	112	101	NSD	NSD	113	91	NSD	110	96

NSD – No sufficient data

Data Source: MASC

pivot those acres to a crop more suited to use that residual N. Dry beans are one crop that could take advantage of high residual nitrate levels in soils testing 90–100 lbs N/ac.

On the phosphorus side, soybeans and pulses are great P scavengers. Soybeans don't often respond to P in small-plot research, regardless of rate or placement — and this lack of response occurred at even very low soil test levels. For peas, research has indicated a benefit to starter P, but large yield responses are not common. Dry beans, on the other hand, have responded well (more than 300 lbs/ac yield increase) to in-furrow-applied 10-34-0-0 at two to three GPA rates in research conducted by NDSU at Carrington, ND. Broadcast or mid-row band-applied P did not affect yield in those experiments and higher rates of 10-34-0-0 reduced dry bean plant populations.

However, if you're going to cut P to soybeans this year, remember that they also export quite a bit of P off-field in the seed (0.84 lbs/bu, so a 40 bu/ac crop would remove 34 lbs P/ac). Peas are also P hogs (0.69 lbs/bu, meaning a 50 bu/ac pea crop would also remove 34 lbs/ac). If ratcheting back on P, be sure to balance inputs and removal throughout the rest of your rotation to adjust for these high-P use crops.

If we're heading into another dry spring, reduce the amount of seed-placed starter fertilizer to avoid toxicity to seedlings. For peas, the maximum safe seed-placed P is 20 lbs P_2O_5/ac with 15% seedbed utilization (SBU) under good soil moisture conditions. On 10-inch row spacings, a hoe drill with a 2-inch spread would have a 20% SBU and a disc drill with 1-inch spread would have 10% SBU (divide opener width by row spacing to calculate SBU). A safer bet is to band it away from the seed — below or to the side.

SEEDING

It's a good year to pay attention to germination test results for your peas. Early reports are showing plenty of seed lots with low germination rates. With more seed handling, these rates can be driven down even further. To plan for success with your peas, check out Anastasia Kubinec's article on page 33 where she covers factors to consider for plant establishment.

When it comes to timing seeding this spring, know that early seeding of peas and faba beans avoids flower blasting during the hottest part of the summer and maximizes the competitive ability of both crops against weeds. With soybeans, you have flexibility with the seeding window (first to third weeks of May). So there is an opportunity to work them into wherever they fit best during a busy May. This is a general statement, so for your respective region within the province, be sure to watch for the risk of a late spring frost. For dry beans, on the other hand, it's best wait until after May long to plant and to target warm soils for rapid emergence.

MPSG's On-Farm Network (OFN) has been evaluating different soybean seeding rates for ten years and has conducted 100 seeding rate trials across Manitoba. Compiled results suggest that seeding rates in the neighbourhood of 150,000 to 180,000 seeds per acre should be adequate to achieve full yield potential. This aligns well with the small-plot research that tells us to target 140,000 to 160,000 live plants/ac.

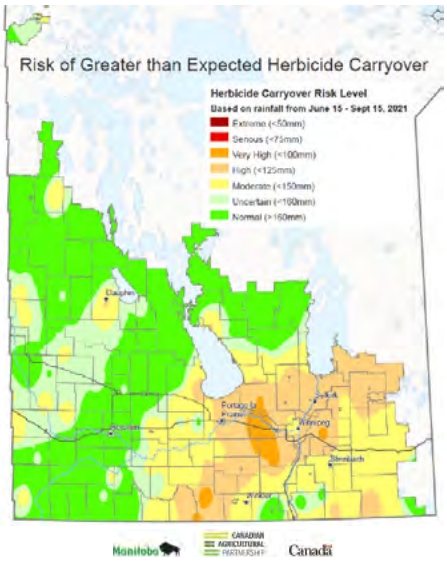
A patch of soybeans injured in the headlands following carryover of a Group 27 herbicide.

HERBICIDES

The first thing to pay attention to in 2022 is your risk of herbicide carryover. Most of our products are broken down by microbial activity, which requires adequate soil moisture and warm temperatures. Residual herbicides can remain in the soil longer if less-than-normal rainfall occurs, increasing the risk of herbicide injury to sensitive crops. As a result, we can use the precipitation map from mid-June to mid-September to inform our risk of carryover for different regions (Figure 1). There are some caveats here. This map was created using Manitoba Agriculture and Environment Canada weather station data and rainfall can be pretty localized, so it is a generalization for an area. In June and July, we also had fewer rains that dropped larger amounts of rain, so soils dried out between rainfall events. This may not have provided enough continuous moisture for microbes to do their job. Sandy soils with low organic matter are at the greatest risk. Refer to the *Guide to Field Crop Protection*

continued on page 29

Figure 1. Risk of greater than expected herbicide carryover based on rainfall from June 15 to September 15, 2021.



and the label for recropping information on specific products. In-season, if you have herbicides with residual carryover, you will see injury pop up after a rain, which releases the herbicides from soil particles and into solution to be taken up by the roots.

Supply chain constraints on glyphosate availability are a concern for both in-crop applications in soybeans and pre-season burndowns in advance of other crops. Explore what other options are available to you and develop a plan B and C with your suppliers. If you're looking at herbicides you haven't dealt with before, double-check the crop rotation restrictions.

For peas and dry beans, there are not a lot of in-crop options. And those that are there largely rely on Groups 1, 2 and 6. With more and more Group 1- and 2-resistant weeds and Group 6/bentazon having only contact activity, a pre-emergent herbicide with residual soil activity is critical.

Cultural management tools like seeding rate and row spacing are also important considerations. Shade out weeds by choosing narrow row widths and aiming for adequate plant stands (soybeans: 140–160,000 plants/acre; peas: 320–360,000 plants/acre or 7–9 plants/ft²).

DISEASE DRAW-DOWN?

Will we need a fungicide in 2022? In MPSG's OFN trials, soybeans rarely respond to a fungicide application. We just don't have many foliar diseases that cause yield loss and it has been rare to see much for white mould or other stem diseases. After the last few dry years, disease loads have generally been drawn down. It is unlikely we will see severe diseases unless we get excess moisture in 2022.

That being said, there are fields with tighter soybean rotational history. In those fields in 2021, Phytophthora root rot was common despite dry conditions. Root diseases are a one-two punch in dry years since the smaller infected root mass can't seek out and access moisture like a healthy plant. Soybean cyst nematode is a similar situation — infected roots can't sustain a plant unless there's plenty of ambient soil moisture.

A similar story for peas — Aphanomyces root rot will be the disease to watch for, and yield can take quite the hit. If you're seeing root rots in your peas, get them tested. Whole plants (roots and shoots) can be sent to the Crop Diagnostic Lab for testing, or you can submit soil samples to labs that test for results outside of the growing season.

Peas, on the other hand, are also more likely to respond to a foliar fungicide to control Mycosphaerella blight. In MPSG OFN trials from 2017 to 2021, peas responded to fungicide roughly one-third of the time. The key here is the timing of disease infection and if symptoms are developing up the crop canopy when it's cool and humid to infect the mid to upper portions of plants. Use the *Fungicide Decision Worksheet for Managing Mycosphaerella Blight in Peas* to make informed spray decisions. Download a copy at manitobapulse.ca.

Aphanomyces root rot infecting peas on July 31.

Adult pea leaf weevils notch leaves.

The best bet to know what is going on in your fields is to get out and scout. Be curious. Dig around.

HOPPERS AND WEEVILS

Lucky for us, peas are not a preferred food source for grasshoppers. Infestations of 10/m² (1/ft²) are not expected to cause economic losses in peas. However, they do enjoy the fact that soybeans and dry beans stay green longer into the season than other crops. As other crops are harvested or as hay and ditches are cut, scout your beans. We use defoliation thresholds to inform management decisions. For soybeans at V stages: >30% defoliation, at R1–R5: 15% and at R6–R8: 25%. For dry beans, defoliation thresholds are 35% during V stages and 15% after R1. Randomly select two plants at five areas of the field to estimate. Since they move into the crop at field edges, edge sprays are often effective.

Pea leaf weevil is on the rise in Manitoba. Learn more about these weevils on page 41 in John Gavloski's article. Seed treatments are currently the most effective management option, but it is unlikely that treatment will be economical given our current pea leaf weevil population levels in the province. The best way for us to get more information on this management practice and its impact on weevils would be to conduct seed treatment trials in peas through MPSG's On-Farm Network. If this is something you're interested in, please reach out to our OFN Agronomist, Leanne (ph: 204-751-0439 or email: leanne@manitobapulse.ca).

We are also planning to kick off a pea leaf weevil survey in May and early June to determine weevil abundance to further inform management decisions.

Happy scouting! ■

BECOME PART OF THE ON-FARM NETWORK

on-farm network
PARTICIPATORY • PRECISE • PROACTIVE

By farmers, for farmers

All On-Farm Network (OFN) research is based on these 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.

HOW IT WORKS

*Your fields, your farm, your findings**

YOU

- Let us know what kind of trial you are interested in or what kind of agronomy question you have.
- Tell us when you are ready to establish your trial (e.g., at seeding or spraying, depending on trial type) and provide us with basic agronomic information for the field.
- Tell us when you are ready to harvest.
- Use the results to guide future management decisions for your farm.

WE

- Design an easy-to-implement trial to investigate your question.
- Provide support to ensure smooth trial establishment.
- Collect data and observations throughout the season.
- Provide harvest support and our weigh wagon, to get accurate harvest results (or you can use your grain cart if it has an appropriate scale).
- Compile the observations and data into a short report of trial results.

** You must be a member in good standing with MPSG to participate.*

WHAT IT DOES FOR YOU

Farm productivity and profitability, optimized

- The OFN empowers you to evaluate agronomic and economic outcomes of management decisions on your farm, in your fields, under your growing season conditions, using your own equipment.
- As a participant, you become a part of a larger network of research across years and regions, which can be used to investigate bigger picture questions.

2022

PULSE AND SOYBEAN TRIAL TOPICS

- Seeding rate
- Row spacing
- Inoculants
- Seed treatment
- Fungicides
- Biologicals
- Dry bean N fertility
- Residue management

Have a different trial idea? Let us know!

MANITOBA Pulse Soybean GROWERS

To participate in the trials, contact

Leanne Koroscil ▪ 204.751.0439 ▪ leanne@manitobapulse.ca

or sign up at manitobapulse.ca/on-farm-network

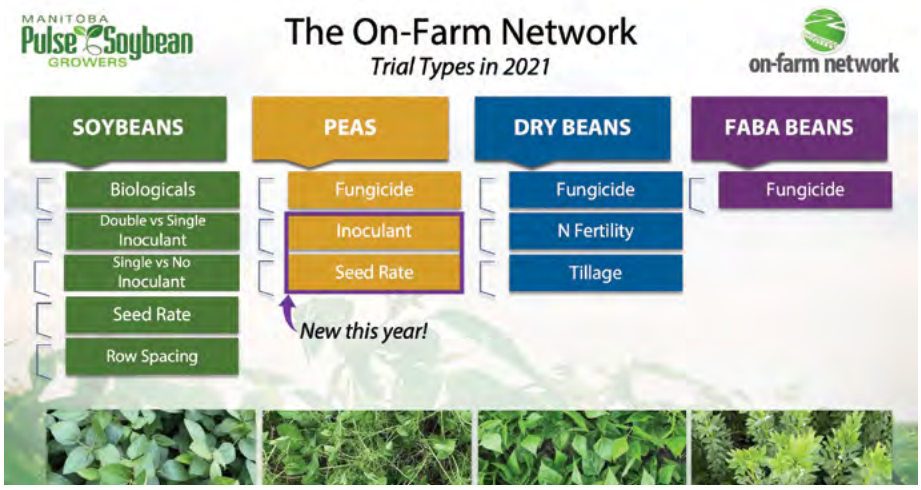
on-farm network

Your Fields, Your Results Webinar Recap

On February 1, 2022, Manitoba Pulse & Soybean Growers (MPSG) co-hosted a webinar with Manitoba Crop Alliance to showcase on-farm research results from 2021. Find a recording of the webinar at manitobapulse.ca/webinars.

2021 RESULTS IN A NUTSHELL

MPSG's On-Farm Network (OFN) harvested a total of 54 trials in 2021, investigating 16 different trial types on soybeans, peas, dry beans and faba beans. The main takeaway from 2021 was that growing season moisture, or lack thereof, drove results this season.



SOYBEANS

Biologicals

Four biostimulant trials compared treated vs. untreated soybeans. No significant yield responses occurred from any biological products tested.

Double vs. single inoculant

There were seven trials on fields with a history of at least two well nodulated soybean crops. One significant yield response to double inoculant occurred. At that site, nodulation was excellent for both double (granular in-furrow and liquid on-seed) and single (liquid on-seed) inoculant treatments. Double inoculant resulted in a 2.2 bu/ac increase, which at a soybean sell price of $13/bu resulted in a profit of $17/ac.

Single vs. no inoculant

Three trials showed no significant yield or nodulation differences. These fields have had at least three previous, well nodulated soybean crops.

Row spacing

There were four trials: two comparing 7.5" vs. 15" and two comparing 15" vs. 30", with no significant yield responses. Plants were small overall in 2021. Canopy closure increased with narrower row spacing and 30" rows did not close.

Seeding rate

There were 14 trials with no significant yield responses. Seeding rates of 100,000 seeds/ac up to 215,000 seeds/ac were tested. Each individual farm's seeding rate treatments varied — most commonly testing their normal seeding rate vs. 30,000 seeds/ac higher and lower. This brings the OFN to 100 seeding rate trials to date (2012–2021). The summary so far: seeding above 190,000 seeds/ac has not provided a return on investment. A seeding rate in the range of 150,000–180,000 should be adequate to achieve maximum yield potential. This is in line with the current recommendation to target 140,000–160,000 live plants/ac.

FIELD PEAS

Inoculant

In 2021, the OFN initiated pea inoculant trials for the first time. Two trials were harvested: one comparing double vs. single inoculant on a field with no pea history, and one comparing single vs. double rates of granular inoculant. Neither resulted in a significant yield nor nodulation difference.

Seeding rate

Pea seeding rate trials were also new in 2021. Six trials were initiated, but only four could be taken to yield. Each trial tested three seeding rates — the farmer's usual rate and +/- 20 seeds/m² (80,000 seeds/ac). No significant yield response occurred at any trial.

Foliar fungicide

Four trials were completed, with three comparing a single application to none and one comparing a double vs. single application. There were no significant yield responses. Mycosphaerella blight was not present in two trials, and in the other two, symptoms remained very mild throughout the season. This year, the OFN used the *Fungicide Decision Worksheet for Managing Mycosphaerella Blight* ahead of fungicide applications to determine the disease risk level and the likelihood of seeing a yield response. In all cases, the recommendation from the worksheet was not to apply fungicide and to revisit in a few days to re-assess symptoms, humidity and the five-day forecast.

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DRY BEANS

Tillage

Two trials compared strip-till to conventional till in pinto and black beans. Conventional till beans were smaller and less vigorous at both trials. At harvest, conventional till pinto beans were too green to be harvested, effectively resulting in zero yields for those strips. At the black bean trial, strip-till resulted in a 289 lbs/ac yield increase over conventional till. This resulted in a net increase of $116–173/ac for the farmer (assuming a black bean sell price of $0.40–0.60/lb).

Nitrogen fertilization

One trial compared 0 vs. 35 vs. 70 lbs N/ac. Visual differences were apparent among treatments throughout the season — with increasing N rate there was improved growth, vigour and more advanced development. The 70 lbs N/ac rate increased yield by roughly 150 lbs/ac compared to the 0 N control. Assuming a urea cost of $37/ac and a pinto bean sell price of $0.40–0.60/lb, the 70 lbs N/ac treatment resulted in a profit of $24–54/ac over the 0 lbs N/ac control.

Foliar fungicide

There were two trials. One compared a single vs. double application and one compared a single application to none. White mould was not present in either trial and as a result, there were no significant yield responses to fungicide.

FABA BEANS

Foliar fungicide

Two trials tested double vs. single application. There were no significant yield responses. Foliar disease incidence ranged from 55–100%, but disease severity remained low and restricted to the lower part of the crop canopy.

For the full report from each individual trial or to watch the video summaries of each trial type, visit **manitobapulse.ca/on-farm-network**.

To participate in the 2022 trials, contact Leanne at **leanne@manitobapulse.ca**. ■

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Pea germinating in dry soil, showing a desiccated first shoot and regrowth.

Setting up for Success

Planting tips for high pea yields

Anastasia Kubinec, Agronomist, Roquette Canada Ltd.

WITH FIELD PEAS and other crops, yield potential is a function of the number of plants/acre multiplied by the number of pods/plant, seeds/pod and seed size. Extra plants make for good yield insurance for unexpected curves thrown by Mother Nature. Lower plant populations can achieve high yields, but crop management practices (e.g., seed placement, diligent weed control) need to be excellent as your margin of error is small.

Unfortunately, seeds put in the ground do not mean the same amount of plants will come out of the ground. Soil moisture, seed placement in soil, seed germination, seed size and seed handling damage will impact successful plant emergence. The below recommendations are meant to reduce stress to the seed and increase emerging plants counts. You will have heard most of these before, but a few really showed up as issues in 2021 due to prolonged dry soil conditions from seeding all the way to harvest.

PLANNING FOR SUCCESS

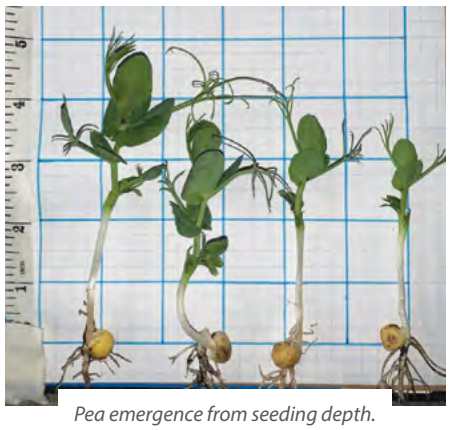
1. **Seed quality** – This is your starting point. If poor quality seed is put in the ground, there isn't much that can be done to make the seed do any better. Germination % is the key thing to look at. This will indicate how many seeds will make a plant (if everything else is good).
2. **Use target plant population for seeding rate** – General 'rule of thumb' seeding rate for peas is 3 bu/ac, but with differences in seed size and % germination, it is better to take a little time and calculate the actual seeding rate needed for a specific targeted stand. The recommended stand to achieve is 7–8 plants/ft² (75–85 plants/m²). The chart below can give you an idea of seed size and resulting seeding rates or can help you calculate on your own.

Target Population		Seed Size (g/1,000 seeds)										
		220	225	230	235	240	245	250	255	260	265	270
live plants/ac	live plants/m²	Field Pea Seeding Rate (bu/ac) – corrected to 95% germination and 90% survivability.										
348,000	86	3.3	3.4	3.5	3.5	3.6	3.7	3.8	3.8	3.9	4.0	4.1
303,500	75	2.9	2.9	3.0	3.1	3.1	3.2	3.3	3.3	3.4	3.5	3.5

Seeding Rate (kg/ha) = Desired Plant Population/m² x 1,000 kernel weight (g/1,000 seeds)
(Seed Germination % (e.g., 0.95) x Expected Seed Survival % (e.g., 0.90) x 100)*

To convert to seeding rate in pounds per acre (lbs/ac) = Seeding rate (kg/ha) x 0.89
To convert to seeding rate in bushel per acre (bu/ac) = Seeding rate (lb/ac) / 60 lb/bu

* Under ideal conditions (soil >5°C average, ideal moisture), an estimated 85% of seeds will result in a plant. If soil temperatures are averaging <5°C for the first 21 days, the peas are in the ground and/or soil moisture is excessively wet or excessively dry, the seed survivability can drop to 60% or lower, even with >90% lab-tested seed germination. In 2021, when seeded into dry soil, field checks resulted in too many fields only producing 60% emerged plants, and when the rains came later in the year, the other 15% emerged but did nothing for 2021 yield.



Pea emergence from seeding depth. Target 1.5 to 2 inches into moisture.

3. **Gentle seed handling** – The high-germination seed you cleaned or picked up can be damaged as you are loading it into the seeder or as it is being metered out during seeding operations. Pulse crop seeds, including peas, need gentle treatment. Reducing handling or using a conveyor belt, if possible, will help reduce seed cracks as they go into the tank. If an auger is what you have for loading, slow and full (as you can do based on equipment) is the best option. Once in the tank of the seeder, reducing fan speed in the tank can help reduce the seeds bouncing around and cracking before they go down into the furrow.
4. **Seeding date** – Peas are cold-tolerant, similar to spring wheat and barley. Once peas are in the ground, you want them to emerge as quickly and uniformly as possible. Start seeding when soils at seeding depth (1.5–2 inches) average 5°C for 3–5 days with no <0°C air temperatures in the forecast for next week. At 5°C, plants will emerge in 3+ weeks, at 10°C emergence occurs in 10–14 days. If you can wait for warmer soils, you will reduce stress on the plant as it is emerging, which will increase plant stand success.

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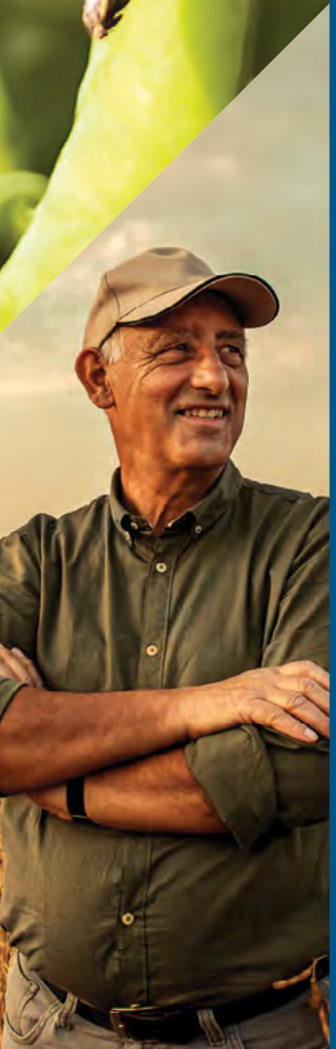
5. **Seeding depth** – The range for optimal germination is 1.5 to 2 inches into moisture. The 'into moisture' part showed to be critically important in 2021. Pea seeds are big and need moist soils to hydrate the seed, start germination and continue to support the seedling until it breaks the soil's surface. Successfully emerged plants in 2021 were more likely to have seed attached 2 inches below the soil line, whereas ungerminated seeds in the same row would be found at 1/2 to 1-inch depth.

   Checking seeding depth is important as soil conditions change, but it is also important to make sure you are also checking seeding depth across the width of your seeder to ensure wings or sections are not in too deep or shallow. With good conditions, you will not see the patterns of uneven seed placement, but in stressful conditions, the tell-tale strips of delayed or reduced emergence will appear.
6. **Fertilizer toxicity and placement** – Pea stands will be reduced from fertilizer toxicity when the fertilizer concentration is too high, too close to the seed. Even with reduced fertilizer needs of peas compared with wheat, the placement and amount of fertilizer need to be considered when put down at seeding. Manitoba Agriculture has excellent recommendation online that you can access by searching "safe rates of seed-placed P MB."
7. **Seed treatment** – When there are stressful spring conditions, such as cold and wet soils, seed-borne disease, or planting into soils known to have root rot issues, a seed treatment is an obvious choice. It reduces the impact of soil-borne and seed-borne disease on the seedling during emergence and in the first few weeks of life. In a spring where soils are warm and dry, there is no known seed- or soil-borne disease issues, a seed treatment may not be needed.

   If using a fungicide seed treatment and a liquid or peat on-seed inoculant, the compatibility between the two products needs investigation, as some seed treatments will reduce the viability of the inoculant. If using a granular inoculant, the concerns over compatibility are reduced. Talk to your retailer or seed treatment manufacturer representative for more details.
8. **Rhizobium inoculant** – This is needed under all conditions. It does not increase plant emergence, but once the plant is growing, it is the source of rhizobium inoculant that helps the pea plant make nodules to convert atmospheric nitrogen into a plant-usable source. Liquid or peat on-seed or granular in-furrow are the available forms. As you organize your seed amounts, ensure you are also are ordering the inoculant that you need.

Every crop year is different and will have challenges. Focusing at seeding on achieving good, uniform plant stands in peas will increase season-long success in timing and effectiveness of management. More plants equals more competition versus weeds; uniform plant development equals more crop at the correct stage for application of herbicides and fungicides. ■



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Minimizing Air Seeder Damage to Field Peas

Prairie Agriculture Machinery Institute results adapted by Laura Schmidt, Production Specialist – West, MPSG

MAINTAINING PEA GERMINATION and careful handling of pea seed are top of mind this spring. The goal is to maximize the number of seeds that make it to produce viable, healthy plants.

An MPSG-funded study was conducted by PAMI to determine the effects of fan speed and moisture content on pea seed quality (germination, vigour and seed coat damage). The original goal of this study was to compare varieties with differing seed sizes and equipment with different distribution systems, but the methods were adjusted due to logistical constraints.

Larger air seeders (>60 ft) typically require higher air velocity for adequate seed distribution and to prevent plugging. As such, there was a desire to know if greater fan speeds result in increased damage to pea seed and how seed moisture content might impact damage.

METHODS

Pea seeds at three different moisture contents (dried to 11.4%, as received at 13.6% and wet at 15.1%) were run through a stationary air drill at three different fan speeds representing low (FSL), medium (FSM) and high (FSH) speeds. Fan speeds were determined by using the manufacturer-recommended speed as the FSM (4250 rpm), then varying the speed approximately 8% lower and higher to achieve FSL (3900 rpm) and FSH (4600 rpm).

A 65-ft, 2010 Bourgault Paralink Hoe Drill 3310 with a 6550 cart was the chosen air drill. This drill contained six secondary manifolds, each with a total of 11 openers, resulting in 66 total openers across the drill. This drill represents a sort of 'worst case scenario' for potential seed damage. A second drill was initially planned to be tested as well. However, due to logistical constraints, the second drill was removed from the scope of the project.

AAC Carver yellow pea seed was used. The seeding rate in these trials was 222.7 lbs/ac (3.7 bu/ac), calculated to target approximately 7.4–8.4 live plants/ft² (or 3.5–3.8 bu/ac). The fertilizer used was MES15, at a rate of 20 lbs P_2O_5/ac, resulting in 59.7 lbs/ac of product (or 19.8 lbs/ac of P_2O_5). Each treatment was run for the equivalent of 0.5 seeded acres with a targeted ground speed of 3.0 mph. Germination, vigour and seed coat damage (via soak test) were assessed before and after treatments.

Table 1. Germination, vigour and seed coat damage of field pea seed at three different moisture contents *before* being run through the drill.

Moisture Content	Germination (%)	Vigour (%)	Soak Test (%)		
			Damaged	Wrinkled	Smooth
Dry (11.4%)	82	78	13.0	15.5	71.5
As received (13.6%)	86	81	11.5	16.5	72.0
Wet (15.1%)	87	87	16.5	56.0	27.5

RESULTS: MOISTURE > FAN SPEED

Surprisingly, varying fan speed did not significantly affect seed germination, vigour or seed coat damage. Seed moisture was the primary factor determining seed damage (Table 2).

Seed moisture content had the most significant impact on germination, vigour and seed coat damage (percentage of damaged, wrinkled and smooth). Pea seed that had been dried to moisture contents below recommended levels (11.4% seed moisture) had significantly lower germination and vigour (a more than 10% decrease) compared to the "as-received" seed (13.6% seed moisture) and the wet seed (15.1% seed moisture). Reduced germination and vigour will negatively affect plant stand and plant establishment, reducing crop yield potential. These results reflect similar findings from previous PAMI research on air seeder distribution and seed damage to wheat, canola and soybeans, where drier soybean seeds (8% seed moisture) resulted in poor germination compared to 13% seed moisture.

Wet seed also displayed a significantly higher percentage of wrinkled seeds and a significantly lower percentage of smooth seeds, compared to the other two moisture contents.

Ensuring seed moisture content is at the recommended level is imperative for good seed germination, vigour and seed coat quality. These results indicate that initial moisture content, before running the seed through the drill, is an important factor for maintaining seed quality and establishing a successful crop.

To obtain the desired moisture content, it is recommended to pay close attention to proper storage and to monitor pea seed moisture by moving the grain during storage, as necessary. Though differences in fan speed did not affect the seed quality, manufacturer-recommended speeds are suggested to maintain productive performance to reduce the risk of plugging at low fan speeds and the potential for more accurate seed distribution at recommended speeds versus high speeds. ■

Table 2. Germination, vigour and seed coat damage of field pea seed at three different moisture contents *after* being run through the drill.

Moisture Content	Germination (%)	Vigour (%)	Soak Test (%)		
			Damaged	Wrinkled	Smooth
Dry (11.4%)	75.3 b	69.8 b	13.9 a	8.2 b	77.9 a
As received (13.6%)	87.0 a	82.4 a	9.33 a	11.0 b	79.7 a
Wet (15.1%)	86.2 a	80.8 a	10.2 a	48.0 a	41.8 b

Aerial view of field trials at the PESAI diversification centre site at Arborg, including the tile drainage project.

The Extremes of Moisture Initiative

An adventure in complex, interdisciplinary problem solving

Brent VanKoughnet, Project Facilitator, AgriSkills Inc.

THE ORIGIN

The three main provincial grower organizations, Manitoba Pulse & Soybean Growers, Manitoba Crop Alliance and Manitoba Canola Growers Association, came to the realization that there is no greater threat to crop production in Manitoba than extremes in moisture — both too much and too little. Even modest incremental steps in progress toward solutions can translate to millions of dollars in farm revenue, considerable risk reduction and a positive impact on the economy. It was also recognized early that no one farm or region will be able to resolve their extreme moisture challenges with a single farm management solution.

THE CHALLENGE

We needed to create a way to address this complex interdisciplinary issue with a systematic, flexible and substantial response. The approach included the engagement of over 75 different researchers and stakeholders. The task was not to find "the answer" but to experiment and broaden the toolbox of the many potential answers and tools that producers may require to manage and mitigate production risks associated with too much and too little moisture.

NOT YOUR NORMAL STUDY

Complex problems like extremes of moisture, particularly those that cross so many different disciplines, require a different kind of project management and a different way of thinking compared to more traditional, isolated challenges. It is even more rare for projects this diverse and complex to be rooted in the development of practical tools for farmers.

Our compliments go to the many researchers and workshop participants who have stretched outside of their normal comfort zones to contribute to both new ideas and new ways of combining disciplines. That multi-disciplinary, multi-tool philosophy has led to the creation and delivery of a bundle of 11 diverse research projects. Nine projects have been underway and will be completed by March of 2022 and two other projects will continue for one more year, to be completed by early 2023.

BUILDING TOOLBOXES

Over time, the project has become more focused on clearly defining four different classifications of toolboxes with different groupings of tools (drawers within each toolbox) to make the findings from these experiments applicable on the farm. Think of it in the way that tools are typically used: some measure and assess, some are universal for multiple tasks, some are specialized with only one function, and some are expensive and need to be used many times to recoup the investment. There are tools that you can borrow from your neighbour and tools where you are on your own. Having a system to organize it all helps us find what we need, when we need it. That is our goal for the outcomes of this extensive study — to set up a practical shop of toolboxes and drawers for managing extremes of moisture (Table 1).

PROJECTS UNDERWAY

Our projects that are underway and nearing completion attempt to create tools for extreme moisture management. Anticipated discoveries will each fall into one or several of the toolbox categories.

A soil moisture monitoring and modelling project led by Paul Bullock and Hartmut Hollaender of the University of Manitoba (U of M) is offering an in-depth analysis of a specific watershed. It is providing new insight into the scale

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Table 1. Toolboxes and drawers for managing extremes of moisture.

Toolbox	Drawers
A. Measures and Predictions An assortment of tools and techniques to measure and estimate soil moisture availability.	• Measures of available moisture • Likelihood (probability) of precipitation that may come
B. Crop Selection Crop choices, sequences and combinations related to crop water demand.	• Annual crop choices • Crop choices that make up a full rotation, or series of crop sequences • Variety selection within a crop type • Intercrop, cover crop or relay crop options
C. Field Activities In-season field operations related to soil moisture removal, conservation or replenishment.	• Seeding • In-season travel • Harvest • Post harvest tillage • Longer-term soil, landscape and drainage management
D. Pests and Fertility Optimizing pesticide use and minimizing nutrient loss under both moisture extremes.	• In-season pest management • Pre-season and in-season fertility management

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and intensity of moisture monitoring systems required to support meaningful models and producer decisions, directly contributing to toolbox A.

David Lobb (U of M) and Curtis Cavers (AAFC) are just completing a three-year project evaluating landscape restoration techniques to rebuild the productivity and profitability of eroded land. With the understanding of the important contribution of organic matter to moisture management, this work could provide an important management tool to toolbox C.

There are many important dimensions to crop rotation research. Moisture management and water resilience may be one of the most beneficial. Martin Entz, from the U of M, has been able to add much more intensive moisture evaluation to a long-term rotation study that was already underway. The combination of these initiatives is a great example of the efficiencies of a collaborative, interdisciplinary approach. This project contributes directly to toolbox B.

The option to grow more than one crop per season through cover or relay cropping opens interesting possibilities for using plants to help manage extreme moisture situations. Yvonne Lawley (U of M) leads a project that explores those possibilities as a practical Manitoba solution. It would also be an important contribution to toolbox B.

A project on optimizing nitrogen under extreme moisture includes the leadership and support of Ramona Mohr (AAFC), Don Flaten, Paul Bullock (U of M), John Heard and Timi Ojo (Manitoba Agriculture). The determination of optimum nitrogen rates is closely linked to current and anticipated rainfall. This project contributes to both toolboxes A and D by incorporating moisture probability frameworks to inform best estimate management practices.

One of our projects has been focused on our ability to assess the economic costs and benefits of farm-level management of excess moisture. It helps establish decision frameworks and evaluates assessment tools. Alexander Koiter of Brandon University's Rural Development Institute leads this project that contributes to toolboxes A, B, C and D.

Tile drainage has received much more attention on light land compared to heavy soils in Manitoba. Sri RanJan from the U of M is working with Nirmal Hari of Prairies East Sustainable Agriculture Initiative (PESAI) at Arborg to assess tile drainage characteristics in heavy soils in a way that will better support our understanding and evaluation of tiling in soils of all types. This is a contribution to toolboxes A and C.

We annually evaluate varieties of major crops through the Manitoba Crop Variety Evaluation Trials (MCVET). Curtis Cavers and Nirmal Hari are leading a project where they are attempting to evaluate moisture resilience as one of the varietal comparisons. This will be an important addition to our B toolbox.

There are believed to be genetic markers that indicate genetic resilience to extremes of moisture. Ana Badea (AAFC) and Claudio Stasolla (U of M) are attempting to demonstrate that phytoglobin levels may be an important indicator of moisture resilience in breeding lines. This, too, would be a welcome addition to toolbox B.

Much of our historical attention to drainage, including tile drainage, has focused on low-slope terrain like the Red River Valley. A project led by David Whetter of Agri Earth Consulting and Bruce Shewfelt of PBS Engineers looks specifically at beneficial practices for soil and water in undulating soil landscapes. The outcome of this project will contribute to toolboxes A, B, C and D.

Physical relocation of soil as part of the landscape restoration project.

Just because you can travel on a wet field doesn't mean you should. The impact of compaction and soil structure destruction is important in assessing the benefits of low ground pressure traffic systems, particularly on heavy clay soils in wet years. A team from PAMI, including Lorne Grieger and Charley Sprenger are leading this project that will add to our understanding of toolboxes A and C.

MORE TO COME

Future articles will dive more deeply into specific project results and will make the case for what work needs to come next to continue to advance our ability to adapt and respond to extremes of moisture. ■

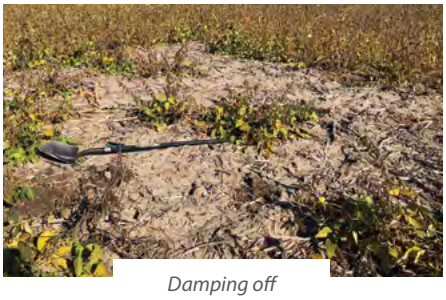
Acknowledgement

Special appreciation to the Government of Canada and the Province of Manitoba for their important contribution of matching funds to this initiative through the CAP funding agreement. The total investment in these projects exceeds $2 million in direct investment, plus incorporates considerable in-kind contributions. It is an important acknowledgement and welcomed support in addressing the most significant and complex farm management challenge of our time.

Declining Sources of Resistance to Phytophthora Root Rot in Soybeans and How to Manage It

Geneviève Arsenault-Labrecque, Postdoctoral Fellow, Vanessa Tremblay, Research Professional and Richard Bélanger, Professor and Research Chair in Plant Protection, Université Laval

SINCE THE MID-1950S, many soybean growers across Canada have struggled with Phytophthora root rot (PRR), caused by the oomycete *Phytophthora sojae*. Once the disease is present in their fields, farmers must deal with it for a long time as surviving spores will persist in the soil for approximately 10 years.



Damping off

Stunted plant growth

Wilted plants

Plant death

Unlike other diseases that are easier to recognize in the field, such as white mould (Sclerotinia stem rot), PRR is an insidious soil-borne pathogen that can affect plants at every growth stage. Where the disease is established, it can cause an average of $160 per hectare in yield losses every season while often going undetected. Symptoms of PRR range from pre- and post-emergent damping off, stem and root rot, stunted plant growth, wilted plants and even plant death. In North America, annual losses attributed to this disease can exceed $500 million.

Different methods are used to fight off PRR. Seed treatments will be efficient in the early season to prevent damping-off, but protection will be lost as soon as the roots emerge. Tolerant varieties can also be used to diminish the impact of the disease, but it is well established that *Rps* (resistance to *Phytophthora sojae*) genes will confer complete protection of plants from seedling to harvest when matched against specific isolates of *P. sojae*.

Indeed, when soybean varieties carrying gene *Rps1a* were first deployed in Canada almost 60 years ago, the disease was under control until the emergence of *P. sojae* isolates with a pathotype able to circumvent *Rps1a*. *Rps1c* was then deployed in 1979 and has been effective for several years. Unfortunately, its intensive use in Canadian soybean fields ultimately led to the emergence of new

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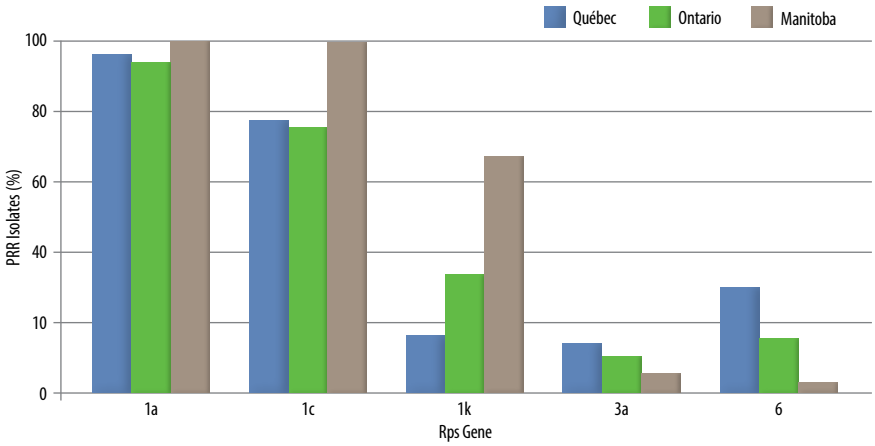

Figure 1. Percentage of Phytophthora root rot (PRR) isolates carrying a given pathotype from 295 isolates sampled from QC, ON and MB fields (2018–2019).

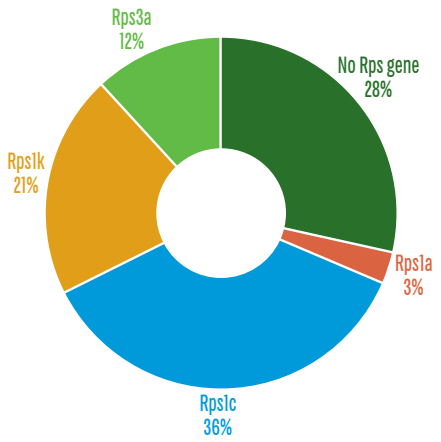

Figure 2. Relative distribution of Rps genes deployed in the 64 and 30 soybean fields in Québec and Manitoba, respectively, that were sampled for the presence of Phytophthora sojae in 2018 to 2019. Pyramiding of Rps genes in some varieties explains the total exceeding 100%.

pathotypes of *P. sojae* and a declining efficiency of this source of resistance. This has led to the deployment of new *Rps* genes so that nowadays, five different *Rps* genes can be found in commercial soybean lines: *Rps1a, Rps1c, Rps1k, Rps3a* and *Rps6*. With the durability of *Rps* genes in the field estimated to last 8–20 years, breeders also have new resistance genes in their sights, including *Rps8* and *Rps11*.

With the deployment of these various sources of resistance, *P. sojae* has developed new variants (pathotypes) and more than 200 can be found worldwide. Without the possibility of knowing which pathotypes are found in their fields, it has become challenging for growers and seed companies to know what *Rps* genes will be efficient to curb PRR. Phenotyping assays can be used to assess *P. sojae* pathotypes, but on a large scale, it is a time-consuming, labour-intensive and often imprecise method. For this reason, a molecular tool using precise genetic markers was developed in our lab that allows for rapid identification of *P. sojae* pathotypes found in a field. This allows farmers to choose *Rps* genes that will be efficient for the next growing season.

The efficiency of this new molecular assay was recently demonstrated in a pan-Canadian survey that also aimed to characterize the diversity of *P. sojae* pathotypes in Canada. For this survey, soil samples from a total of 246 fields were collected during the growing seasons of 2016 to 2019, including 84 in Manitoba, 81 in Ontario and 81 in Québec. A total of 295 unique isolates of *P. sojae* were obtained, 107 originating from Manitoba, 96 from Ontario and 92 from Québec. A subsample of those isolates was first phenotyped with our traditional hydroponic assay and genotyped in parallel with the newly developed molecular assay to validate it. Once the molecular tool efficiency was confirmed (98.6%), it was used to characterize the remaining isolates. Upon analysis, 24 different pathotypes were detected in Québec and Ontario, and eight were detected in Manitoba, where soybean production is more recent.

As shown in Figure 1, this study also highlighted that some sources of resistance to PRR in soybeans are rapidly declining. For instance, *Rps1a* was overcome by 96, 94 and 100% of *P. sojae* isolates tested from Québec, Ontario and Manitoba, respectively. *Rps1c* followed closely, as it was overcome by 77, 75 and 100% of the isolates, respectively. Concerning *Rps1k*, its efficiency is somehow maintained in Québec and Ontario, with 16 and 33% of the isolates able to circumvent it, respectively, while this percentage rose to 67% in isolates from Manitoba. For *Rps3a* and *Rps6*, less than 20% of the isolates are able to circumvent it across Canada, with the exception of *Rps6* in Québec, where almost one isolate out of three is able to overcome its resistance.

During the course of this survey, soybean varieties that were grown in the sampled fields from Manitoba and Québec were recorded. As shown in Figure 2, *Rps1c* was the most common resistance gene used, followed by *Rps1k*, *Rps1a* and *Rps3a*, while nearly one-third of the fields were planted with cultivars carrying no *Rps* genes. When data was compared with the *P. sojae* pathotypes detected in a given field, it was found that 84% of farmers grew soybean varieties that were not resistant against the pathotypes of the isolates found in the fields.

These results stress the importance of carefully managing the declining sources of resistance in light of the widespread use of resistance genes, *Rps1a* and *Rps1c*, since their deployment in the 1950s. In order to do that, growers should select resistant soybean varieties according to the pathotypes of the *P. sojae* isolates that are found in their field to ensure their efficiency and preserve the longevity of these resistance sources. It is also essential for breeders to direct their efforts to *Rps* genes that are still efficient (*Rps1k*, *Rps3a* and *Rps6*) while developing resistant varieties, without losing sight of promising genes such as *Rps8* and *Rps11*.

Growers already have the opportunity to detect PRR presence from soil or plant samples and to characterize *P. sojae* pathotypes in order to know which *Rps* genes they should use. This service is offered by AYOS diagnostic, a spinoff founded by students in the lab that aims to ensure the developed diagnostic tool is available for all Canadian growers. They are also working on a similar tool with AAFC that targets soybean cyst nematode and its two current sources of resistance: Peking and PI 88788. ■

Insects in Pulse and Soybean Crops in 2021 and Outlook for 2022

John Gavloski, Entomologist, Manitoba Agriculture

Two-striped grasshopper nymphs (left) and adult (right).

ONE OF THE big factors affecting crops in 2021 was the weather. Generally, hot and dry conditions at times were stressful on crops. Weather conditions can also affect levels of some insects, as well as the ability of crops to compensate for feeding. A series of consecutive dry years provides favourable conditions for the potential pest species of grasshoppers to increase, which we have seen happening in Manitoba. Dry weather also provides favourable conditions for spider mite levels to increase. Grasshoppers were an issue in some pulse and soybean fields in 2021, and spider mites were a concern in some soybean fields. Feeding from lygus bugs was an issue in some pulse crops, and the known distribution of pea leaf weevil in Manitoba continues to spread both south and east. How big a concern this will likely be in Manitoba is hard to say.

On the positive side, soybean aphid levels were once again very low, and pea aphid was generally not at economic levels during the more vulnerable stages of peas. Cutworms were still a concern, although the level of damage to pulse and soybean crops in 2021 was not as great as the previous year. Hopefully, this trend continues.

GRASSHOPPERS – WILL THE INCREASE CONTINUE

There has been an increase in grasshopper populations over the past few years, and this trend of higher populations continued in 2021. If this trend of drier summers continues in 2022, pulse growers should once again keep an eye on grasshopper levels around and in their crops.

What can reverse the trend of increasing grasshopper levels? Rainy weather at critical points in the grasshoppers' lifecycle, such as when they are newly emerged or laying eggs, can help bring levels down. There is also a fungal pathogen called *Entomophaga grylli* that results in dead grasshoppers left clinging to the stems of plants. It is most effective under warm, humid conditions.

Some predators of grasshoppers, such as certain species of blister beetles and bee flies, were abundant in some areas, which could help regulate levels somewhat. There are many species of both blister beetles and bee flies, and the larvae of some species within both these groups specialize in feeding on grasshopper eggs.

There were reports from agronomists of some fairly high levels of black or gray blister beetles in patches in some soybean fields. These are both species that prey on grasshopper eggs as larvae. Adults feed on many plants and will sometimes be numerous in patches in crops. They generally don't cause enough defoliation to be an economical concern, so control is generally not needed when you encounter these in pulse or soybean crops. On the plus side, in a year when grasshoppers are abundant, it is encouraging to know that their larvae feed on nothing but grasshopper eggs.

SPIDER MITES – A POTENTIAL CONCERN IN DRY YEARS

Spider mites first became noticeable in some soybean fields in late-July. Control was applied in some fields in early-August.

When scouting soybeans or dry beans, light-coloured stippling damage on the leaves, which is easier to spot than the mites themselves, may be the first indication of spider mite feeding. Confirm the presence of mites by tapping the leaves over something where they will stand out. A black piece of construction paper works well, as they can be easier to see against a dark background. The mites will look like specs of dust that move. Stippling can be common in the lower canopy and not be of economical concern. It is when stippling is becoming common in the middle of the canopy that it can be economical. If control is needed, stick to registered products. If you are applying insecticides for multiple pests, including spider mites, be aware that some insecticides (such as most pyrethroids) don't work well on spider mites and may flare their populations. If rain is in the forecast, mite levels may naturally decline. Mites are particularly susceptible to fungal pathogens, which are favoured by moist conditions. This is one of the reasons dry weather encouraged mite outbreaks.

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Spider mites

Both of these species of blister beetles belong to a genus called Epicauta. Larvae of these feed on grasshopper eggs.

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PEA LEAF WEEVIL – RANGE EXPANDING IN MANITOBA

Larvae of pea leaf weevil feed on the root nodules of pea and faba bean plants, and if there is excessive feeding, the reduction in nodules can lead to the plants not fixing enough nitrogen. Until recently, pea leaf weevil had been an insect that was moving eastward through the prairies but had not been found in Manitoba. Pea leaf weevil was found in Manitoba for the first time in 2019, after an agronomist in the northwest region sent in a sample for identification.

In 2020 and 2021, pheromone-baited pitfall traps for pea leaf weevil were set up in several locations in Manitoba in the spring and early-summer to determine the levels and range of pea leaf weevil in Manitoba. In addition, agronomists sent in samples of weevils from peas and faba beans for verification. Pea leaf weevils were only found in the northwest in 2020, but the known range expanded in 2021. A large part of the documented range expansion is because of some keen agronomists who have been collecting weevils from faba beans and peas in late-July and August.

Pea leaf weevil

In 2021, pea leaf weevils were found in some areas of the southwest and central regions. In early-August an agronomist sent in a sample of weevils collected near Sinclair, in southwest Manitoba, all of which were pea leaf weevil. Later in August, an agronomist with Manitoba Pulse & Soybean Growers (MPSG) collected pea leaf weevils from near Cypress River and Holland, expanding the known eastward distribution of pea leaf weevil into the central region of Manitoba. We still don't know how significant of a problem pea leaf weevil will be in Manitoba though.

This coming year we will be doing a survey in late-May and early-June, when plants are in the second to sixth node growth stages, counting the number of crescent-shaped notches in the leaves, which the adult weevils make. This will help us determine the relative abundance of pea leaf weevil in various regions. The survey is easy to do and not too time-consuming, and agronomists and pulse growers are welcome to participate.

Regular crop scouting is essential to ensure insects and other potential pests do not do economic damage to your crop. For 2022, be vigilant for grasshoppers and start monitoring for them in late-May or early-June as the egg hatch is beginning. If it is another dry year, keep an eye on spider mite levels as well. If there are surprises that arrive from the south, such as soybean aphid, we will update you through the *Manitoba Crop Pest Updates*. If anyone is interested in participating in the pea leaf weevil survey or suspects that they have found pea leaf weevil in an area outside their known range, please contact myself, at Manitoba Agriculture or a production specialist at MPSG. ■

Laura Schmidt, Production Specialist – West

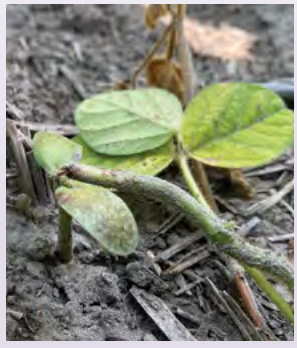
COOL OUT? MAY NEED TO SLOW YOUR ROLL.

And by that, I mean delay rolling until things warm up and plants are more flexible.

Rolling after plants have emerged has some benefits. If it's a dry and windy spring, it reduces your risk of soil erosion. If it's a wet spring, it avoids sealing or crusting soils that could inhibit emergence.

There is also some caution needed to time rolling properly to minimize risk of plant injury. For soybeans, target the V1 to V2 stages once all plants are past the hook stage (VC). Roll on a warm day, during the hottest part of the day (aiming for about 25°C). Avoid rolling in the morning when plants are at their firmest and most likely to snap.

As you go, check for breakage – it may be better to wait for a warmer day later in the week, especially if you're coming off of a cool couple of days. Soybeans can bounce back from some breakage and keep growing (see pictures), but their stems will be weaker, and they may grow along the ground, making them hard to pick up at harvest.



2021 Disease Survey Results

Cassandra Tkachuk, Research Specialist, MPSG

on-farm network

A representative sample of soybean, field pea and dry bean fields are surveyed each year for root, foliar and stem diseases across Manitoba. These surveys are a collaborative effort between Agriculture and Agri-Food Canada (AAFC), Manitoba Agriculture and Manitoba Pulse & Soybean Growers. Below are the results from the 2021 surveys.

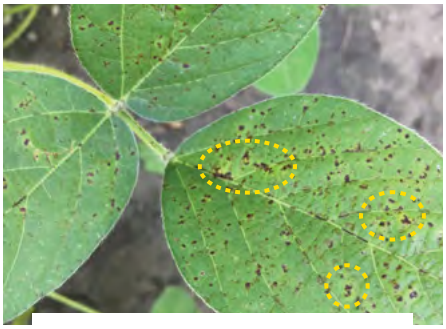
The On-Farm Network (OFN) has also tested foliar fungicides in soybeans, dry beans and field peas over the past several years to evaluate the performance of these products under a range of environments. A summary of the long-term fungicide results can be found within each section below.

Crop reporting regions in Manitoba

Soybean Disease Survey

IN 2021, 60 soybean fields in Manitoba were surveyed for root diseases, including Fusarium, Pythium and Rhizoctonia root rots, and disease isolates from 40 fields were tested. A total of 67 fields were surveyed for Phytophthora root rot and suspect samples were collected. Surveying took place from mid-July to mid-August and Phytophthora assessment extended into early September. At least 10 plants were uprooted at each of three random sites within a field and taken back to the AAFC–Brandon lab for root disease identification.

Fusarium root rot was the only root disease confirmed in 2021. It was present in all 40 fields at an average severity of 4.7, on a scale of 0–9 (Table 1). Despite the prevalence and relatively high severity of Fusarium (yield loss incurred at a rating of 4), root rot pressure was exceptionally low in 2021 due to dry conditions. Root rot-infected plants were also typically isolated to low spots within a field, meaning the incidence of Fusarium was low. Take note of root diseases in your fields moving forward, as they persist in soil and crop residue, and can be significant yield robbers under wet conditions.



Septoria brown spot with some bacterial blight lesions (circled).

A total of 58 soybean fields were surveyed in 2021 for foliar and stem diseases at the R5–R6 stages. Soybeans were visually assessed for infection by bacterial blight, Septoria brown spot, downy mildew, frogeye leaf spot, northern stem canker, white mould, pod/stem blight and anthracnose.

Septoria brown spot and bacterial blight remain the most common foliar diseases of soybeans, found in 81% and 67% of fields across Manitoba, respectively (Table 2). However, the severity of these diseases stayed low in 2021, meaning

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Table 1. Prevalence and severity of Fusarium, Pythium, Rhizoctonia (based on isolations from 40 of the 60 fields) and Phytophthora root rot (67 fields) in soybeans in Manitoba in 2021.

		Disease Severity (0–9)[1]	
Disease	Prevalence (%)	Average[2]	Range
Fusarium root rot	100%	4.7	3.7–5.5
Pythium root rot	0	0	0
Rhizoctonia root rot	0	0	0
Phytophthora root rot	0	0	0

[1] All diseases, except Phytophthora, were rated on a scale of 0 (no disease) to 9 (death of plant).
[2] Average severity is based only on crops in which disease was observed.

Table 2. Prevalence, incidence and severity of soybean foliar diseases from 58 fields across Manitoba in 2021.

		Region (number of fields surveyed)				
Foliar Disease	Rating	Manitoba Average (56)	Central (24)	Eastern/ Interlake (20)	Northwest (2)	Southwest (12)
Bacterial blight	Prevalence[1]	67%	71%	50%	50%	75%
	Incidence[2]	14%	18%	4%	22%	22%
	Severity[3]	0.17	0.18	0.04	0.28	0.35
Septoria brown spot	Prevalence	81%	80%	80%	100%	100%
	Incidence	31%	26%	43%	5%	23%
	Severity	0.38	0.36	0.45	0.05	0.38
Downy mildew	Prevalence	7%	4%	0%	0%	25%
	Incidence	2%	4%	0%	0%	2%
	Severity	0.32	0.04	0	0	0.02

[1] Average % of fields with some level of infection. [2] Average % of plants infected within infected fields.
[3] Average severity of infected plants within infected fields on a scale of 0 (no disease) to 5 (severe symptoms with defoliation).

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there was minimal impact on yield. Downy mildew was present in as many as 25% of fields in the southwest region, but it was not detected in all regions and its prevalence and severity were low overall.

Frogeye leaf spot was found in one field within the central region and one in the southwest, and white mould was found in only one field in the eastern/Interlake region (data not shown).

ON-FARM EVALUATION OF SOYBEAN FUNGICIDE

Since 2014, 66 replicated and randomized field-scale trials have been conducted through the OFN to evaluate foliar fungicide in soybeans. The main goal for fungicide application in soybeans is to control white mould. However, white mould (Sclerotinia) is not the yield robber in soybeans that can be in other crops, and the continuous flowering period of indeterminate soybeans can make control difficult.

According to the aggregated on-farm results, there were no soybean yield responses to fungicide 83% of the time (55/66 trials), statistically significant yield increases 17% of the time (11/66 trials) and economical yield increases only 9% of the time (6/11 significant yield trials), where the yield bump was great enough to cover the cost of fungicide.

The best strategy for making an economical fungicide decision is to determine the likelihood of disease development each season and in each field, since profitability depends on the presence of white mould. Disease is likely to develop if conditions are wet and cool (<21°C) leading up to flowering, if your field has a history of white mould pressure and if there are signs of disease development in the current crop (e.g., apothecia on the soil surface ahead of flowering). ■

Dry Bean Disease Survey

IN 2021, 40 dry bean fields were surveyed for root, foliar and stem diseases in Manitoba. Root diseases included Fusarium, Pythium and Rhizoctonia root rots, foliar diseases included common bacterial blight, halo blight and rust, and stem diseases included white mould and anthracnose. Most surveyed fields were in the traditional bean-growing regions of southern Manitoba and 10% of fields were outside of these regions.

Common bacterial blight lesions on pods.

Fields were surveyed for root disease during mid- to late-July at the early flowering to beginning seed stages. At least 10 plants were sampled at each of three random sites within each field. Fusarium root rot was the only root disease detected in 2021, found in all 40 fields at an average severity of 4.5, on a 0–9 scale (Table 3). A severity rating of 4 is the level at which yield loss is incurred.

Fields were visually assessed for foliar and stem diseases in mid-August when plants were starting to mature. Common bacterial blight (CBB) was the most prevalent disease, found in 98% of fields at an average severity of 1.3, on a scale of 0–5 (Table 3). Foliar products are available for CBB, but their efficacy is variable and often require multiple applications. Halo blight was found in 5% of fields and white mould in 3% — both at very low severity levels. Rust and anthracnose were not detected.

ON-FARM EVALUATION OF DRY BEAN FUNGICIDE

Since 2016, 16 replicated and randomized trials have been conducted to evaluate foliar fungicide application in dry beans through the OFN. White mould and anthracnose are the disease targets of foliar fungicide in dry beans, but white mould is typically the main concern. Anthracnose was not found during the 2021 survey and has not been a recent issue for dry beans due to variety resistance.

Over the duration of these on-farm trials (2016–2021), we have not seen any statistically significant dry bean yield responses to foliar fungicide due to dry conditions across sites and minimal white mould pressure. It is important to note that most bean fields tested in these trials

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Table 3. Prevalence and severity of foliar and stem diseases from 40 dry bean fields in Manitoba in 2021.

		Disease Severity		Leaf Infection Incidence	
Disease	**Prevalence**	**Average[1]**	**Range**	**Average[1]**	**Range**
Root Diseases	**% fields infected**	**0–9 scale[2]**		**% leaf area infected**	
Fusarium root rot	100%	4.5	3.0–5.9	–	–
Pythium root rot	0%	0	0	–	–
Rhizoctonia root rot	0%	0	0	–	–
Foliar Diseases		**0–5 scale[3]**			
Common bacterial blight	98%	1.3	0.3–2.7	8.6%	0.3–23.3%
		% plant tissue infected			
Halo blight	5%	0.2%	0.1-0.3%	–	–
Rust	0%	0%	0%	0%	0%
Stem Diseases					
White mould	3%	0.3%	0.3%	–	–
Anthracnose	0%	0%	0%	0%	0%

[1] Averages are based only on crops in which diseases were observed. [2] Root diseases were rated on a scale of 0 (no disease) to 9 (death of plant). [3] A severity scale of 0 (no disease) to 5 (50–100% of leaf area infected) was used for common bacterial blight.

were grown in wide rows (30 inches). Dry bean fungicide trials are planned to continue in 2022 to capture more locations and environments.

Fungicide application timing for dry beans is in July at the start of flowering to protect plants from the potential spread of sclerotinia ascospores through flower petal drop. The amount of July precipitation tends to coincide with the amount of crops infected by white mould. White mould pressure was more severe in the wetter year of 2016, compared to subsequent, drier years with less disease pressure (Table 4).

Assessing rainfall amounts leading up to and during dry bean flowering is one way to anticipate white mould development in your fields. Also consider field history of host crops and disease presence. If past white mould levels were high, the carryover of sclerotia bodies in the soil will increase your risk of disease development. Also scout for signs of disease development ahead of fungicide application and use the *Fungicide Decision Worksheet for Managing White Mould in Dry Beans.* ■

Table 4. White mould prevalence and severity compared to normal July rainfall (%), which is a driver of white mould development, from 2016 to 2021.

	Prevalence	Severity	Precipitation
Year	% crops infected	% infected plant tissue	% normal July rainfall in central MB*
2021	3%	0.3%	29%
2020	31%	3.1%	80%
2019	3%	0.7%	75%
2018	3%	1.0%	55%
2017	68%	2.6%	42%
2016	40%	7.3%	137%

*90% of surveyed dry bean fields were in the central region of Manitoba.

Field Pea Results

IN 2021, 46 pea fields were surveyed for root diseases and 41 fields were surveyed for foliar diseases during mid- to late-July at the R3 to R4 (flat to full pod) stages. Foliar diseases included Mycosphaerella blight, bacterial blight, downy mildew, white mould, powdery mildew, anthracnose, rust and Septoria leaf blotch.

A detailed summary of 2021 results can be found in Table 5 and a comparison of disease results from 2016 to 2021 in Table 6. Fusarium root rot was the most common root disease, found in all surveyed fields at an average severity of 3.1, on a scale of 0–9. Rhizoctonia was not detected in any fields and Aphanomyces data is unavailable for 2021 due to ongoing pandemic constraints. MPSG is committed to gaining a better understanding of Aphanomyces in the province moving forward.

Mycosphaerella blight freckling in the lower canopy.

Mycosphaerella blight was the most prevalent disease and has been found at some level of severity in every surveyed pea field since 2016 (Table 5). Downy mildew was found in 12% of fields and bacterial blight in 7%. However, disease pressure and severity were low overall due to the widespread dry conditions.

ON-FARM EVALUATION OF PEA FUNGICIDE

Since 2017, the OFN has conducted 31 randomized and replicated, field-scale trials across Manitoba to evaluate foliar fungicide in peas. To date, there have been 20 single vs. no fungicide trials, one double vs. none, two double vs. single vs. none and eight double vs. single.

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Table 5. Prevalence and severity of root and foliar diseases from 46 and 41 pea fields, respectively, in Manitoba in 2021.

	Prevalence	Severity*
Disease	% fields infected	0–9 scale
Root Diseases		
Fusarium root rot	100%	3.1
Rhizoctonia root rot	0%	0
Aphanomyces root rot	–	–
Foliar Diseases		
Mycosphaerella blight	100%	3.5
		% infected area
Bacterial blight	7%	0.1%
White mould	0%	0%
Powdery mildew	0%	0%
Downy mildew	12%	0.1%
Anthracnose	0%	0%
Rust	0%	0%
Septoria leaf blotch	0%	0%

*Average severity of infected plants within infected fields on a scale of 0 (no disease) to 9 (51–100% infection in the upper, middle and lower canopy).

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Mycosphaerella blight and white mould are the targets of foliar fungicide in peas, but Mycosphaerella is usually the main concern.

According to aggregated data comparing peas with and without fungicide (including single vs. none, double vs. none and double vs. single vs. none), there have been no yield responses to fungicide 74% of the time (17/23 trials), statistically significant yield increases 26% of the time (6/23 trials) and economic yield increases 9% of the time (2/6 significant yield trials), where the yield bump at least covered the cost of the product. Sites experienced mostly dry conditions over the years, which contributed to the lack of yield responses.

When conditions are conducive to disease development, that is when one might consider a second fungicide application. The aggregated results from double vs. single trials tell us that double application resulted in no yield increase 62% of the time (5/8 trials), a statistically significant yield increase 38% of the time (3/8 trials), and in all three of these cases, the yield bump was economical.

Fungicide decisions should be customized for each field, each year using the *Fungicide Decision Worksheet for Managing Mycosphaerella Blight in Field Peas.* ■

Table 6. Prevalence and severity of field pea root and foliar diseases in Manitoba from 2016 to 2021.

	Fusarium Root Rot		Aphanomyces Root Rot	Mycosphaerella Blight		Bacterial Blight		White Mould	
Year	Prevalence[1]	Severity[2]	Prevalence[1]	Prevalence[1]	Severity[2]	Prevalence[1]	Severity[3]	Prevalence[1]	Severity[3]
2021	100%	3.1	–	100%	3.5	7%	0.1%	0%	0.0%
2020	100%	3.7	–	100%	3.4	71%	0.7%	14%	0.1%
2019	100%	2.9	64%	100%	3.8	39%	0.1%	0%	0.0%
2018	100%	3.1	63%	100%	4.9	0%	0.0%	0%	0.0%
2017	100%	3.6	–	100%	4.5	0%	0.0%	3%	0.1%
2016	100%	2.8	–	100%	6.0	0%	0.0%	55%	0.5%

[1] Percentage of fields infected. [2] Severity on a 0–9 scale. [3] Severity as a percentage of leaves infected.

Soybean Scout ANSWERS

Photos: A. Hager, University of Illinois

A – Palmer Amaranth *(Amaranthus palmeri)* was identified for the first time in Manitoba in 2021 in the R.M. of Dufferin. Palmer is cited as one of the most problematic weeds in the U.S. as it is a prolific seed producer and has evolved resistance to as many as seven herbicide groups (2, 3, 5, 9, 14, 15, 27). It is very difficult to distinguish from other pigweeds at the seedling stage. It is hairless (other than a single hair that may grow from the leaf tip), it has broad seedling leaves, notched leaf tips, a long petiole and a "V" mark that may develop later on the leaf surface. It typically grows 6–8 ft. tall but can reach more than 10 ft.

B – Tall Waterhemp *(Amaranthus tuberculatus)* was first identified in Manitoba in 2019 and has since been confirmed in six municipalities. It, too, is a prolific seed producer with evolved resistance to seven herbicide groups in the U.S. (2, 4, 5, 9, 14, 15, 27). Initial testing of local populations indicates resistance to Groups 2 and 9. It is also difficult to distinguish from other pigweeds. It is hairless (unlike the fine-haired redroot pigweed), its seedling leaves are longer and narrower, it has notched leaf tips and leaves that have a waxy or glossy appearance. It typically grows 4–5 ft. tall but can also reach more than 10 ft.

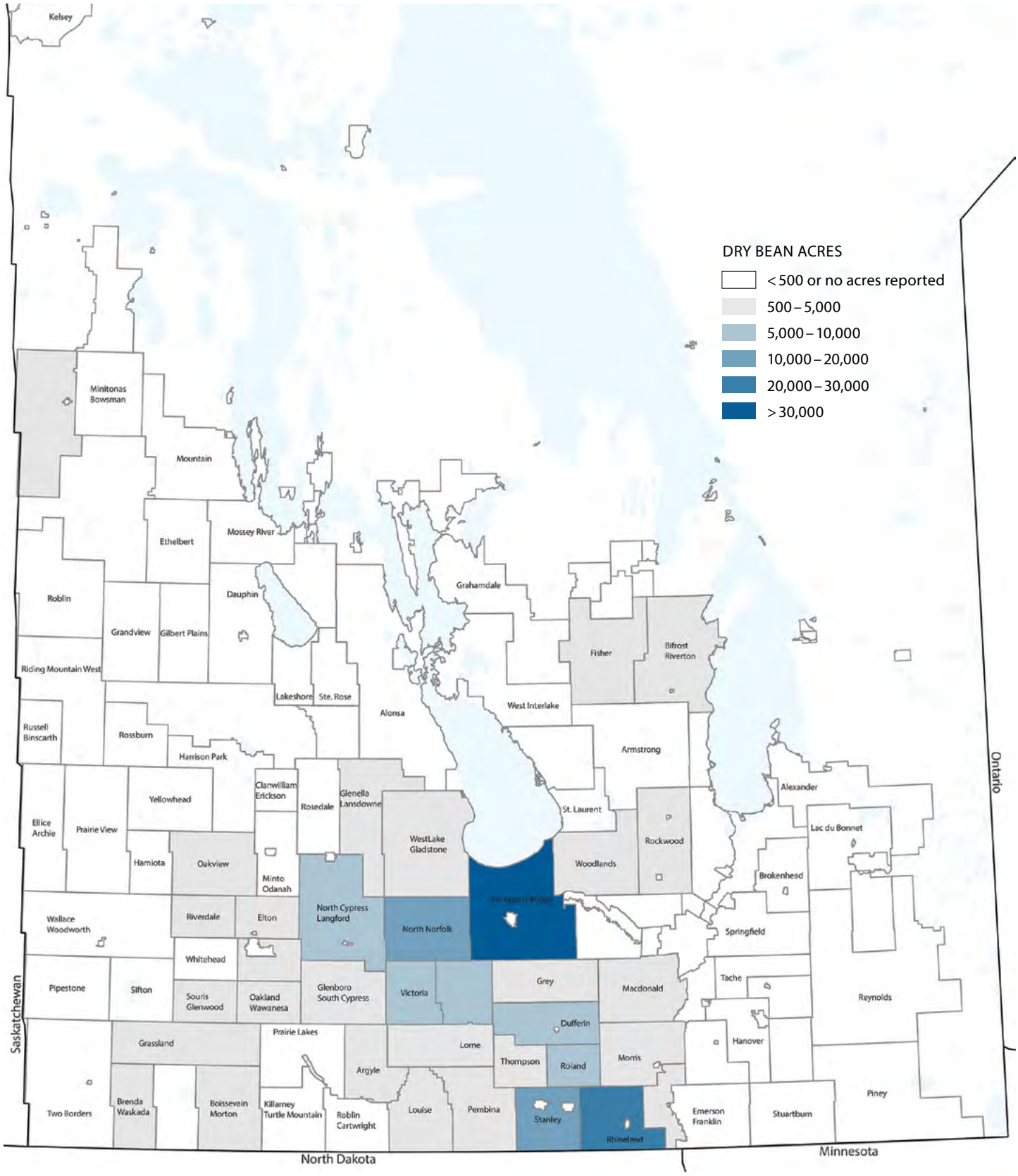
NOTE: Both palmer amaranth and tall waterhemp are tier 1 noxious weeds, meaning they must be eradicated. If you suspect either of these weeds in your fields, contact Laura Schmidt (laura@manitobapulse.ca) or Kim Brown-Livingston (Kim.Brown@gov.mb.ca). DNA testing can also be done at the Pest Surveillance Initiative lab in Winnipeg.

Quick Reference Guide: Soybean and Pulse Seeding Tips

	Soybeans	Field Peas	Dry Beans	Faba Beans
Salinity Tolerance	Threshold of 1.0 mmho/cm 25% yield loss (YL) at 1.75 mmho/cm 50% YL at 2.3 mmho/cm Mixed with high calcium carbonates, IDC will set in.	Threshold of 0.3 mmho/cm 25% YL at 1.8 mmho/cm 50% YL at 3.75 mmho/cm	Threshold of 0.5 mmho/cm 25% YL at 1.3 mmho/cm 50% YL at 1.7 mmho/cm	Threshold of 0.75 mmho/cm 25% YL at 1.75 mmho/cm 50% YL at 2.5 mmho/cm
Planting Date	Early to late May Consider calendar date, soil temp, 24-hour forecast and personal risk.	Late April to early May	Late May to early June	Mid-April to early May
Minimum Soil Temperature for Germination	8°C *>14°C for faster emergence*	4°C	12°C *>15°C for faster emergence*	3 to 5°C
Planting Depth	0.75–1.75 inches	1.5–2 inches	0.75–1.5 inches	2–3 inches
Target Plant Stand (live plants/ac)	140–160,000 Use the ***Bean App Seeding Rate Calculator*** to determine your most economical seeding rate.	320–360,000 *80–90 live plants/m²* *7–8 plants/ft²*	*Pinto* 70–80,000 (wide-row) 90–120,000 (narrow-row) *Navy* 90,000 (wide-row) >115,000 (narrow-row) *Black* 90–120,000	180,000 *45 live plants/m²*
Row Spacing	Wide (>15") or narrow (<15")	Narrow (6–12")	Wide (>15") or narrow (<15")	Narrow (<15")
Inoculant Strategy	Species: *Bradyrhizobium japonicum; Bradyrhizobium elkanii* Double inoculate first-time soybean fields. Single inoculate if the field has a history of soybeans, if previous crops have nodulated well and if the most recent soybean crop was within the past four years.	Species: *Rhizobium leguminosarum biovar viceae* Single inoculate, even if fields have a history of peas. Consider double inoculation if soils have been flooded, experienced drought or have no pulse history.	Species: *Rhizobium legum-inosarum biovar phaseoli* Dry bean inoculants are currently being researched. To date, they have not been widely commercially available. Nitrogen fertilization to supply 70 lbs N/ac total (residual N + fertilizer N). See *Manitoba Soil Fertility Guide* for more information.	Species: *Rhizobium leguminosarum biovar viceae* Single inoculate. Consider double inoculation if soils have been flooded or have no pulse history.
Maximum Safe Seed-Placed P_2O_5 (Actual)	20 lbs P_2O_5/ac in narrow rows (<15") and 10 lbs P_2O_5/ac in wide rows	20 lbs P_2O_5/ac	10 lbs P_2O_5/ac in narrow rows (<15") and 0 in wide rows	20 lbs P_2O_5/ac
Days to Maturity	100–125	90–97	91–101	104–110
MPSG Resources Available	• Production Guidelines • Fertility Factsheet • Seed Treatment Risk Assessment • Growth Staging and Maturity Guide • Plant Development Guide • Insect and Disease Scouting Calendar and Identification Guide • Soybean Aphids: Identification, Scouting and Management	• Production Guidelines • Organic Production Guidelines • Growth Staging and Maturity Guide • Insect and Disease Scouting Calendar • Root Rot in Peas and Lentils • Fungicide Decision Worksheet for Mycosphaerella Blight • Desiccation and Harvest Guide	• Growth Staging and Maturity Guide • Insect and Disease Scouting Calendar • Fungicide Decision Worksheet for White Mould • Desiccation and Harvest Guide	• Growth Staging and Maturity Guide • Insect and Disease Scouting Calendar

For more detailed production information, visit **manitobapulse.ca/production.**

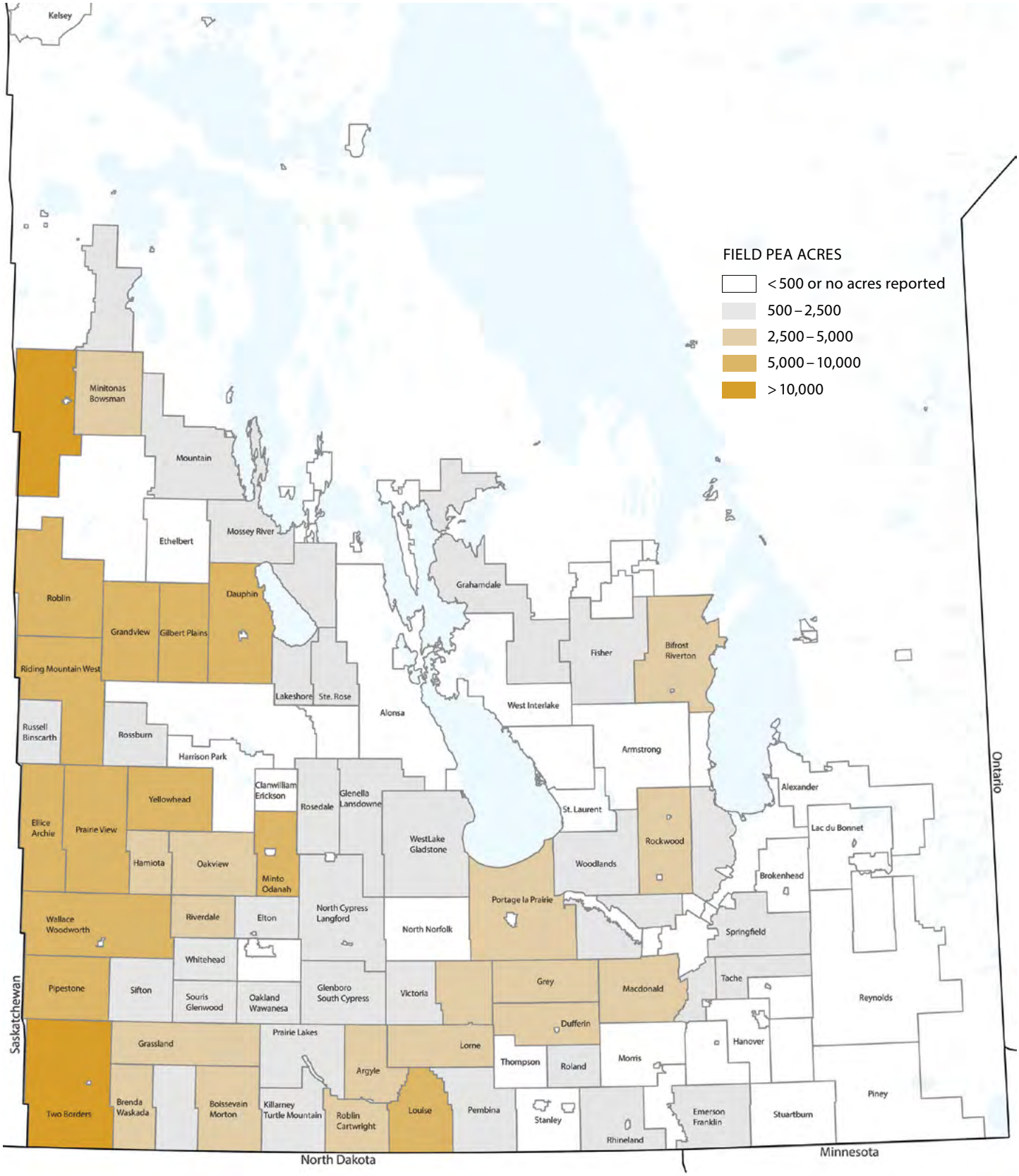
2021 Dry Bean Acres



MANITOBA Pulse Soybean GROWERS

MASC Manitoba Agricultural Services Corporation

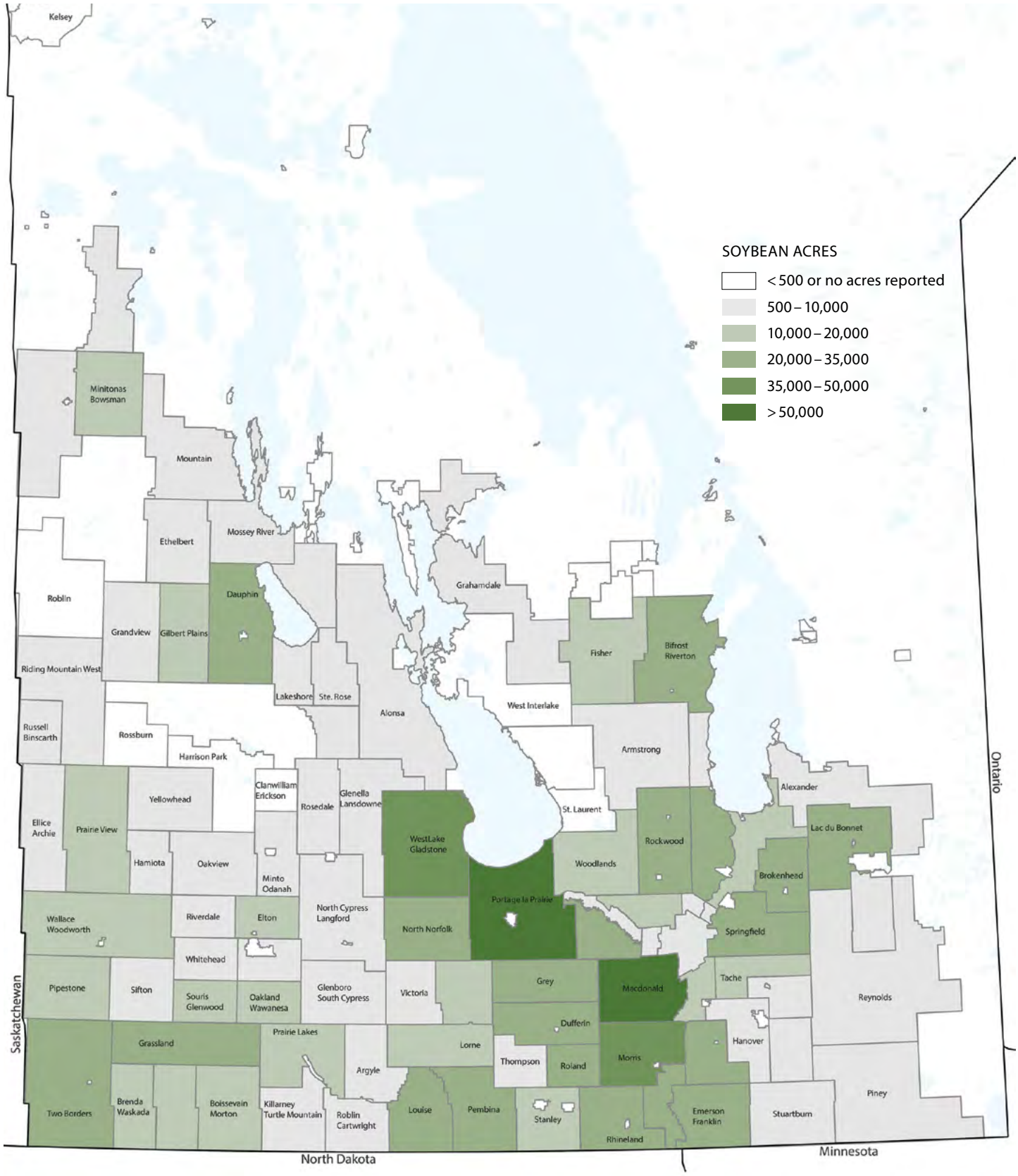
2021 Field Pea Acres



MANITOBA Pulse Soybean GROWERS

MASC Manitoba Agricultural Services Corporation

2021 Soybean Acres



MANITOBA Pulse Soybean GROWERS

MASC Manitoba Agricultural Services Corporation

Manitoba Pulse and Soybean Buyer List – March 2022

COMPANY	EDIBLE BEANS	FABA BEANS	LENTILS	PEAS	SOYBEANS	PHONE	LOCATION	CGC REGULATED
Agassiz Global Trading	✓			✓	✓	204-745-6655	Homewood, MB	
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	✓
Columbia Grain Inc. (CGI) (Walhalla Bean Co.)	✓					701-549-3721	Walhalla, ND	✓
Delmar Commodities Ltd.	✓		✓	✓	✓	204-331-3696	Winkler, MB	✓
ETG Commodities	✓	✓	✓	✓	✓	416-900-4148	Mississauga, ON	✓
G3 Canada Limited				✓		204-983-0239	Winnipeg, MB	✓
Gavilon Grain LLC					✓	816-584-2210	Omaha, NB	✓
Global Food and Ingredients Inc.		✓	✓	✓		416-840-8590	Toronto, ON	✓
Hensall District Co-op	✓			✓		204-750-0529	Winnipeg, MB	✓
Horizon Agro Inc.					✓	204-746-2026	Morris, MB	
Kalshea Commodities Inc.			✓	✓		204-272-3773	Winnipeg, MB	✓
Knight Seeds			✓	✓		204-764-2450	Hamiota, MB	
Linear Grain Inc.	✓	✓		✓	✓	204-745-6747	Carman, MB	✓
Louis Dreyfus Company Canada ULC				✓	✓	403-205-3322	Calgary, AB	✓
Lyft Commodities Inc.	✓	✓	✓	✓	✓	604-355-4275	Vancouver, BC	✓
Marina Commodities Inc.			✓	✓		204-937-2300	Roblin, MB	✓
Masterfeeds		✓		✓		403-327-2555	Lethbridge, AB	
McDougall Acres Ltd.	✓	✓	✓	✓	✓	306-693-3649	Moose Jaw, SK	
Natural Proteins Inc.					✓	204-355-5040	Blumenort, MB	
Nu-Vision Commodities	✓			✓	✓	204-758-3401	St. Jean Baptiste, MB	
Parrheim Foods				✓		306-931-1655	Saskatoon, SK	✓
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				✓	✓	204-594-8750	Winnipeg, MB	✓
Prairie Fava Ltd.		✓				204-721-4715	Glenboro, 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	✓
Roquette Canada Ltd.				✓		204-428-3722	Portage la Prairie, 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	✓
Semences Prograin Inc.					✓	450-469-5744	Saint-Césaire, QC	
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	✓
Sunrise Foods International Inc.					✓	306-657-4541	Saskatoon, SK	✓
The Andersons Inc.			✓	✓		419-891-6464	Maumee, OH	✓
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		✓
Western Harvest Bean ULC	✓					204-515-7331	Winnipeg, MB	
Wilbur Ellis Company of Canada Ltd.	✓		✓	✓		204-867-8163	Minnedosa, MB	✓
XPT Grain Inc.	✓			✓		306-525-0205	Regina, SK	✓

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, which 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 that have registered with MPSG and are actively purchasing pulse and soybean crops in Manitoba. The word registered does not imply endorsement. The complete list is available on our website manitobapulse.ca.

Recipe Corner

Black Bean and Lentil Lasagna

Servings: 4–6 | Prep time: 15 minutes | Cook time: 60 minutes | Total time: 1 hour & 15 minutes

Ingredients

- 2 cups (500 ml) green lentils cooked
- 1 can (540 ml) rinsed/drained and crushed
- 1/2 can (400 ml) diced tomatoes (good quality)
- 1 tbsp (30 ml) tomato paste
- 4 cloves garlic chopped
- 1/2 white onion chopped
- 1 tbsp (30 ml) fresh thyme
- 2 tbsp (60 ml) chopped parsley
- 1 tsp (10 ml) fresh oregano
- 2 cups (1/2 litre) chicken stock or water
- 1 tsp (10 ml) cumin
- 1 tsp (10 ml) chili powder
- 2 cups (500 ml) ricotta cheese
- 1 cup (250 ml) grated Parmesan cheese
- 9–12 no-boil lasagna noodles (enough for 3 layers)
- Canola oil as needed
- Salt/pepper to taste

Method

Preheat the oven to 350°F. Lightly grease a 9 x 13-inch baking dish.

1. In a large heavy-bottom pot sweat the onions and garlic with canola oil until soft and translucent and season with salt.
2. Add the spices, thyme, oregano and tomato paste and cook an additional 2–3 minutes. Check seasoning again.
3. Add the diced tomatoes, cooked lentils, crushed black beans and cook again for an additional 2–3 minutes.
4. Cover with the chicken stock (or water) and simmer on low heat for 20 minutes to develop flavour. Taste and adjust seasoning if necessary.
5. Remove from heat and fold in the ricotta cheese and parsley.
6. Spread 1/2 cup of the sauce mixture on the bottom of the prepared pan. Layer three noodles, 1/3 of the sauce mixture, and repeat two more times.
7. Cover with lightly greased foil and bake at 350°F for 30 minutes. Uncover and evenly sprinkle Parmesan and chopped parsley over the top. Bake another 10 minutes until the edges are bubbling and the top of the lasagna is browned.
8. Let stand about 10 minutes before serving.

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

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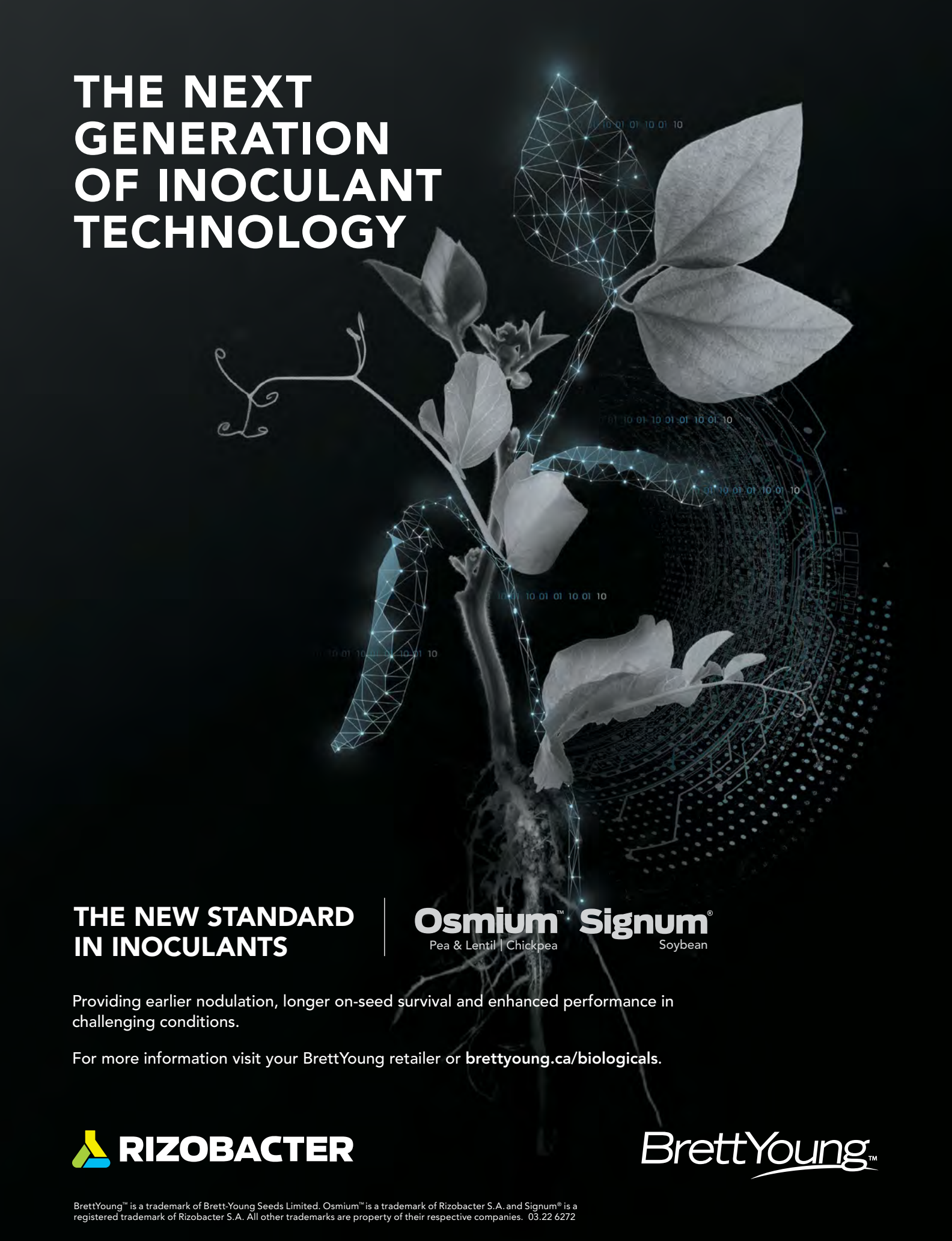

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