MANITOBA Pulse Soybean GROWERS

pulsebeat

Issue 98 • Fall/Winter 2023

The Pursuit of a Soybean Variety as Adaptable as a Manitoban P.38

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Editor	*Toban Dyck, Burr Forest Group*
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Manitoba Pulse & Soybean Growers thanks the authors who have taken the time to contribute to this publication.

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Pulse Beat is the official journal of and published by Manitoba Pulse & Soybean Growers (MPSG) – a farmer organization funded by sales of pulse (beans, peas, lentils and faba beans) and soybean crops grown in the province of Manitoba. Circulation is approximately 4,000 distributed to farmers, government, researchers and industry involved in pulses and/or soybeans.

MEMBER PRIVACY POLICY

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Please direct your comments or concerns to Melissa Denys at 204.745.6488 or email melissa@manitobapulse.ca.

In This Issue

Manitoba Pulse & Soybean Growers 2023 Board of Directors and Staff

ELECTED FARMER DIRECTORS

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

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2024

MANITOBA Pulse Soybean GROWERS

Annual General & Special Meeting

February 14, 2024 | 8:00 a.m.

Victoria Inn and Convention Centre 1808 Wellington Ave. Winnipeg, MB.

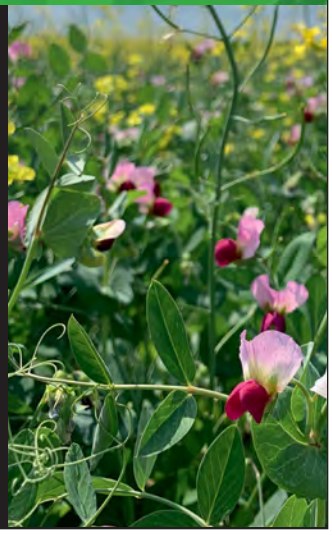
NOTICE IS HEREBY GIVEN that an in-person meeting and special* meeting of the Manitoba Pulse and Soybean Growers (MPSG) members will be held during the 2024 CropConnect Conference.

**a special meeting is called to consider revision of the MPSG by-laws*

Nominations to fill three seats on MPSG's Board of Directors will open December 24, 2023 and close on January 24, 2024. The 2024 Board of Directors Nomination Package is available at **www.manitobapulse.ca**, or by contacting **melissa@manitobapulse.ca**.

MSPG Nominating Committee: Alex Burgess, Chair & Robbie Misko

**Candidates must be members in good standing with MPSG. Elections will be held during MPSG's AGSM on February 14, 2024.*



Manitoba Pulse & Soybean Growers 2023 Committees and Representatives

MPSG Committees – *The first named is chair*
Executive – M. Rattai, B. Phillips, E. Sirski
Governance/HR – F. Prince, G. Sawatzky
Ag Policy & Market Development – B. Phillips, A. Burgess, B. Pallister, E. Sirski, J. Preun, M. Rattai, R. Misko
Finance/Audit – J. Preun, B. Phillips, M. Rattai
Resolutions – A. Burgess, R. Misko
Nominating – A. Burgess, R. Misko
Research & Communications – G. Sawatzky, F. Prince, B. Martens, B. Pallister, M. Rattai, R. Misko

MPSG Representatives
Canadian Grain Commission Pulse Advisory Committee – G. Sawatzky
Grain Growers of Canada – B. Phillips
- **Trade and Marketing** – E. Sirski
- **Business Risk Management** – B. Phillips

Keystone Agricultural Producers
- **Grains, Oilseeds, Pulses Industry Rep to KAP Board:** – A. Burgess
- **Commodity Group** – D. Domitruk

MCVET– D. Domitruk
Prairie Recommending Committee for Pulse and Special Crops – D. Domitruk
Pulse Canada – B. Martens, J. Preun
Soy Canada – E. Sirski, M. Rattai

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A Tale of Two Soybeans

Melvin Rattai, Chair, MPSG

IT'S BEEN A BEAUTIFUL SUMMER for us on the farm.

As I'm writing this, it's October of 2023. I'm staring out of my window and the grass is still very green. The harvest is about 90 per cent complete and the trees have their outstanding fall colours.

Reflecting back on the season, we started seeding in May with good moisture, and one very good rain after seeding got the crop going. Then, no rain in June. However, despite having no rain in June, timely rains throughout the rest of the growing season on some of our fields helped the crops. On some of our fields the dry spell continued throughout the growing season.

How well did the soybeans for human consumption (IP) grow versus commodity soybeans?

The growing season was very long, we just made it under the frost-free window. We had a frost on September 12. As we gather more data on these particular soybeans and examine all the details, we will look at the profitability with the two to three dollar spread per bushel over the other soybeans. – Melvin Rattai

A field of ripe soybeans. Photo credit: Toban Dyck

It has been an interesting year for MPSG. We've seen an increase in soybeans per acre this year. Our staff has been maintaining MPSG's award winning research and crop production standards. You can be confident that your check-off investment dollars are being put to great use.

Manitoba Pulse & Soybean Growers (MPSG) is looking forward to working with the new agriculture minister. We will get in touch with their office to work with them for the benefit of Manitoba's pulse and soybean farmers.

Soy Canada and Pulse Canada boards have been working hard on the national protein strategies.

We are continually encouraged by the number of our farmer members who use our on-farm network research and programs.

Enjoy the holidays and take care of yourselves! Stay focused on the things that matter the most in life. ■

Soybeans – A Wild Ride in Manitoba

Daryl Domitruk, PhD. P.Ag, Executive Director, MPSG

REPORTING WITH GREATER detail about the research in which MPSG invests growers' money is one way for us to remain accountable to members.

Our publisher, Burr Forest Group, has produced a picture of how solutions are built through a sequence of research phases.

Challenge

THE CHALLENGE

We start by identifying a challenge. Agronomists in the field observe complex interactions among soil, water, and genetics then stir in the observations, opinions, and analysis of the grower. A seasoned agronomist uses their professional judgement to weigh the evidence and zero in on the challenge. That's MPSG's first point of accountability – using members' check-off dollars to employ skilled agronomists and provide them with the tools to survey members' crops. Part of their job is to sift out challenges that require research to find a solution. MPSG agronomists can readily initiate research projects tailored to members' needs.

In 2023, MPSG agronomists sampled soil and roots from over 200 fields. We're gaining a handle on the challenge posed by root rot in pea and soybean crops and the emerging presence of soybean cyst nematode. See MPSG's social media and *Pulse Beat – Science Edition* for results.

AFTER THE CHALLENGE: THE ROAD TO FARMER ADOPTION

At which phase MPSG invests depends on how much mystery shrouds the challenge. The deeper the mystery, the further upstream we must invest, and the longer it will take to get farmers a solution. A good example of this situation is root rot.

ROOT ROT

By the time a crop displays symptoms of root rot, it's too late. Even if there were an available rescue treatment, root rot pathogens are endemic in the soil and capable of resisting treatment. Root rot is such a significant research challenge, it has brought MPSG and its sister organizations together to figure out the fundamentals of the pathogens and their interaction with plants and soil.

Fundamental Research

THE FUNDAMENTALS

Since 2018, MPSG has spent about $960,000 on root rot research. Of that figure, about $440,000 has been spent on the fundamentals. For plant breeders to acquire the ability to select resistant varieties, we first must enlist plant pathologists and soil microbiologists to clearly identify the pathogens and figure out their behaviour in soil. Simultaneously, we must support scientists whose trade is genetics, genomics, and bioinformatics to isolate genes for resistance. Plant breeders are waiting downstream to learn how many genes exist, where they are focused on chromosomes and how their actions are triggered.

In this phase, the research does not appear to be connected to grain farming. The work is focused on the invisible world of plant cells and single cell microbes, the genes within those cells, and even the gene's building blocks – nucleic acids. Nevertheless, this phase is critical to the grain farm. Steps towards cost-effective solutions like resistant varieties, higher yields, and lower chemical use don't happen without knowledge of the fundamentals. MPSG reports to members as projects progress through this phase even though, for most of us, the highly specialized language of upstream science may be out of reach.

AAFC Brandon developed techniques for detecting and quantifying root rot in peas. This helped assess the risk of Aphanomyces in Manitoba fields. The same project also screened newly crossed pea lines for the presence of DNA segments correlated to root rot resistance.

Laval University developed a technique to identify specific races of Phytophthora root rot in soybeans. MPSG uses the method supplied by a spin-off of the Laval project, to confirm if resistance reported

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by seed companies matches the race of pathogen present in Manitoba.

AAFC Lethbridge developed improved methods for screening peas for root rot resistance. The results emphasized that at present only partial genetic resistance is achievable.

University of Manitoba reported that members of the Fusarium family of pathogens that infect wheat also infect soybean and cause root rot.

Applied Research

STEPS FORWARD THROUGH APPLIED RESEARCH

Within the ag community, we've reserved the "applied" designation for a phase of projects that get us closer to the farm-gate solution. Most plant breeders and research agronomists practice their craft in this phase. MPSG has spent about $520,000 to date examining root rot through experiments in crop rotation, seeding systems, drainage effects, etc. The results inform fundamental research and shed light on the effect farm practices have on root rot. Because we often want to test many different practices at once, we use the efficient method known as "small-plot research." Due to the strong influence of soil and weather on crop disease, MPSG insists on conducting such studies at a range of locations. MPSG vigorously extends results of projects in this phase as most farmers find the results at least somewhat relatable.

Also, during this phase plant breeders will be handed information on resistance genes so they can create improved disease resistant varieties. As most people know, this can take a decade. Testing the staying power of genetic resistance requires intense screening across contrasting environments. Plant breeding is a combination of science and art as the eye of the breeder is as important a tool as any.

Members should know that MPSG is a relatively small contributor to the plant breeding phase of research. The reasons are a) our main crop, soybeans, is largely developed by the private sector, and b) dry pea breeding is conducted by publicly funded labs in Saskatchewan and Alberta – where the majority of pea production and pea research resides. In contrast, dry bean improvement is a significant element in MPSG's research portfolio. Leadership of the breeding program, including the search for root rot resistance, at AAFC Morden has recently been brought under the program at AAFC Harrow in Ontario.

AAFC Brandon has established that growing pea and soybean in rotation has no impact on root rot, at least in the short term. The work has set the basis for long-term experiments to gauge if farm practice has any bearing on root rot management.

Research from the University of Manitoba revealed that as a low residue crop, soybeans benefit from a higher residue preceding crop such as corn. There appears to be positive effect on soil health and the activity of N-fixing microbes.

University of Saskatchewan's pea breeding program managed to incorporate sequences of genes that impart partial resistance to Aphanomyces root rot into pea lines that also have desirable traits including semi-leafless leaf type, white flower colour, powdery mildew resistance, and round/smooth seed shape.

The MPSG/University of Manitoba Agronomist-in-Residence program is in the midst of an eight-year crop rotation experiment to determine if extending the interval between pea crops effects the severity of root rot.

Farm Scale Testing

FARM SCALE TESTING: PROOF OF PROGRESS

MPSG has an advanced ability to test new practices, varieties, and technologies on members' farms. For potential solutions to reach the farm scale testing phase, things had to go right in previous phases. Still, due to the financial risks involved, scaled up on-farm testing can verify a solution's practical value under specific soil and weather conditions and within a farm's limits of time, labour, equipment, and money. By this phase, there are usually only two or three solutions to compare. Generally, farmers want to know if the new option is superior to the previous standard. Contrasting varieties, chemical or biological treatments, and variations in rotation or soil management are excellent candidates for on-farm testing. About 40 per cent of MPSG's research budget is dedicated to on-farm tests.

Approaching 600 trials conducted across Manitoba, MPSG's On-Farm Network has acquired soil sampling and digital imaging tools to begin extracting more detailed information from trials on famers' fields. Over time this will include more comprehensive tracking of root rot in response to solutions developed through the phased approach to research.

Demonstration

SUCCESS? IT'S TIME TO DEMONSTRATE

Mostly reserved for improved crop protection products, varieties, or equipment, the demonstration of a scientifically proven solution is a key part of extension. Comparisons to a standard are often not required as the new option has already established its superiority in previous phases. MPSG is often found looking over the shoulder of members as they try solutions and apply their own subjective assessments. These experiences prepare our agronomists for the next cycle of phased research projects.

Since 2018 MPSG has partnered on nation-wide root rot projects worth over $10 million. That's about a 10-to-1 leverage of our growers' dollars with governments being a key contributor. We remain some distance away from solutions so work is expected to continue into the foreseeable future. ■

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STAFF UPDATE

Mikayla Melnick, B.Sc.

On-Farm Network Assistant

Meet Mikayla Melnick! Mikayla just finished her second summer season with MPSG and is looking forward to using her experience over the last two summers, along with her degree in biomedical toxicology, to expand her roles and responsibilities on our team.

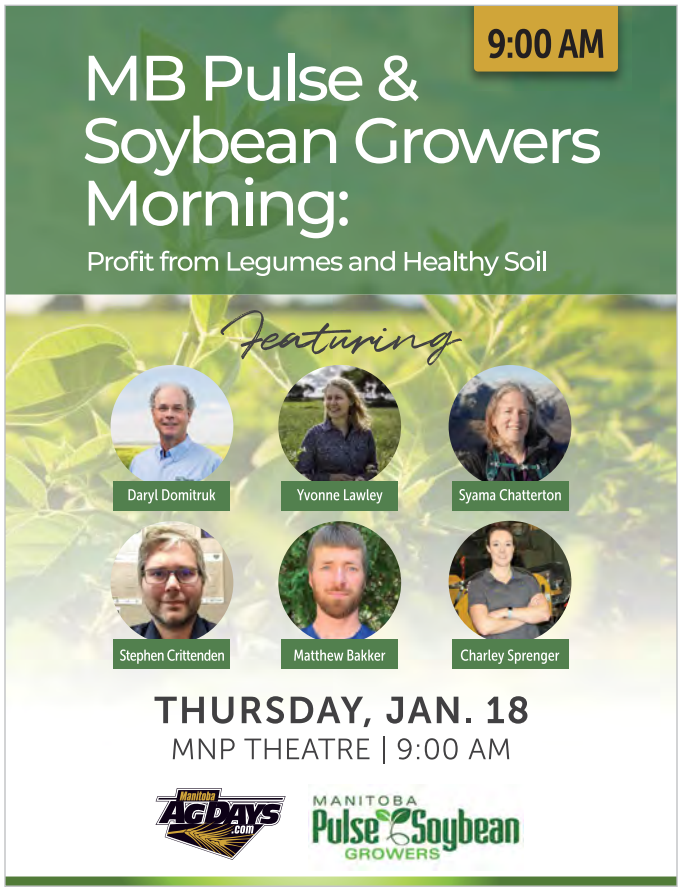

Photo provided by Chris

Christopher Forsythe, M.Sc. P.Ag

On-Farm Network Agronomist

Meet Christopher Forsythe. Chris grew up in Winnipeg, Manitoba. Directly after high school he began to work on his uncle's grain farm in western Manitoba where he developed a keen interest in farming and agriculture. After completing a bachelor of science in agronomy at the University of Manitoba he worked as a research agronomist at Monsanto in their breeding program. From there he completed a master of agriculture with a focus on agroecology at the Swedish University of Agricultural Sciences. After living in Scandinavia for the last seven years, and most recently working in vertical farming, he was ready to move back to Manitoba with his family. Chris's goal is to provide farmers with the best possible knowledge from the OFN trial results to empower them in making informed production decisions. His approach to agriculture is always holistic. He is interested in legume agronomy, soil-microbiology and the long-term sustainability of the pulse and soybean industry in Manitoba.

Email: chris@manitobapulse.ca Twitter: @OFNagronomist
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Bryan Cassone

MPSG RESEARCHER, BRANDON UNIVERSITY

Better yields through early season disease detection

Matt McIntosh, farmer and writer

DETECTING AND TREATING crops for diseases can be an uphill battle. Bryan Cassone, professor and chair of Brandon University's Department of Biology, has been researching ways soybean growers can get a head start.

With funding from MPSG, Cassone started developing an early season disease detection method in 2016. The intention – to achieve a much higher level of success in identifying disease pressure and doing so early enough to prevent yield loss.

As Cassone describes, disease-causing microorganisms in soybeans can cause drops in both yield and quality. While Manitoba growers have experienced comparatively smaller yield reductions from pathogens, the need for more accurate and faster identification is growing as disease pressures themselves change.

"Most disease prevention involves looking at symptoms in the plant. Studies show this isn't really an accurate way of doing it, maybe hitting a 30 per cent success rate on a good day. That's wildly inaccurate. You might as well not do it," says Cassone. He adds diagnoses, even when accurate, often occur when significant damage has already been incurred. If crops could be diagnosed accurately before physical signs of infection appear, growers could proactively implement much more effective control measures.

The intervening years saw the development of a diagnostic tool capable of identifying a wide range of common soybean pathogens within about one day of tissue submission.

"What we did was harness genetic sequencing and develop a method of identifying diseases without any knowledge of them visually…We can now test soybean plants for most of the major diseases without seeing symptoms. It's very quick and a cheaper way to do it," Cassone says.

"Most labs have the infrastructure to do this. We would like to do this in house but we need to know there is enough demand before putting up the resources."

Disease identification and prevention are not the only projects on which Cassone has partnered with MPSG. Wireworm marking, for example, offers another case of a historically benign problem for Manitoba soybean growers, albeit one necessitating more attention in recent years.

"The thing with wireworm is there hasn't been much work on them because they were effectively controlled by lindane. Then the product was banned. Wireworms blew up in numbers and became a concern for some growers," says Cassone.

"We characterized species of wireworms throughout Manitoba, learning a lot more about its basic biology and optimizing ways to survey them. That's important for control. We also recently published the first semi-field study trying to figure out the actual damage capacity wireworms have in soybeans. There appears to be a lot more damage potential than we previously thought."

In the future, Cassone and his colleagues hope to expand the capability of their pathogen diagnostic tool to include additional geographies – the tool has already proven effective in Manitoba and Ohio, and there's no reason to think it can't work elsewhere – as well as a wider range of crop diseases. Additionally, he hopes there will be opportunity harness mRNA tools to incorporate disease and pest resistance directly into more crop varieties. ■

Soybean field in Manitoba. Bryan Cassone and his colleagues hope to expand the reach of their pathogen diagnostic tool to areas outside of Manitoba and Ohio. Photo credit: Toban Dyck

Robbie Misko BOARD MEMBER

Building on a family legacy of service in Canada's agriculture sector

Matt McIntosh, farmer and writer

SERVICE AND COMMUNITY involvement have long been a feature of Robbie Misko's family. Joining the Manitoba Pulse & Soybean Growers (MPSG) board in early 2023, Misko hopes to build on that legacy by supporting the organization in its government outreach and research efforts.

The Misko family – that's Robbie, his parents, and two sisters – operate a pea, canola, and wheat farm in the province's Parkland region. While Robbie's sisters largely manage seeding and combining, he and his father, Robert, manage logistics, fertilizer and chemical inputs, and other tasks. Misko's involvement with MPSG follows his father's diverse and long-standing involvement with various institutions and organizations, including Manitoba Wheat and Barley Growers Association, Manitoba Crop Alliance, Cereals Canada, and local municipal governance.

"I joined the MPSG board at the second meeting of the year. It's my first time sitting on a board for an agriculture organization. We do mostly peas, so I'm coming at it from that side of things. We're hoping to see what research can be done in terms of yield or even chemical wise," says Misko, reiterating the limited number of chemical treatments that can be used in pea production is a constant challenge. Regarding yield, he hopes the organization's research efforts continue exploring how different varieties could increase production potential.

Misko currently sits on the board's marketing and development committee and the research and communications committee. Despite only attending a handful of meetings as of November 2023, Misko says his board colleagues have been doing a good job staying on top of the many agronomic and farm policy issues.

"They try and push government policy to be better for farmers. We're hoping to get government to realize that, with fertilizer and other inputs, every farm is different," he says. "Our farm is a clay loam, and if you go five kilometres east, it's more sandy loam, if not more sand then clay. You need a lot more rain in that area to produce the same crop. Even farms within the same land area have completely different soils, land topography, and even weather. We can't have blanket policy."

On the marketing side, Misko says 2023 appears to be similar to the previous year – that is, little substantial change in end markets for peas. As with oilseeds and buildup of crush capacity across the prairies for canola, however, he recognizes market development is often a longer-term game. He adds MPSG's Scouting Network is an initiative of particular interest and highly valuable for growers trying to account for regional differences in soil, weather trends, and other factors.

"You actually see in your area what that treatment does in your area, in this weather. It's good information to have, so that down the road you can look up your area and make more informed decisions." ■

> *"...farms within the same land area have completely different soils, land topography, and even weather. We can't have blanket policy."*


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Removing Market Barriers, Strengthening Pulse Trade in India

PULSE CANADA

Greg Northey, Vice President, Corporate Affairs, Pulse Canada

AS HARVEST 2023 concludes, pulse growers across Western Canada are putting in the hours necessary to get their crop ready for export to over 140 markets around the world. While the focus on the farm is getting the crop in the bin, staff at Pulse Canada are focused on several priorities to advance the growth of the sector and drive value back through to the farm gate.

As you know, our industry has invested three decades into nurturing our relationship with India, and has worked diligently and constructively for the past 13 years with successive governments towards a free trade agreement. The Early Progress Trade Agreement (EPTA) held much promise, providing a framework for the next 30 years of pulse trade between our nations.

In September, progress towards an EPTA was effectively halted. With diplomatic tensions between Canada and India high, there was no longer an appetite on either side to work towards closer trading ties.

This news was incredibly disappointing to our industry. There is no doubt that this recent strain, along with some aggressive pricing out of Australia, has put downward pressure on red lentil prices for Canadian growers over the last month. While it is true lentil shipments to India in September were not disrupted, grower prices have dropped since mid-September. Bottom line – this kind of uncertainty is not good for Canadian pulse growers and our overall ag economy.

As India is Canada's largest market for lentils, Pulse Canada has taken several steps to ensure trade is impacted as little as possible:

- Pulse Canada has maintained close contact with the federal government, including the minister of agriculture and the minister of international trade, advising on how to keep pulses out of the retaliatory crosshairs. We believe diplomatic disputes should be resolved by diplomats and they should not impede the ability for countries to trade.
- Pulse Canada has been actively engaging to ensure the federal government understands the value to Canada's pulse industry in repairing relations with India as soon as possible.
- Pulse Canada continues to send strong signals through our business-to-business relationships with organizations, companies, and customers in India to assure them that the Canadian pulse industry is 100 per cent committed to its pulse partnership with India.

Thanks to the work of growers and the trade, for over 20 years Canada has been the largest supplier of pulses to India, and we know everyone is prepared to do the work that will ensure this remains true for the next 20 years as well.

Our efforts to rebuild and strengthen this crucial trade partnership are a top priority. We are working diligently to resolve trade issues, improve market access, and demonstrate our commitment to the Indian market. Furthermore, we continue working to diversify the market for Canadian lentils, taking steps to enhance the reputation of Canadian pulses, reinforcing our commitment to quality and sustainability in new high-value markets around the world.

While Pulse Canada has been working to remove market barriers for the value chain, growers have had to navigate new criteria for applying lambda-cyhalothrin. After a re-evaluation decision from the Pest Management Regulatory Agency (PMRA),

continued on page 15

Rebuilding and strengthening the trade partnership with India remains a priority for Pulse Canada. Picture of red lentils. Photo credit: Toban Dyck

Before the Plate: Manitoba Farmer Profiles

Each week, Great Taste of Manitoba profiles a Manitoba farmer in Before the Plate, a video series introducing the farm families and agricultural communities that work tirelessly to produce the local ingredients featured in the Great Taste of Manitoba cooking show.

"Growing Together"

Farmers: Mark and Dawna

Specialty: Grains, Oilseeds, Pulses

Region: Central

MARK AND DAWNA both studied agriculture at the University of Manitoba and worked in the agribusiness sector before deciding to return to their farming roots. Their passion for agriculture has rubbed off on their three boys, Kyle, Todd, and Brad, who are all actively involved in farm work. They grow cereals, oilseeds, and soybeans on their fourth-generation family farm. They are passionate about growing soybeans because they believe in the environmental benefit of having a diverse crop rotation. Never growing the same crop on the same field more than once every four years reduces weed and pest pressures, which in turn reduces their reliance on crop protection products. Soybeans are also in a class of plants called legumes. Legumes turn nitrogen from the air into fertilizer, therefore reducing the amount of fertilizer that needs to be added to the soil.

Mark and Dawna enjoy sharing their agronomy knowledge with others through their seed and input business. They believe in the value of science-based research, and they share the results of their field scale research with their customers. This ensures they match the right crop with the right acre so that what's planted can be harvested with as much success as possible. They are a part of a community of passionate growers who aim to make responsible choices when it comes to producing crops, and they are proud to feed those locally produced crops to their own family.

Watch it here: **greattastesmb.ca/farmers/growing-together/** ■

continued from page 14

the latest label for lambda-cyhalothrin indicates that crops treated with lambda-cyhalothrin cannot be used as livestock feed in Canada. As any crop entering the grain handling system is eligible for use as livestock feed, this poses a risk of becoming an off-label use. To provide growers with the tools needed to navigate this landscape, Pulse Canada teamed up with Cereals Canada and the Canola Council of Canada to promote the Keep it Clean program. In addition to digital and print communications, a webinar was held in advance of harvest to update growers and agronomists on the latest tips and tools to protect the marketability of Canada's canola, cereal, and pulse crops. As exports ramp up, ensuring our crops meet the requirements and needs of key customers worldwide remains a top priority.

Earlier this summer, the federal government brought into force an 18-month pilot program to re-introduce extended interswitching for Western Canadian shippers. Pulse Canada played a key role in advocating for this policy and ensuring it made its way through the legislative process. Expanding access to competitive rail services means Canadian shippers will have the option to achieve efficiencies, reduce costs, and enhance connectivity through market competition. This improvement is vital for grain farmers and businesses of all sizes, enabling them to deliver their products and services more effectively to Canadian and international customers.

The temporary nature of extended interswitching has raised concerns among pulse crop producers. The uncertainty surrounding its future inhibits long-term planning and investment, which are crucial for the growth and stability of the industry. Pulse Canada's advocacy for making extended interswitching permanent aligns with its commitment to fostering a competitive and efficient transportation network that benefits all stakeholders.

Of course, to maintain Canada's reputation as a reliable shipper of grain, the entire supply chain must be firing on all cylinders. The strike that plagued western ports this July was a prime example of how vulnerable the system can be. It is estimated that for each day the ports were closed, it would take an additional week to clear the backlog. While it is positive that an agreement was reached, attention must now be focused on the outstanding agreements with workers at ports and railway lines across Canada. Pulse Canada continues to advocate in Ottawa for the government to take a more proactive stance on facilitating agreements long before the notion of a strike becomes a reality. Our message is that Canada's economy is far too important to be held hostage by a single component of the value chain.

Pulse growers can expect updates on these and other issues as we enter 2024. If you have any questions on any of the initiatives we undertake on your behalf, please do not hesitate to get in touch with me at **gnorthey@pulsecanada.com**. ■


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Resilience Takes a Village SOY CANADA

Brian Innes, Executive Director, Soy Canada

FOR MANITOBA SOY, we're living in a time of resilience where strong demand and on-farm performance are nurturing growth and delivering profitability. Coming off record soy yields in 2022, 2023 is showing us the value of resilience.

For Canadian soy, resilience is something we're seeing right across the country, whether soy is the mainstay of the rotation or a new addition.

Resilience in demand for protein, edible oil, and soy for food manufacturing is delivering continued opportunities for farmers and the whole value chain. We're seeing this from local processors in Manitoba and North Dakota, as well as from export opportunities overseas.

At Soy Canada, we work with the ingredients of resilience every day. They are visible in the work we do on market access, our work to develop markets, and our work to link the value chain together so that all segments are coordinated and can make the best decisions for their own operations.

On market access, we're seeing resilience because of a major re-opening of the growing Vietnamese market in September that had been shut to Western Canadian soy since 2019. With Vietnamese soy crush capacity doubling and strong demand for non-GM and food-grade soy continuing, renewed ability to export free of unworkable weed seed tolerances creates new export opportunities.

The path to reopening the market was winding and took a significant step forward with our February 2023 Indo-Pacific mission to Vietnam. Alongside our exporters and producers, including John Preun from St. Andrews, MB, we met with our import partners to explore how we could resolve challenges with creeping thistle that had blocked our market. Many meetings followed and we were pleased to shepherd a solution that works for all crops farmers grow by collaborating with Pulse Canada, Cereals Canada, and the Canola Council.

On market development, we're seeing resilience because of new research into northern soybean quality revealing that the animal values northern soy differently than how we traditionally measure soy quality using crude protein. In partnership with Manitoba Pulse and Soybean Growers, our second Northern Soybean Summit in November brought together the latest research, grain handlers, soy

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Soy Canada's delegation visiting Dabaco's soybean processing plant near Hanoi, Vietnam. Photo Credit: Supplied by Soy Canada

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Meeting with Dabaco vice chairman Thao Khac Nguyen and his team at their headquarters in Hanoi, Vietnam, Soy Canada delegation members on the right consisting of John Preun, farmer from St. Andrews, MB; Tyler Denham, Snobelen Farms; Albert Lee, Embassy of Canada; Brian Innes, Soy Canada. Photo Credit: Supplied by Soy Canada

processors, and the feed industry. Our work to increase the value of northern soy produced by Manitoba farmers continues.

And we're also seeing resilience with strong interest in expanding food-grade soy in Manitoba to meet export opportunities for manufacturers of soy foods like soy milk and tofu. While Canada represents only about three per cent of global soy production, we are world leaders and have a significant market share of specialty food-grade soybeans.

Soy Canada is seeing this increased interest with a dramatic growth of food-grade varieties from Manitoban soybean variety trials submitted to our testing program at Agriculture and Agri-food Canada's Harrow Research and Development Centre. In addition to protein, food manufacturers are often interested in free sugars, sucrose and oligosaccharides, and other factors that determine processing performance. The 2023 variety trials saw a 44 per cent bump in the amount of food-grade samples submitted to the program, a sign that our seed developers and exporters are increasingly interested in increasing the amount of food-grade soy produced in Manitoba.

Our work to support food-grade variety testing across the country helps put new varieties in the hands of farmers quicker – varieties that our seed developers and exporters are confident will meet the needs of food manufacturers that have very specific requirements.

As we look to the future, our focus is firmly on what we know is appearing on the horizon. We're seeing continuing competitive and market access threats to our exports. We're seeing a continued need to knit together the entire value chain from seed developers, farmers, grain handlers, and processors. We're seeing a continued need to share our sustainable production practices with our customers, including having strong data on our carbon intensity for feed manufacturers and biofuel producers.

We see all of this because Manitoba farmers invest their check-off in Soy Canada. It's a future that promises more resilience, and hopefully, continued growth and prosperity of the crop in the rotations of Manitoba farmers. ■

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Seed Innovation: Gene Editing

The transformative impact for Manitoba's pulse and soybean Farmers

Toban Dyck, writer and farmer

THIS YEAR, THE Canadian Food Inspection Agency (CFIA) released updated guidance regarding gene-edited crops. The new guidance arrived to a happy, albeit impatient, audience that anticipated its contents and was biting its tongue waiting for Canada to green light a regulatory morsel that has already been approved in much of the world.

According to the Canada Grains Council's website, "Gene editing is a relatively new method plant breeders can use to make precise, targeted changes to a plant's DNA. This process mirrors what can happen in nature or through traditional plant breeding, but in a more efficient way."

Until this guidance came out, breeders involved in gene editing were subject to the same rigorous protocols and regulatory roadblocks as those involved in creating genetically modified organisms (GMOs), resulting in exponential cost increases and lengthy market-readiness timelines. Gene-edited crops are still subject to regulatory oversight, but it's more aligned with other non-GMO processes.

"Gene editing is a game changer for plant breeders, no matter which crop they are working on," says Krista Thomas, vice president of trade policy and seed innovation at the Canada Grains Council, emphasizing the role of gene editing in expediting the breeding process and yielding crops with enhanced disease resistance and stress tolerance, higher yields, and improved agronomic performance. This revolutionary technique mirrors natural processes and traditional plant breeding but does so with unprecedented efficiency.

"Take certain pulse crops, for example, where breeders often want to reduce antinutrients. Gene editing can make this process quicker and more precise," she says. This targeted approach not only expedites the development of crops with desired traits but also enhances precision, ensuring a more predictable and reliable outcome.

Pulse crops, in contrast to corn, soy, and canola, have not been subject to GMO-type modification. Because of this, there is concern that they could be losing ground to other crops in their productivity and market attributes. Gene editing provides a way for pulses to preserve their non-GMO status while accomplishing critical steps in genetic improvement in a faster, more efficient manner.

In May of this year, China granted its first approval of a gene-edited soybean variety, a move made, in part, as it increasingly leans on science to increase its food production. The soybean in question has two modified genes that raise the plant's level of oleic acid, a healthy fat. Another case comes from Brazil, where Embrapa Soybeans used Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) technology to deactivate lectin, an antinutritional factor, in soybean DNA.

In September, Canadian researchers used gene editing to improve the aroma, fatty acid, and flavour profiles in yellow peas – also a first-of-its-kind breakthrough.

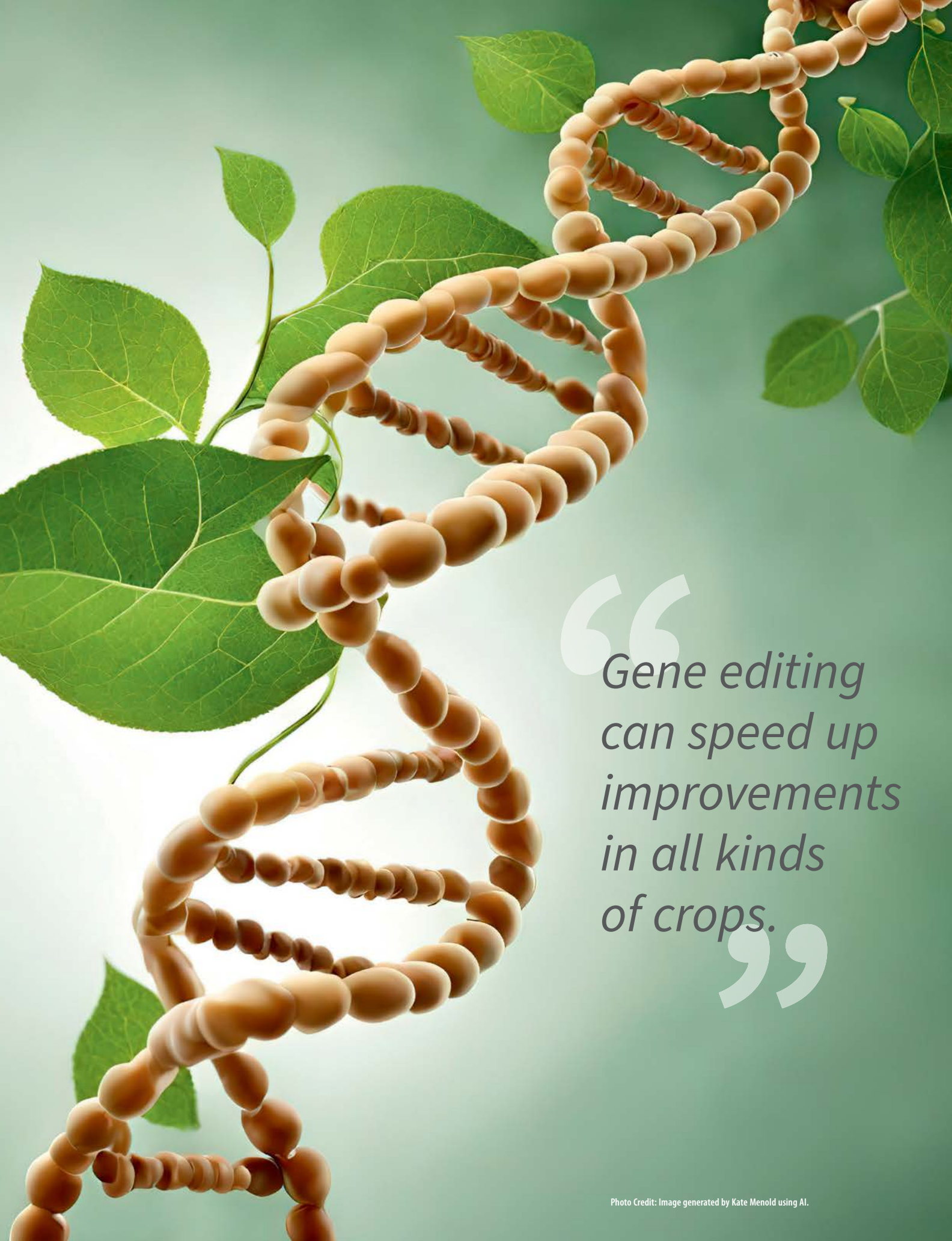
Thomas clarifies that plants developed through targeted editing of their own DNA are not GMOs. "They are indistinguishable from traditionally bred plants," she says. This clarification becomes paramount as the term "GMO" typically refers to plants containing foreign DNA from a different species.

"Gene editing can speed up improvements in all kinds of crops," she notes. This is a crucial advantage, considering that traditional biotech methods often face challenges due to the slow and expensive nature of navigating complex global GMO regulations. In contrast, gene editing presents a more straightforward path to market in most countries, promising a quicker and more cost-effective route for introducing innovations.

The economic impact of gene editing extends beyond its benefits for regulatory efficiency. Thomas emphasizes that the technology not only addresses challenges in developing transgenic varieties but also benefits conventional breeding in Canada. She also notes the positive impact on research funding and the overall attractiveness of Canada as a breeding ground for innovation. This is especially timely, as many companies and researchers have been moving their funding and expertise to countries with innovation-friendly regulatory environments.

In the context of regulatory advancements, Thomas highlights the significant progress made globally regarding the treatment of gene-edited plants. "Compared to five years ago, we have much better regulatory clarity about how plants developed using gene editing are going to be treated," she says. The international consensus recognizes gene-edited plants as distinct from GMOs, paving the way for a more efficient regulatory process.

Manitoba Pulse & Soybean Growers' sister groups – Pulse Canada and Grain Growers of Canada – have been supporters of Canada Grains Council's efforts to facilitate regulatory advancements in Canada, such as the transformative potential of gene editing. However, although gene editing offers great precision, researchers still need to know what genes to look for. This research takes a lot of time. As a result, continued investment in research to identify gene targets is required. Farmers in the province can anticipate a future characterized by faster, more accurate breeding processes, enhanced crop traits, and sustained innovation. ■



Gene editing can speed up improvements in all kinds of crops.

Photo Credit: Image generated by Kate Menold using AI.

What North Dakota Crush Capacity Means for Manitoba Soybean Growers

Greater capacity across North America a net positive for oilseed growers

Matt McIntosh, farmer and writer

IN ANTICIPATION OF continued growth in demand for soybean meal and biofuels, North Dakota has recently expanded its soybean crushing capacity with a facility capable of processing 150,000 bushels of soybeans per day.

North of the border, Canadian soybean industry representatives see the development as a net positive for soybean growers in Manitoba. And with the right policies, Manitoba could help feed the American crush facilities while simultaneously developing domestic processing capacity.

INCREASED DEMAND FROM LIVESTOCK SECTOR

Opening in September of 2023, the Green Bison soybean processing facility in Spiritwood, North Dakota, is the state's only dedicated soybean crushing facility. A joint venture between ADM and Marathon Petroleum, it joins two existing ADM plants that handle canola, sunflowers, and a variety of other processing oilseeds including soybeans. Once running at full-steam, the facility will produce 600 million pounds (approximately 272 million kilograms) of refined soybean oil and 1.28 million tons of soybean meal annually.

According to Stephanie Sinner, executive director of the North Dakota Soybean Council, the hope is that the significant addition to the state's crush capacity will enable the region's soybean producers to fill two growing markets – meal and oil – in addition to the already well-established whole soybean market in China, Vietnam, Taiwan, and the Philippines.

"North Dakota is and will continue to be an exporter of whole soybeans through the Pacific Northwest ports. We've not had dedicated crush for soybeans in the state ever. Now we will also have soybean meal to export, although the hope is we will use that soybean meal domestically as a ration ingredient for livestock," says Sinner.

"There's definitely a concerted effort to expanding livestock operations in the state. Our hope is species that consume soybean meal as part of a regular ration will be able to access a locally grown and sourced ingredient. Pork, poultry, and dairy is what comes to mind. For Northern grown soybeans, they tend to be lower in crude protein. But when you look at the overall quality package of the soybeans, we tend to be higher in essential amino acids, which is critical to livestock diets."

SOYBEANS KEY TO FUEL EMISSION TARGETS

As ADM and Marathon Petroleum highlight, the Green Bison facility will also be critical in helping states and cities across the United States reach emission reduction goals through biodiesel. Indeed, Sinner says demand for biodiesel and other renewable fuels is enormous and comes at a time when North Dakota farmers are significantly expanding soybean acres. Soybeans are proving to be both profitable and a good rotational fit.

"Putting biodiesel into the pipeline is a way to very quickly get those states and cities to those clean air standards," she says, adding the current Environmental Protection Agency mandate for renewable fuels – 20.94 billion gallons for 2023, and 21.54 billion in 2024 – are well short of what oilseed growers could supply.

"The demand is there for fuel, which means demand is there for the ingredients. That's the demand pull. We continue to see that going very strongly."

POSITIVE NEWS FOR MANITOBA GROWERS

In Manitoba, the number of soybean acres seeded has seen a general upward trajectory since the early 2000s. Particularly significant growth has occurred since 2013, with over 1.57 million acres planted in 2023.

Chris Vervaet, executive director for Canadian Oilseed Processors Association, says while actual acres planted in soybeans continues to vary year-over-year due to environmental conditions – growers are less likely to plant soybeans when conditions are very dry – the overarching upward trend and generally good yields means Manitoba could potentially see investment in soybean crush capacity similar to what has been achieved for canola in recent years. Prairie provinces should continue to promote their tax credit programs to attract biofuel production.

"In the recent past, before we saw an increase in interest for renewable fuels, a big challenge was finding a home for soybean oil. Where was the soybean oil going to go, and go competitively, so it's not just finding a market to get rid of it?" says Vervaet, adding lower protein levels have also been a challenge to finding new markets, while logistical and labour issues are perennial considerations for any company looking to invest in the province.

Regardless of the challenges facing increased crush capacity in Manitoba, he considers developments south of the border to be positive news for Manitoba growers. With the addition of the Green Bison facility – as well as two other facilities proposed by North Dakota Soybean Processors and Epitome Energy – exports for processing to the United States could significantly increase cross-border trade.

"Only $7 million [worth] of soybeans were exported to North Dakota from Manitoba in 2022, compared to $838 million to the rest of the world – primarily China. This might change with soybean

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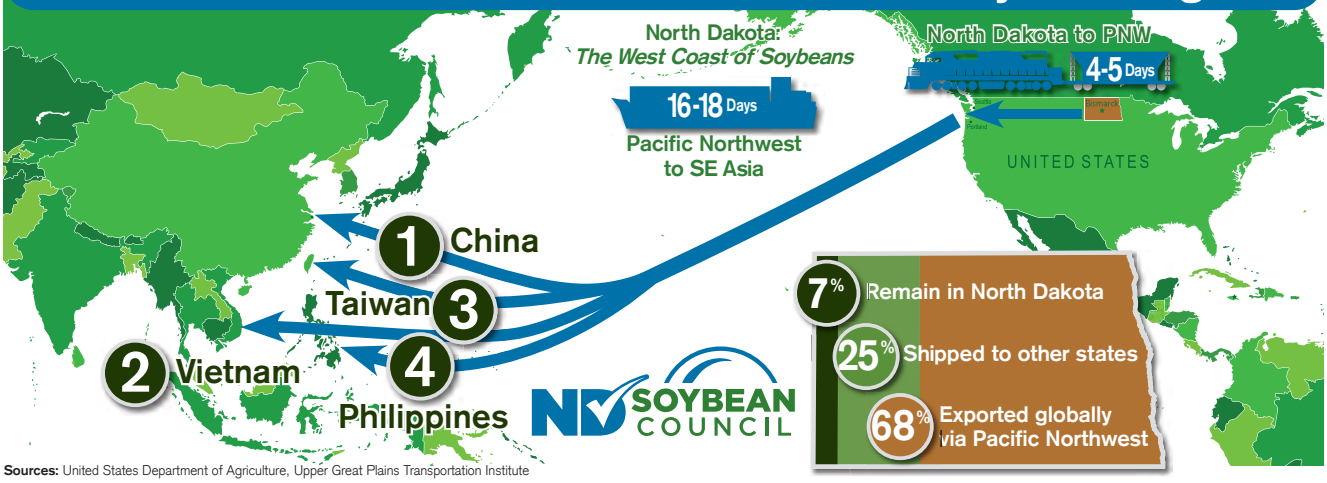
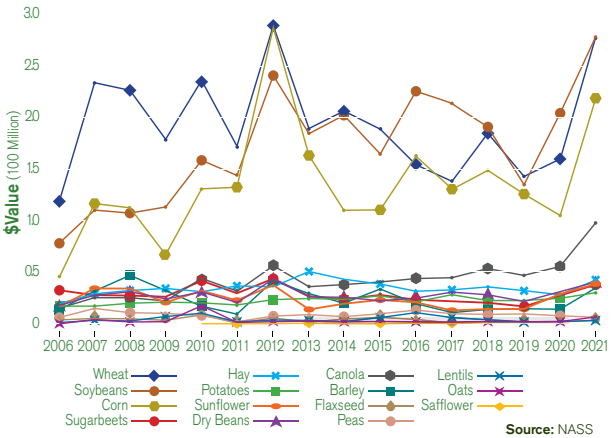
Where in the world do North Dakota soybeans go?



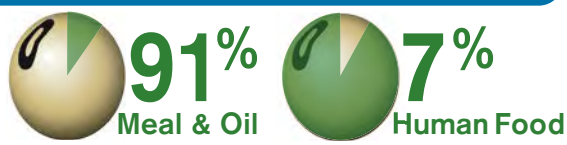
Sources: United States Department of Agriculture, Upper Great Plains Transportation Institute

Farmgate Value of N.D. Crops



Source: NASS

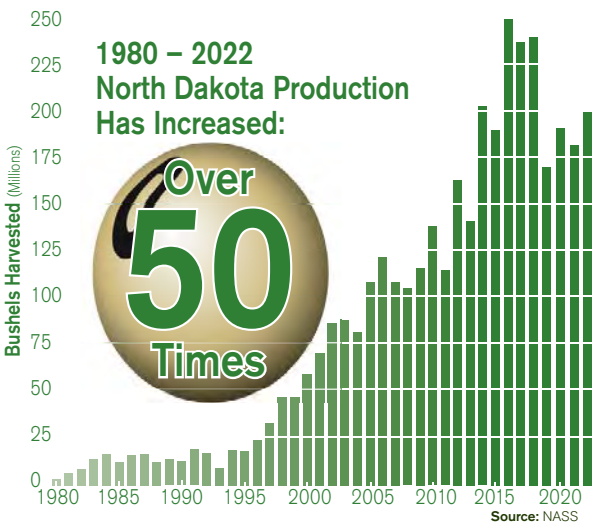
Primary Uses for N.D. Soybeans



- N.D. soybeans are exported as whole soybeans and processed overseas
- N.D. is the #2 exporter of whole U.S. soybeans

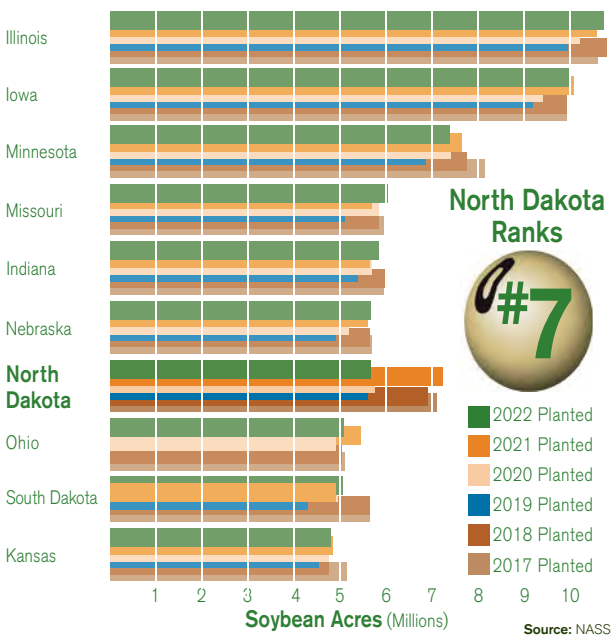
Source: North Dakota Soybean Council

North Dakota Soybean Production



Source: NASS

U.S. Soybean Acres



Source: NASS

North Dakota Soybean Council | ndsoybean.org | (701) 866-3423 | 4852 Rocking Horse Circle South, Fargo, North Dakota 58104

North Dakota 2022 Soybean Crop

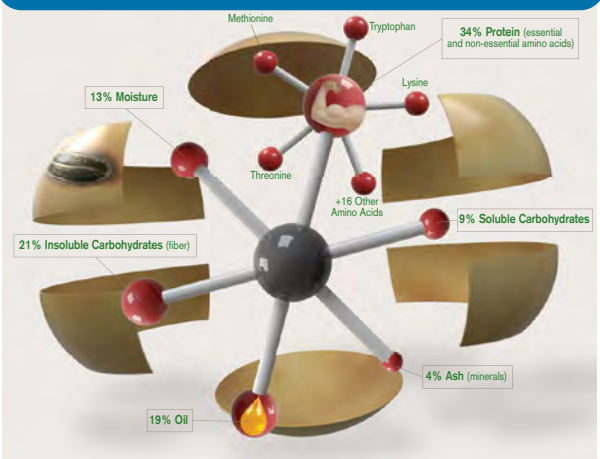
- North Dakota had **the top 2 soybean acreage** counties in the U.S. in 2022
  - — Cass County is #1 in the U.S. in acres planted and harvested; #3 in bushels produced
  - — Stutsman County is #2 in the U.S. in acres planted and harvested
  - — Richland County is #5 in the U.S. in acres planted and harvested
- North Dakota is #7 in the U.S. in total soybean acres planted and harvested
- Soybeans **planted**: 5.70 million acres, 2.31 million hectares
- Soybeans **harvested**: 5.67 million acres, 2.29 million hectares
- Average **yield/acre**: 35 bushels/acre, 2.35 metric tons per hectare
- Total **production**: 198.50 million bushels, 5.40 million metric tons
- 2020/2021 Market Year Average price per bushel: $14.00
- Crop Value: $2.78 billion
- North Dakota is the 8th largest soybean producer in the U.S. in total bushels

U.S. 2022 Soybean Crop

- Soybeans **planted**: 87.45 million acres, 35.39 million hectares
- Soybeans **harvested**: 86.34 million acres, 34.94 million hectares
- Average **yield/acre**: 49.5 bushels per acre, 3.33 metric tons per hectare
- Total **production**: 4.28 billion bushels, 116.49 million metric tons

Source: NASS

Soybean Composition



Soybean Transportation Scale Conversions

Cargo Capacity

110-Car Shuttle Train
12,100 Tons • 403,370 Bushels

Jumbo Hopper Car
110 Tons • 3,667 Bushels

Large Semi
27 Tons • 900 Bushels

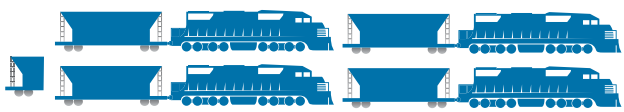
Panamax Freighter
57,000 Tons • 2,094,408 Bushels

Equivalent Units

4 Large Semi Trucks

=

1 Jumbo Hopper Car



5.2 110-Car Shuttle Trains

=

1 Panamax Freighter

Sources: Upper Great Plains Transportation Institute and Soy Transportation Coalition, unitedsoybeanboard.org and soyatech.com

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crush in North Dakota coming online," he says.

"What we see happening in North Dakota on the soybean crush side is what's happening throughout the United States. The expansion of crush capacity across North America is unprecedented. No matter where it is, if it's in North America, it's a good thing. It's more delivery options, supports farm gate values, and brings value added processing to rural communities. I think the icing on the cake is a lot of the interest in expansion is the interest in renewable fuels and decarbonizing fuels."

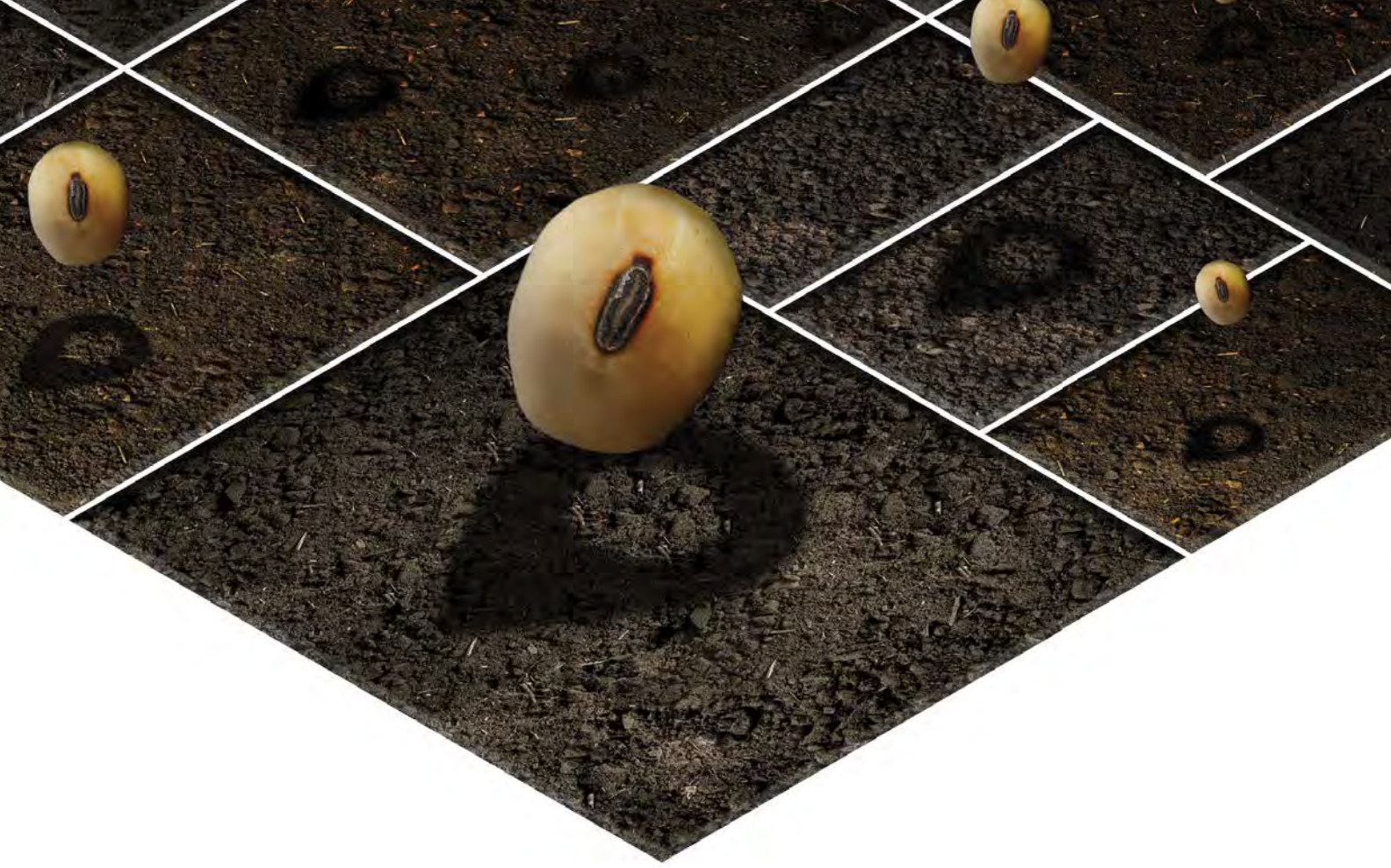
CONCERNS OVER POTENTIAL POLICY SHIFTS

Global demand for whole soybeans is so strong that Sinner believes "it's a good bet" they will increasingly become part of North Dakota's crop mix. Concerns over potential drops in other markets remain, however, despite expectations of continued increased demand for soybean meal and oil.

"On renewable fuels, it's the policies that get set which is the biggest unknown. We all know things can change quickly," she says. For this reason, the North Dakota Soybean Growers Association, and other industry groups, continue to advocate for strong biofuel mandates.

Vervaet expresses a similar sentiment.

"We always encourage governments, both provincially and federally, to consider making carbon intensity requirements more stringent," he says. "We view the federal Clean Fuel Regulation as being the biggest driver at a national level." ■



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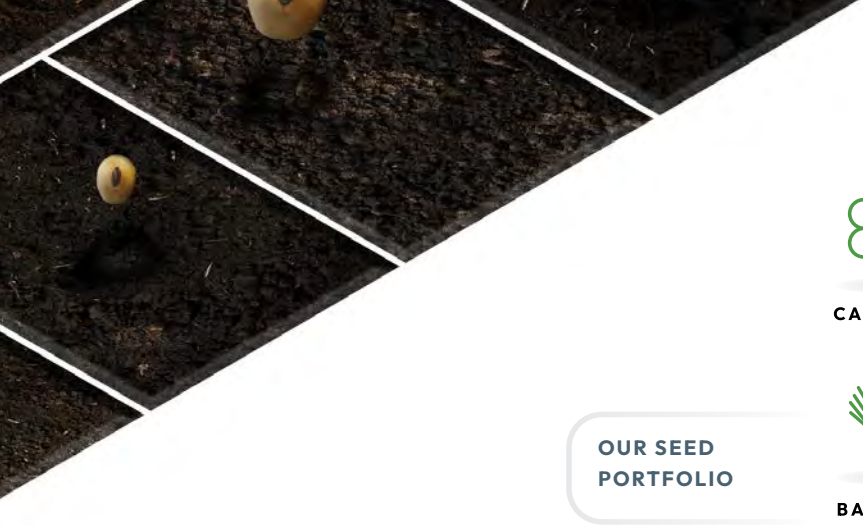

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But what exactly are inoculants, and why are they so crucial for pulse crops?

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The benefits of using inoculants are numerous.

Enhanced Nitrogen Fixation: Nitrogen is an essential nutrient for plant growth. Inoculants ensure a consistent and efficient supply of nitrogen, leading to healthier plants and higher yields. By harnessing the natural power of Rhizobia, you can reduce your dependency on synthetic nitrogen fertilizers.

Increased Crop Productivity: Improved nitrogen fixation means more vigorous plant growth, resulting in increased biomass and higher yields. By giving your pulse crops the nutrients they need, you can unlock their true potential and maximize your returns.

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Tailored Solutions: We understand that each field and crop is unique. Our team of agronomy experts works closely with you to recommend the right inoculant for your specific crop, soil type, and conditions, ensuring optimal performance and cost-effectiveness.

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Contact our knowledgeable team today to learn more about our extensive range of Proven Seed soybeans and pulse inoculant solutions. Together, let's grow a sustainable, productive, and prosperous future for your pulse crops.

Hail Damage Recovery in Soybeans

Comparing small-plot research results with in-field reality

Laura Schmidt, MSc, PAg, Production Specialist – West, MPSG

HAILSTORMS WERE SPORADIC and localized this season. While hail claims are still being processed at the time of writing this, roughly seven per cent of soybean acres were damaged by hail this growing season, above the usual average of five per cent. Soybean acres in the Central region were impacted the most, affecting 50,000 acres and damage recorded in Eastern, Interlake, and Southwest regions ranged from 14,000 to 15,000 acres.

SMALL-PLOT RESEARCH

The first comprehensive dataset evaluating the impact of simulated hail damage on soybean yield and maturity was developed for Manitoba. In this research, conducted by Kristen MacMillan, MPSG-UM Agronomist-in-Residence at the University of Manitoba, both defoliation and stem breakage were assessed in small-plot experiments at Portage and Minto from 2015 to 2018.

Results from this research, shown in Figure 1, indicate that short-season soybeans grown in Manitoba respond and recover differently than soybeans grown in regions farther south. Yield loss is both overestimated and underestimated at different growth stages and hail severities. The impact on maturity is also an important consideration, with severe amounts of stem breakage resulting in an 8-14 day maturity delay and severe amounts of defoliation causing a 3-4 day maturity delay.

Within each chart and soybean growth stage, bars followed by different levels are significantly different at $p<0.05$.

Full results from these comprehensive experiments may be found and explored in the annual reports available at **www.manitobapulse.ca/research/agronomist-in-residence/.**

Here, let's compare these results to a scenario we witnessed in the field this past growing season.

In The Field

Like many fields this summer, one of our On-Farm Network soybean trials was caught in the crosshairs of a hail and thunderstorm in late June. This trial received hail on June 28 and assessments of damage were made the following day.

These soybeans, which were flowering (R1-2) at the time, were left with one, two, or no trifoliate leaves remaining per plant, and one to two nodes were broken off at the top of the plant. Damage was fairly even throughout the field. Comparisons made to healthier plants near the shelterbelt estimated damage as 66 to 100 per cent defoliation and 20 to 40 per cent node removal/stem breakage on average. Luckily, very little plant stand loss was observed in the field, and plant stand remained at roughly 160,000 plants/ac.

What should we expect from this field moving through the rest of the growing season? To answer that question, we turned to the research.

On average, losing two-thirds of the leaves at R1 resulted in 16 per cent yield loss, while complete leaf loss caused 40 per

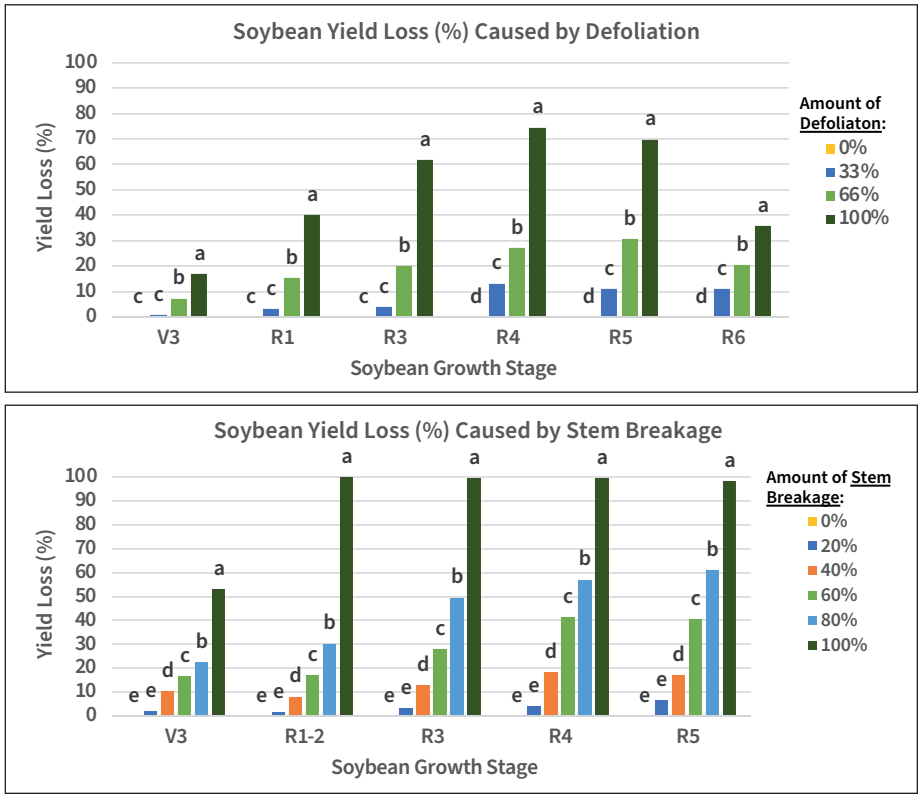
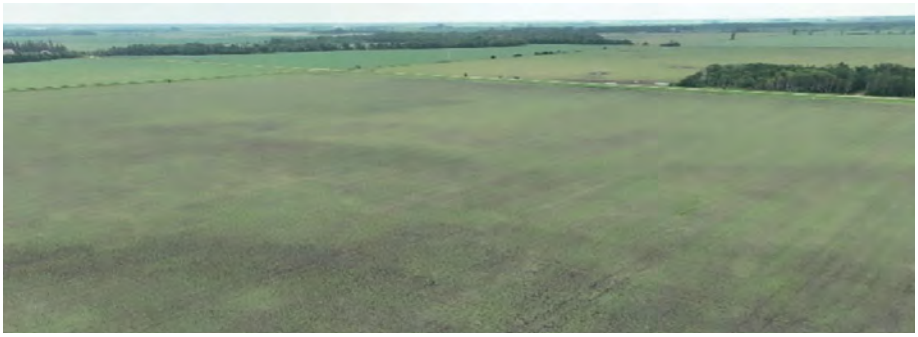


Figure 1. Average soybean yield loss (%) for varying defoliation (top graph) and stem breakage (bottom graph) severities at different soybean growth stages. (MacMillan, 2023).

Full results from these comprehensive experiments may be found and explored in the annual reports available at **www.manitobapulse.ca/research/agronomist-in-residence/.**



Soybeans the morning after a hailstorm on June 29 with few leaves remaining and broken stems. Photo credit: Laura Schmidt

cent yield loss in the small-plot research conducted at southern Manitoba sites. For stem breakage at R1-2, losing one node (20 per cent breakage) resulted in two per cent yield loss and eight per cent yield loss when two nodes were broken (40 per cent breakage). Add these numbers together, and we could anticipate yield losses of 18 per cent to 24 per cent for least damaged areas, and losses as high as 48 per cent for those beans hit the hardest.

The field was saturated following the storm, but there was no ponding water. Stems were partially shredded and there were concerns of diseases that might set in those open wounds. Another pass was made with the sprayer a few days following the storm to manage weeds like volunteer canola that had taken advantage of the extra room and sunlight to grow. With a wide-open crop canopy, the disease risk was ultimately deemed quite low.

Revisiting this field throughout the growing season showed the impressive capacity soybeans have to compensate in their growth through branching, number of pods per plant, and the number of seeds within those pods. On July 10, 13 days after the storm, soybeans in the field had reached R3 and regrowth was evident.

By mid-August, the crop canopy was thick with leaves, and plants were full of branches at R5-6. The only downsides were that these beans were about 12 to 14 inches tall and late-emerging weeds had taken advantage of those open spaces and the uncompetitive crop.

In terms of maturity, it looked like these hail-damaged soybeans were about 7 to 10 days behind other beans in the area. As the season progressed, that maturity delay became more apparent. Using the small-plot research results, based on the timing of hail and the severity of damage, roughly an 8 to 10 maturity delay would have been expected.

Come early September, plants were at R6.5 with 37 pods per plant and 2.7 seeds per pod, on average. Previous research by Kristen MacMillan has also outlined average yield components for Manitoba soybeans, finding 29 pods per plant and 2.3 seeds per pod on average. These hail-damaged soybeans compensated for the damage, in part, by increasing these two yield components.

A couple of weeks later and these soybeans needed some pre-harvest weed control. Heat and glyphosate were applied to manage the increased weed pressure. The field was harvested on October 19 at 15.5 per cent moisture, after some weather and equipment delays.

The million-dollar question, how did yields compare at the end of the season to yield-loss estimates?

The average soybean yield for the last five years in that region has been 34 bu/ac, according to MASC data. Estimating a whole-field average yield loss of 18 per cent to 24 per cent, we'd expect 26 bu/ac to 28 bu/ac out of this field. On the whole, the crop averaged roughly 42 bu/ac, with the on-farm trial area of the field pulling off an average 51 bu/ac. Oddly enough, that works out to 24 per cent above the area's yield average.

We wouldn't expect this scenario in every field or every year. Stars aligned for excellent soybean yield potential despite

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Soybean regrowth on July 10, two weeks after the storm. Photo Credit: Laura Schmidt

Soybeans recovered from hail by growing branches from healthy nodes and formed scabs under hail wounds. Photo Credit: Laura Schmidt

Soybeans on August 21, with a short, thick canopy of leaves and branches and increasing weed pressure. Photo Credit: Laura Schmidt

Hail-damaged soybeans on Sept. 8 had 37 pods per plant and 2.7 seeds per pod, on average. Photo Credit: Laura Schmidt

Weeds took advantage of the extra open space and sunlight in the field throughout the season. Photo Credit: Laura Schmidt

the hail damage. But this does showcase an impressive ability for soybeans to recover from damage at flowering.

Two other on-farm trials, near Elm Creek and St. Pierre, also received moderate to severe hail damage in early August when soybeans were at R5. We didn't follow those fields as closely throughout the season, but hail assessments were made. Near Elm Creek, 30 per cent defoliation was noted, along with some stem breakage. That trial averaged 40 bu/ac at harvest. And at St. Pierre, 75 per cent defoliation was noted, and the field averaged 19 bu/ac. At that site, moisture was a limiting factor for most of the season, impacting yield potential and plant recovery after hail.

MPSG's On-Farm Network strives to bridge the gap between applied small-plot research and the realities of what occurs at the field scale on farms across Manitoba. Hailstorms this season provided a unique opportunity for us to take a closer look at this research data on a broader scale. ■

On-Farm Network: A Decade of Farmers Performing Research

Laura Schmidt, MSc, PAg, Production Specialist – West, MPSG

on-farm network
PARTICIPATORY • PRECISE • PROACTIVE

2023 MARKS THE 11th year of on-farm research conducted by MPSG. Over 450 on-farm trials have been conducted in every region of Manitoba (Figure 1). More than 200 farmer members have received MPSG support to investigate the ins and outs of soybean and pulse agronomics and crop input products at field scale.

As shown in the pie chart (Figure 2), farmers' curiosity has focused on a select number of basic farm practices.

As soybean production in the province has evolved, so has the On-Farm Network. Figure 3 charts the evolution of our program as we respond to grower questions. Recently, we've taken another step to improve the usefulness of on-farm trials. Rather than simply evaluating the effect of practices and products on yield, now we dive deeper investigating the why of the yield results we're seeing.

What plant stands emerge from our tested seeding rates? How many plants survive to harvest? Are there row spacing impacts on weed pressure in the field? What disease dynamics are impacting fungicide trial results? Questions like these guided the direction of the research program.

To end this growing season, we added a new staff member to our MPSG team, Chris Forsythe. Chris has joined us as the next On-Farm Network Agronomist. We hope you'll say hi if you see him this winter! ■

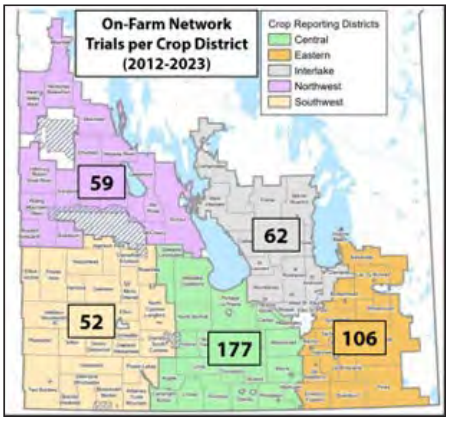

Figure 1. On-Farm Network trilas have followed soybean expansion over time

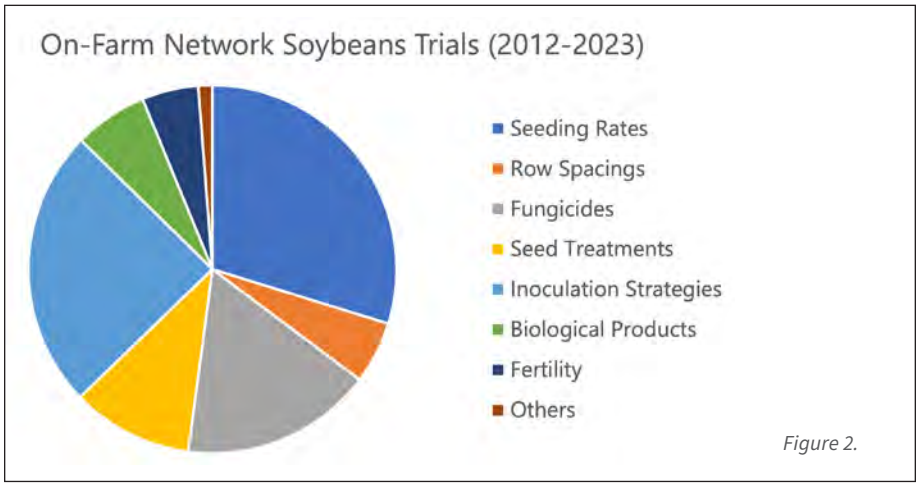

Figure 2.

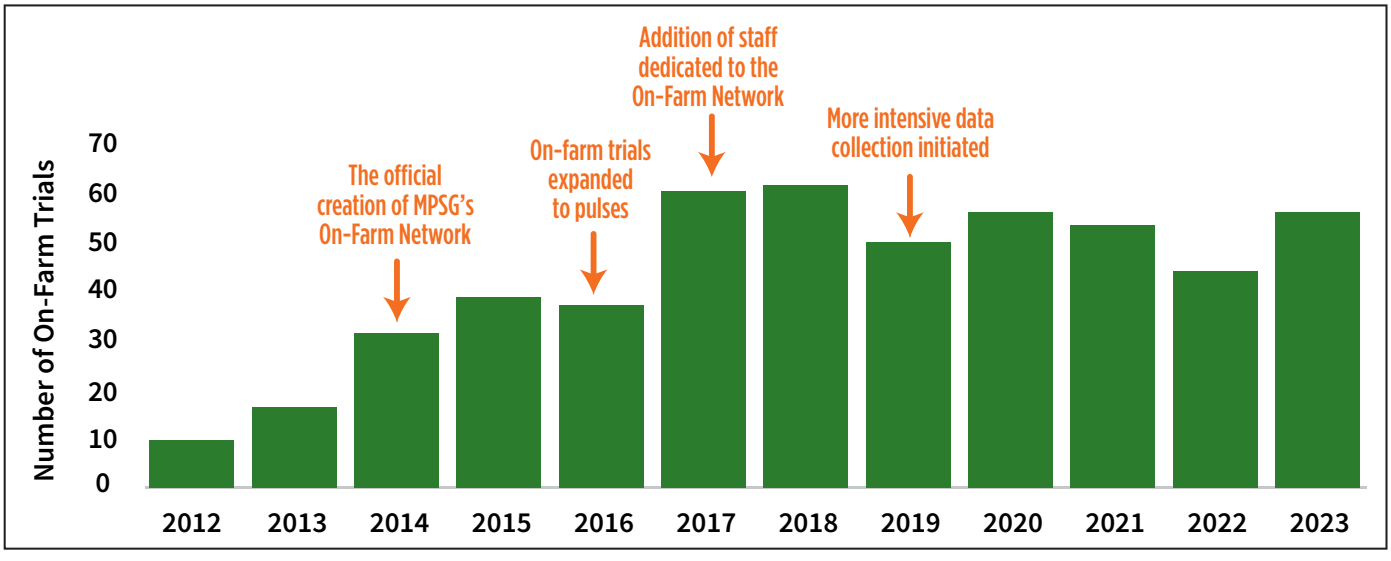

Figure 3. Timeline of MPSG's On-Farm Network trials

On-Farm Network: 2023 Results

Laura Schmidt, MSc, PAg, Production Specialist – West, MPSG

EARLY IN 2023, we set a goal of conducting 63 on-farm trials. Usually, we expect to achieve 80 percent of our goal. With some great support from growers we achieved 89 per cent of our goal with 56 trials established and monitored throughout the growing season.

We experimented with new software to keep our team connected throughout the growing season and to better keep track of field visits and what we were finding in the field. Through this enhanced surveillance, we gathered more than 1000 photos and logged more than 235 on-farm trial field visits among our four field staff.

We also added two more trial types to the line-up, pea seed treatment trials and dry bean inoculant trials. And we expanded the information we can gain from these fields by undertaking new initiatives to evaluate seed-borne diseases, fungicide resistance and surveillance for key soybean diseases. Learn more about the results from these new surveillance initiatives by scanning the Bean Report QR code on Page 13.

What did we see for yield results from our trials in 2023? Below is a quick synopsis. More information is available at manitobapulse.ca under the On-Farm Network tab, including how these 2023 results fit into long-term research results over the years.

SOYBEAN SEEDING RATE AND ROW SPACING

Thirteen seeding rate trials in soybeans found no changes in yield with changing seeding rates by 30,000 seeds/ac. Two trials looked into row spacings for soybeans, comparing 7.5 inches versus 15 inches and 15 inches versus 30 inches. Farmers found no yield differences across these contrasting row spacings. This confirms the long-held notion that soybeans have an impressive ability to compensate for spatial arrangement by adjusting the number of branches, pods, and seeds per plant.

SOYBEAN INOCULANTS

Seven trials compared double inoculation (granular in-furrow plus liquid on-seed) versus single inoculation (liquid alone). Four trials compared single inoculation to no inoculant. Among these 11 inoculation trials, there were no significant yield differences. In a field with sufficient soybean history, there is the opportunity to walk back the amount of inoculant used.

SOYBEAN "BIOLOGICAL" CROP INPUT PRODUCTS

Eight trials explored biological products, evaluating Fertiactyl (four trials), Envita (two trials), and humic acid (one trial) in soybeans. There were no improvements in soybean yield with these products in 2023. As a result, losses in profit ranging from $5 to $30/ac were recorded.

PEA SEEDING RATE

Two trials evaluated seeding rates ranging from 160 to 240 lbs/ac. There were no yield differences. Pea seeding rate trials have had us scratching our heads – we're not seeing yield responses despite testing plant stands as low as 3–4 plants/ft^2 on-farm. More investigation is required.

PEA SEED TREATMENTS

The new pea seed treatment trials took two forms – testing fungicide seed treatments to manage root rots and/or testing insecticide seed treatments to manage pea leaf weevil. Both products were compared to untreated seed. At these trials in 2023, root rot pressure was quite low, so there was no benefit to fungicide seed treatments. Insecticide seed treatment (imidacloprid) was evaluated at a trial near Roblin, which showed that while pea leaf weevil predation was the greater in untreated peas, the seed treatment did not result in a significant yield increase. These trials are in their infancy, and we're excited to learn more as they continue.

on-farm network
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Soybean Trial Types	Number of Trials in 2023	Number of Trials 2012-2023
Seeding Rates	13	120
Fungicide	2	68
Double vs. Single Inoculant	7	57
Single vs.No Inoculant	4	42
Row Spacings	2	22
Biological Products	8	26
Total	36	402

Pea Trial Types	Number of Trials in 2023	Number of Trials 2016-2023
Seeding Rates	2	9
Seed Treatments	2	2
Fungicides	9	53
Total	13	74

Freshly combined soybeans from a 2022 MPSG On–Farm Network tiral being transferred from a weigh wagon to a truck. Weigh wagons are used to gather data on the crop's bushel weight so OFN technicians can calculate the trial's yield.
Photo credit: Laura Schmidt

Dry Bean Trial Types	Number of Trials in 2023	Number of Trials 2016-2023
Nitrogen	1	6
Inoculants	4	5
Fungicides	2	19
Total	7	35

PEA FUNGICIDES

Across nine trials comparing a single application to leaving the field untreated, yield was improved on three occasions by 2.8 to 12.6 bu/ac. Yield responses were related to the amount of Ascochyta/ Mycosphaerella blight recorded in the crop after application, where the fungicides acted to reduce the severity of the disease and the number of plants with stem infections. Where yield increases were observed the fungicide more than paid for itself.

DRY BEAN INOCULANTS AND N-FERTILIZER RATES

In dry beans, contrasting inoculant products were tested at four trials. No yield responses were found. One trial comparing four nitrogen fertilizer rates failed to show a yield response. Importantly, neither the inoculants nor the different fertilizer rates had any effect on root nodulation.

It's clear farmers facing decisions on crop inputs and other agronomic practices can lean on on-farm tests to guide their thinking. MPSG continues to hone its abilities help farmers carry out these important tests. For more details on these trials including long-term summaries, visit manitobapulse.ca and check out the 2023 On-Farm Network Results Summary. ■

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Seed-Borne Disease Testing after a Pea Fungicide Trial

This spring, when we were looking to clear out last year's harvest samples, we asked ourselves: Is there more information we can glean from these samples? With fungicide trials, the answer was clear – we have not yet evaluated the impact a fungicide application (or two) may have on the amount of seed-borne disease carrying over to the next growing season. This is a valuable consideration.

Composite seed samples from treated versus untreated strips of pea fungicide trials were sent for testing. When comparing single application versus none for 2022 trials, seed-borne Ascochyta infection was present in 83 per cent of trials (five out of six trials) and infection ranged from 0.5 to 10.5 per cent (average 4.3 per cent). At three trials, a single application of fungicide reduced the amount of seed-borne Ascochyta to 0 per cent at three out of six trials. Comparing two applications versus one in 2022 found seed-borne infections at 57 per cent of trials (four out of seven trials) ranging from 0.5 to 5 per cent (average 2.2 per cent) and the second application of fungicide reduced infection at every trial where the disease was present.

In 2023, seed-borne Ascochyta was present at 71 per cent of trials tested so far (five out of seven trials), ranging from 0.5 to 3.9 per cent infection (Table 1). A single application of fungicide (versus none) reduced the amount of seed-borne Ascochyta at every trial where it was present in 2023. Two trials near Swan River, comparing two applications versus one, have yet to be processed.

Table 1. Percentage of seed-borne ascochyta found in post-harvest seed samples from 2023 pea fungicide trials evaluating a single fungicide application vs. none.

SEED-BORNE ASCOCHYTA (%)				
Trial	**Nearest Town**	**Single Fungicide Application**		**None**
PF01	Dauphin	0.8		3.9
PF02	Roblin	0		0.5
PF04	Elm Creek	0.1		0
PF06	Notre Dame	0		0.5
PF07	Stonewall	1.0		1.5
		Product 1	Product 2	None
PF03	Sperling	0	0	0
PF05	Altamont	1.0	0.1	2.3

A field of soybeans experiencing spring runoff after being forced to overwinter on a farm near Morden, Manitoba. Researchers are working on developing soybean varieties meant to thrive in Manitoba's unique and diverse growing conditions.
Photo credit: Toban Dyck

FEATURE

The Pursuit of a Soybean Variety as Adaptable as a Manitoban

Toban Dyck, writer and farmer

“ We have to build into our varieties more resilience than we're doing now.”

YOU AND I, we’re good at some things. I can perform Walk the Dog with a yo-yo, for example.

But I am not good at predicting whether we should focus on soybeans tolerant of drought or excess moisture. Farmers, the ag industry, and plant breeders want soybean varieties that are drought tolerant when the late-season rains don’t come. The same bunch – of which I include myself – want soybean varieties that can handle excess moisture when we see our beans sitting in puddles for extended periods.

We may be talking about this all wrong. We may not actually want a variety that can do one or two things very well. What we want, more likely than not, are plant varieties that are able to adapt to various conditions, and plant varieties that can do many things well.

Breeding adaptability and versatility into soybean the varieties that Manitoba farmers have access to is no easy task, and it involves attention to detail at every stage along the innovation pipeline of bringing a new crop to market.

“Now what we're not breeding for – and it's likely because we haven't had to – is varieties that are capable of changing,” says Malcolm Morrison, an oilseed physiologist with Agriculture and Agri-Food Canada (AAFC). “A variety that one year can tolerate drought, the next year might have to tolerate flooding.”

Morrison cites the increasing and more severe manifestations of climate change as the basis for plant breeding efforts to focus on developing plant varieties that can sense and interpret environmental cues and adapt to them.

As Manitoba works to find and secure its unique identity as a soybean-growing province, it should take seriously the plant breeding challenges scientists are committed to identifying and meeting.

“Farmers are going to see hot, dry conditions one year,” says Morrison. “And, you know, the following year, abundant moisture and flooding in the spring. We have to build into our varieties more resilience than we're doing now. But, it's not an easy thing to do. It requires that one can model the crop to address the question, for example, when – if there's a prolonged period of moisture stress – does that occur and what is it likely going to affect? I would say that we need people that can look at models and then physiologists that can see how environment interacts with the genetics.”

The lack of adaptable varieties is a barrier to Manitoba or, more generally, Western Canada reaching a watershed, breakthrough moment in its soybean-production trajectory, but it is one hurdle of many.

One of the common misconceptions in Manitoba is that the province is situated on the northern threshold of soybean-growing potential. This, however, is not the case, according to Kevin Baron, a research

scientist with Solum Valley Biosciences and a partner in N49 Genetics.

"People think we're pushing the northern frontier of where soybeans can be grown," says Baron. "But soybeans are actually grown in Siberia, Northern China and Sweden, a few places further north from a latitude perspective."

Another hurdle is the way variety traits are being communicated to farmers. Growers may already have access to seed with increased levels of stress tolerance. They are just not being told about them.

"I do believe there is stress tolerance – hidden stress tolerance – in the germplasm growers have now. We just need to characterize it better," says Baron. "We get Iron deficiency chlorosis (IDC), but I don't think there's anything else communicated to growers at this point about a variety's tolerance to drought, salinity stress, or excess moisture. We could be giving growers information that there is material [varieties] out there that by happenstance has stress tolerance genes."

Where breeders have accessed and screened germplasm is also a consideration to take seriously. As Baron

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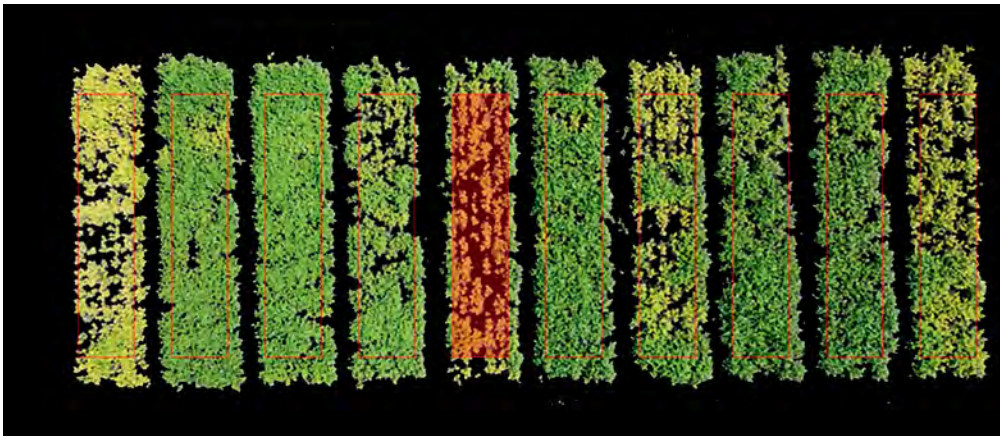

Digital image analysis of commercial soybean varieties tracking canopy coverage and leaf greenness scores of the most IDC tolerant and IDC susceptible material available to soybean growers.

Photo Credit: Supplied by Kevin Barron.

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points out, and this has been written about in previous issues of *Pulse Beat*, soybean research relevant to regions of Manitoba has been done in the U.S. on IDC-prone soils similar to our own.

Some of this research has led to the development of varieties with strong IDC tolerance , and some of these traits have been available in the north central US market for up to 40 years.

"If multinationals such as Syngenta, Pioneer (Corteva), or Bayer, evaluated material from their Minnesota or Iowa testing programs a little further north, they would probably be at a strategic advantage here with respect to IDC," says Baron. "Regarding drought tolerance, you could look to breeding programs in Arkansas or North Carolina for experience on drought and water use efficiency traits in soybean. In several cases, researchers in these geographies establish field trials in sandy, drought-prone soil to evaluate soybean lines and nitrogen fixation, and this is an approach that could be adopted locally."

Baron's company is about five years out from bringing a new soybean variety to market, and it is doing so by subjecting lines to a series of managed stress environments. Using both field trials and indoor growth rooms to mimic Manitoba growing conditions, Baron's company identifies the most stress tolerant material. "Every year, we can go into a growth room after sampling soil from these ugly 'stressful' field sites with IDC or salinity issues and use that to make genetic gains outside of the Manitoba growing season. If the environments are controlled or managed to generate severe stress, then the selection intensity is high and we can see differences amongst lines, selecting only the top performers," he says. "And that's how they're able to keep making genetic progress. When mother nature doesn't provide us with an annual, regular, and repeatable stress test, we intervene to make sure the selection pressure is there."

Soybean yields were spotty in 2023, the result of a multitude of factors. Farmers are used to characterizing the yield discrepancies they see across their farms in terms of rainfall, but it's more than that.

Field S007-Y4 Soybeans in the Red River Valley. Photo credit: Toban Dyck

Like many things, the devil appears in the details.

Some research out of the U.S. suggests that planting soybeans earlier, achieving rapid row closure, and extending the period for root systems to develop could be an effective way of ensuring the plant has moisture when it needs it and isn't as reliant on the mid- to late-season rains Manitoba farmers have grown accustomed to.

Root systems can play an important, incremental role in a soybean plant's ability to endure stress. According to Baron, the exploratory nature of varieties with fibrous root systems may allow them to extract more moisture from the topsoil earlier in the growing season.

"Some of them have a deeper rooting depth," adds Baron. "So that when a mid-season drought comes along, they're already accessing more water."

There is no silver bullet when it comes to the development of the perfect soybean variety for Manitoba and/or Western Canada. Baron confirms this in our interview. He is in the throes of the breeding process, and he shared three areas of focus in their variety development program:

1. **Getting it right – finding the right combination of genes for yield and maturity that fits the target geography. Focusing on Manitoba soils and the stress tolerance of belowground processes that limit yield potential on marginal soils, cold and wet soils, or in response to drought, salinity, or IDC.**
2. **Root systems – developing a good root system early in the season and pairing this trait with supporting traits that enable soybeans to "beat the heat" during hot and dry spells. For example, selecting lines capable of accessing soil moisture deeper in the profile but also possess canopy wilt traits to conserve moisture and avoid defensive leaf flipping.**
3. **Nitrogen fixation – for yield and protein production, being cognizant of the relationship between nitrogen fixation, photosynthesis, and overall plant performance and plasticity under favourable and stressful environmental conditions. In pairing varieties with inoculant strains or formulations, are we selecting the best combination to perform under multiple scenarios?**

"There are many variables to consider," says Baron. "It's a matter of managing them as best you can and paying attention to the details most important to your commercial field or target environment."

Manitoba is on the right path. It's a province still relatively new to the soybean market, and it is still finding its footing in it. Rest assured, with minds like Baron's and Morrison's and the work MPSG is doing on its own, with collaborating researchers, and with its sister organizations like Soy Canada, Manitoba will find its place in the global market. The potential seems far from tapped and the incremental gains researchers are making could and should be celebrated. ■

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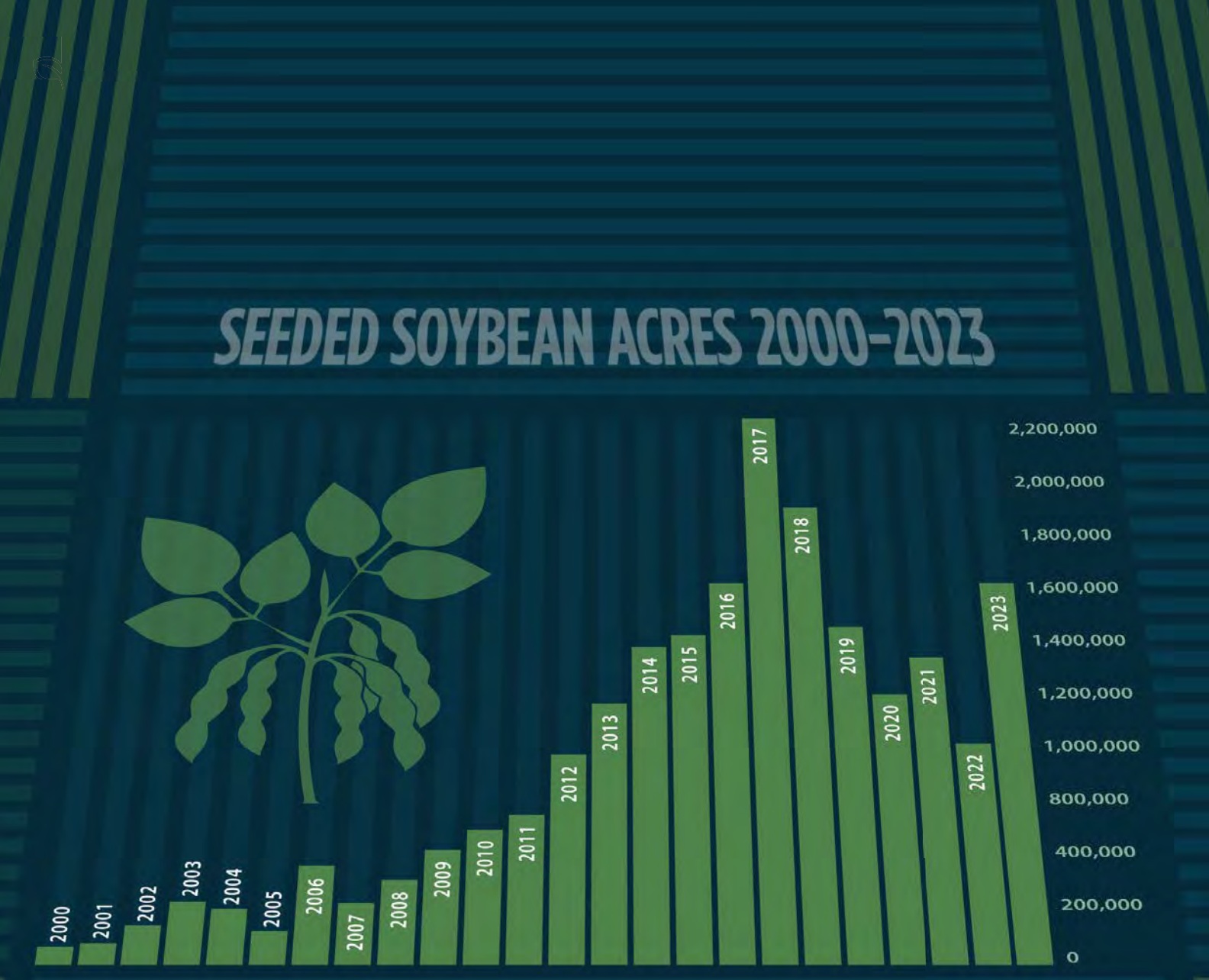
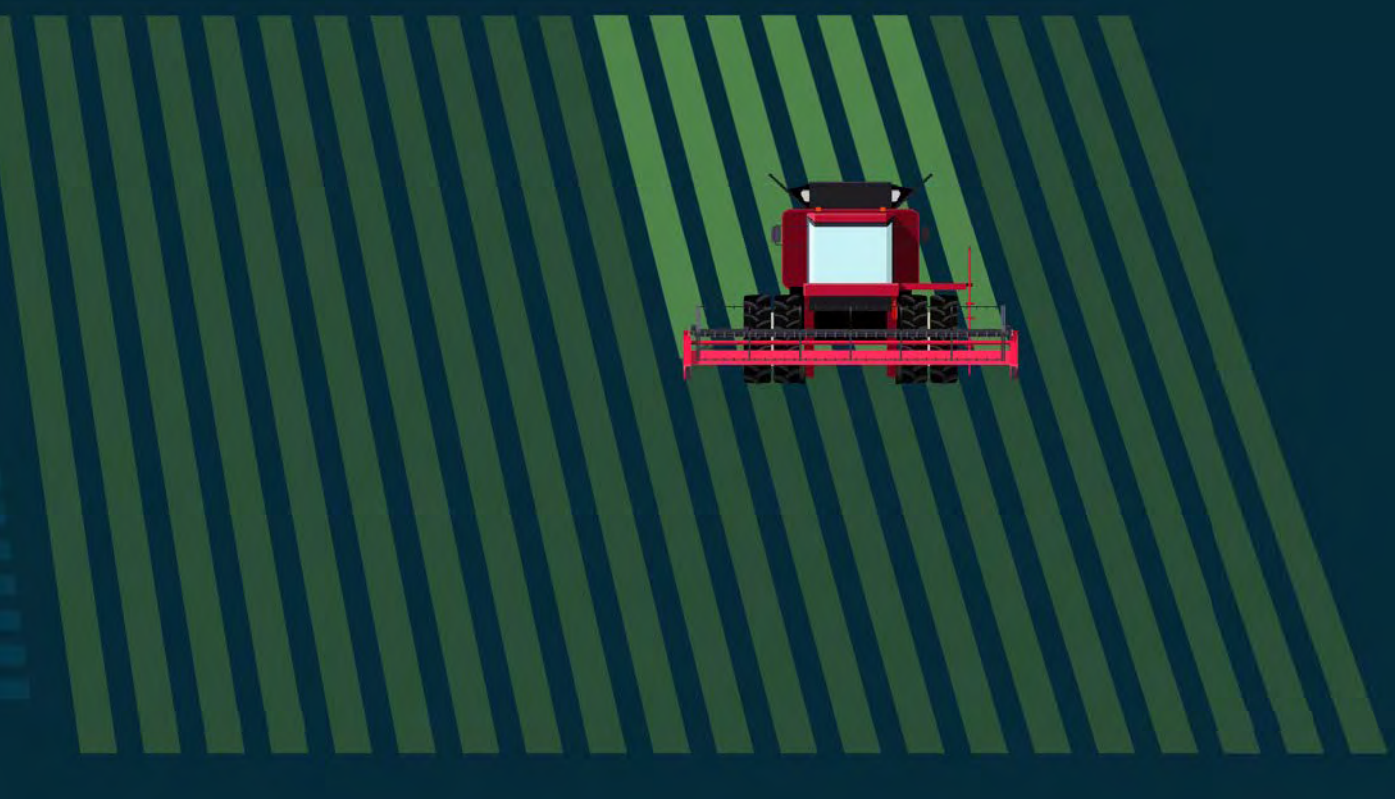


Charting Soybeans *in Manitoba*

THIS GRAPH SERVES as a crucial tool for Manitoba Pulse & Soybean Growers (MPSG) to understand the dynamics of soybean acres planted in the province over time. Analyzing the fluctuations in soybean acres allows us to prioritize your investments in research, extension, and market development.

This information helps us explain and be transparent with the management and governance decisions we make. For example, while acres still fluctuate, we've proposed moving our financial year-end from Dec 31 to July 31, allowing us to use seeded acreage reports from MASC to get a clearer picture of our revenue for the year and how that revenue is best allocated to serve our farmers.

This graph is part of our ongoing commitment to presenting information related to pulses and soybeans in easy-to-consume and clear formats. ■



RECIPE CORNER

Black Bean Brownies

Courtesy of MPSG

SERVINGS: 9 | PREP TIME: 25 min | COOK TIME: 20–25 min | TOTAL TIME: 45–50 min

Ingredients

¼ cup (60 mL) unsalted butter, melted

2 oz (60 mL) semisweet baking chocolate, melted

2 eggs

2 tsp (10 mL) vanilla

1 19oz-can (560 mL) black beans, drained, rinsed and dried

¾ cup (175 mL) brown sugar

⅓ cup (75 mL) flour

⅓ cup (75 mL) cocoa powder

½ tsp (2 mL) salt

½ tsp (2 mL) baking soda

2 tsp (10 mL) instant coffee powder

⅔ cup (150 mL) chocolate chips

Method

1. Preheat oven to 350F (175C). Grease 8- or 9-inch square (20- or 22-cm square) pan.
2. After draining the black beans, spread them out on one layer to dry them before putting them in the blender.
3. In blender, add beans, eggs, vanilla, melted butter, and melted chocolate. Blend until smooth.
4. In large bowl, combine flour, sugar, cocoa powder, salt, baking soda, and coffee powder.
5. Pour bean mixture into bowl with flour mixture and fold together. Add chocolate chips and stir until combined.
6. Pour into prepared pan and smooth the top.
7. Bake for 20–25 minutes or until toothpick inserted in centre comes out clean.

GREAT Tastes OF MANITOBA

White Bean Tomato Stew

Courtesy of MPSG

SERVINGS: 6–8 | PREP TIME: 25 min | COOK TIME: 30 min | TOTAL TIME: 55 min

Ingredients

2 Tbsp (30 mL) canola oil

1 medium onion, diced

6 cloves garlic, minced

1 tbsp (15 mL) ginger, minced

1 lb potatoes (about 3–4 medium potatoes) (454 g), cut into 1/2" pieces

2 carrots, chopped

1 19 oz-can (560 mL) white beans, drained and rinsed

1 28 oz-can (830 mL) crushed tomatoes

2 tbsp (30 mL) tomato paste

½ cup (125 mL) peanut butter

1 tsp (5 mL) cumin

1 tsp (5 mL) coriander

1 tsp (5 mL) salt

¼ tsp (1 mL) cayenne powder

½ tsp (2 mL) ground pepper

1 ½ tsp (7 mL) dried thyme

4 cups (1 L) water or stock

2 cups (500 mL) spinach

Method

1. In large pot or Dutch oven, heat oil over medium heat. Add onion, garlic and ginger and sauté until onion is beginning to soften, about five minutes. Add tomato paste and spices and stir until well combined and fragrant, about two minutes. If the spices are sticking to the bottom of the pot, add 1–2 Tbsp of water (15–30mL).
2. Pour in water/stock and add carrots, potatoes, beans, peanut butter, and tomatoes. Bring to a simmer at medium-high heat. Lower heat to maintain simmer. Continue cooking for 25–30 minutes or until potatoes are tender. Stir occasionally.
3. Taste at the end, add salt if necessary. Add spinach and stir until wilted.

Serve with rice and naan bread, if desired.

GREAT Tastes OF MANITOBA

Manitoba Pulse and Soybean Buyer List – September 2023

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 licencing 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 crops in Manitoba. The word registered does not imply endorsement. The complete list is available on our website manitobapulse.ca.

COMPANY	EDIBLE BEANS	FABA BEANS	LENTILS	PEAS	SOYBEANS	PHONE	LOCATION	CGC REGULATED
Adroit Overseas Enterprises Ltd.	√	√	√	√	√	604-930-4855	Surrey, BC	√
Agassiz Global Trading	√			√	√	204-745-6655	Homewood, MB	
Alliance Pulse Processors Inc. dba AGT Foods Canada	√	√	√	√	√	306-525-4490	Regina, SK	√
All Commodities (AC) Trading Ltd.			√	√		204-339-8001	Winnipeg, MB	√
Avena Foods Ltd. dba Best Cooking Pulses Inc.			√	√		306-586-7111	Rowatt, SK	√
Bayer - Crop Science Monsanto Company					√	314-694-5764	St. Louis, MO	
Belle Pulses Ltd.		√		√		306-423-5202	Bellevue, SK	√
Besco Grain Ltd.		√		√		204-745-3662	Carman, MB	√
Brett-Young Seeds Ltd.				√	√	204-478-2204	Winnipeg, MB	
Broadgrain Commodities Inc.	√	√	√	√	√	416-504-0070	Toronto, ON	√
C.B. Constantini Ltd.	√	√	√	√		604-669-1212	Vancouver, BC	√
Cargill Ltd.					√	204-947-0141	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, NE	√
Global Food and Ingredients Inc.	√	√	√	√		416-840-8590	Toronto, ON	√
Hensall District Co-operative Inc.	√			√		204-750-0529	Winnipeg, MB	√
Horizon Agro Inc.					√	204-746-2026	Morris, MB	√
Kalshea Commodities Inc.			√		√	204-488-0251	Winnipeg, MB	√
Knight Seeds			√		√	204-764-2450	Hamiota, MB	
Linear Grain Inc.	√	√		√	√	204-745-6747	Carman, MB	√
Lyft Commodity Trading Ltd.	√	√	√	√	√	604-355-4275	Vancouver, BC	√
McDougall Acres Ltd.	√	√	√	√	√	306-693-3649	Moose Jaw, SK	
Natural Proteins Inc.				√		204-223-7020	Winnipeg, MB	√
Nutri-Pea					√	204-355-5040	Blumenort, MB	
NuVision Commodities Inc.				√		204-239-5998 x 108	Portage la Prairie, MB	
Parrish & Heimbecker Ltd.	√			√	√	204-758-3401	St. Jean Baptiste, MB	
Paterson Grain				√	√	204-987-4329	Winnipeg, MB	√
Prairie Fava Ltd.	√			√	√	204-956-2090	Winnipeg, MB	√
Prairie Premium Products Inc.			√			204-721-4715	Glenboro, MB	√
Providence Grain Group				√		204-252-2940	Portage la Prairie, MB	
PS International, LLC dba Seaboard Special Crops			√	√	√	780-997-0211	Fort Saskatchewan, AB	√
Richardson International Ltd.		√	√	√		306-565-3934	Regina, SK	√
• Richardson Pioneer Limited			√	√		204-934-5652	Winnipeg, MB	√
• Tri Lake Agri Limited				√	√	204-934-5627	Winnipeg, MB	√
Roquette Canada Ltd.				√	√	204-934-5652	Winnipeg, MB	√
Rudy Agro Ltd.				√		204-428-3722	Portage la Prairie, MB	√
Scoular Canada Ltd.	√		√	√		306-867-8667	Outlook, SK	√
Seed-Ex Inc.	√	√	√	√		403-349-5077	Calgary, AB	√
Semences Prograin Inc.				√	√	204-737-2000	Letellier, MB	√
Sevita International					√	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	√
SureSource Commodities, LLC			√	√		419-891-6464	Maumee, OH	√
The Andersons Inc.		√		√		204-665-2384	Medora, MB	√
Vandaele Seeds Ltd.				√	√	204-745-6444	Carman, MB	√
Vanderveen Commodity Services Ltd.	√		√	√	√	Contact your local Viterra Sales Rep		√
Viterra Inc.	√					204-515-7331	Winnipeg, MB	
Western Harvest Bean ULC	√	√	√	√		403-328-3311	Lethbridge County, AB	√
Wilbur Ellis Company of Canada Ltd.	√			√		306-525-0205	Regina, SK	√
XPT Grain Inc.	√			√		306-525-0205	Regina, SK	√

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