MANITOBA Pulse Soybean GROWERS

pulsebeat

Issue 88 • Fall/Winter 2019

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Cover photo by Toban Dyck, MPSG

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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 4,400 distributed to farmers, government, researchers and industry involved in pulses and/or soybeans.

MEMBER PRIVACY POLICY

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

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

In This Issue

MANITOBA Pulse Soybean GROWERS

Notice of 2020 Annual General Meeting

NOTICE IS HEREBY GIVEN that a meeting of the members of Manitoba Pulse & Soybean Growers (MPSG) will be held during the CropConnect Conference

February 12, 2020
8:00 AM – 9:00 AM

Victoria Inn Hotel and Convention Centre
1808 Wellington Avenue • Winnipeg, MB

The purpose of the meeting is to

1. approve the minutes of the 2018 members meeting
2. receive the financial statements of MPSG for the current fiscal year
3. appoint the auditor of MPSG
4. receive the board chair and executive director's report
5. elect directors to the MPSG Board of Directors

CALL FOR DIRECTOR NOMINATIONS

Nominations to fill four seats on MPSG's Board of Directors opens December 25 and will close on January 23, 2020.

Are you interested in becoming a director?*
Would you like more information?

To obtain a 2020 Board of Directors Nomination Package, please contact Sandy • sandy@manitobapulse.ca

****You must be a farmer of pulse and/or soybean crops and in good standing with MPSG.***

NOMINATION COMMITTEE

- Hailey Jefferies – hailey@prairiefava.com
- Calvin Penner – pennergc@gmail.com
- Garrett Sawatzky – garrett.sawatzky@umanitoba.ca

Elections will be held at the MPSG Annual General Meeting February 12, 2020.

Manitoba Pulse & Soybean Growers 2019 Committees and Representatives

MPSG COMMITTEES – *The first named is chair*

Executive – C. Penner, M. Rattai, E. Sirski, J. Preun (non-voting), F. Labelle

Governance/HR – F. Prince, B. MacMillan, F. Labelle

Policy – H. Jefferies, B. Phillips, F. Prince (alt), F. Labelle, T. Dyck

Finance/Audit – M. Rattai, J. Preun, F. Labelle, M. Denys-Roulette

Resolutions and Nominating – H. Jefferies, G. Sawatzky, C. Penner

Communications/Member Relations/Market Development – E. Sirski, H. Jefferies, B. MacMillan, F. Labelle, B. Phillips, T. Dyck, S. Robinson, L. Schmidt, D. Domitruk

Research – F. Prince, B. Martens, M. Rattai, B. Phillips, J. Preun, G. Sawatzky, D. Domitruk, F. Labelle, S. Robinson, L. Schmidt, C. Tkachuk, W. Voogt, I. Kirby, M. Bourns, industry advisors

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

MPSG REPRESENTATIVES

Canadian Grain Commission Pulse Sub-Committee – F. Labelle, D. Domitruk (alt)

Grain Growers of Canada – B. Phillips, B. MacMillan (alt)

Keystone Agricultural Producers
- **General Council** – F. Labelle
- **Pulse/Oilseed Sub-Committee** – M. Rattai, F. Labelle (alt)
- **Commodity Group** – C. Penner, M. Rattai

MCVET – D. Domitruk, D. Lange

PGDC/PRCPSC – B. Martens, H. Jefferies, D. Domitruk, D. Lange

Pulse Canada – B. Martens, H. Jefferies
- **Sustainability** – F. Prince

Soy Canada – E. Sirski, M. Rattai

Western Canadian Pulse Growers Association
- **WGRF** – B. Dalgarno (MPSG) (exp. 2023)
- **CGC Western Grain Standards Committee** – E. Sirski (exp. 2021)

Message from Board Chair

Calvin Penner, Chair

IT'S BEEN A year to remember — one for the books. As I am writing this, I am staring out my window at a yard covered in snow. We just experienced a snowstorm for the record books. It was powerful, devastating and it came in the middle of harvest during what was already an unusually wet fall. The storm stalled my farm's operations just after we were able to get going again following heavy rains.

Who would have thought that the record dry on our farm would turn to record wet? I think even the most experienced weather observer would be hard-pressed to find a year with which to compare this one. Who would have thought we would be cutting grass one day and shovelling snow the next? Who would have thought this summer we would need to use the floodway to protect Winnipeg?

We're now harvesting soybeans amid the snow. That's a first for us. We're hopeful we'll be able to finish, but we're aware that not all farmers will be able to get their crops off this year. On behalf of Manitoba Pulse & Soybean Growers (MPSG), we wish you all the best dealing with these challenging situations and we urge you not to lose hope.

Mental health is a crucial element of farming and we strongly encourage you to familiarize yourself with the kinds of support available to you, so that when you need someone to talk to, you know where to go. There's no shame in asking for help. Everyone needs a boost now and then.

Manitobans have been pulled through two elections in close succession, neither of which had promising platforms for agriculture. It was disappointing. There were a lot of buzzwords used, but no party on the provincial side had a concrete action plan and no party in the federal election had one, either.

MPSG would like to congratulate Manitoba's new Minister of Agriculture and Resource Development Blaine Pedersen. We have already been in touch with his office and we look forward to working with him for the benefit of Manitoba's pulse and soybean farmers. We would also like to take this time to express our thanks to the former agriculture minister Ralph Eichler. We enjoyed a great working relationship with him and we wish him all the best as he tackles a new portfolio as Minister of Economic Development and Training.

It has been an interesting year for MPSG. We've seen a decline in soybean acres and have been pressured to do more with a tightening budget. We feel we've been doing a good job at this. Our staff have found ways to cut costs while maintaining MPSG's winning research and crop production standards. This is not easy. It requires constant evaluation and reevaluation, but, rest assured, we have good minds for such heavy tasks. You can be confident your check-off investment dollars are being put to good use.

We are encouraged by Pulse Canada's push to increase domestic consumptions of dry beans in Canada and their involvement in the national protein strategies that are unfolding as part of supercluster funding. MPSG has been part of these discussions, as we maintain relationships with our local pulse processors.

Soy Canada has a challenge ahead of them. China is a challenging topic. When they decided to stop buying our soybeans and canola, our markets were crippled. Soy Canada's Executive Director Ron Davidson has been very active on this file. We have full confidence in his ability to represent our soybean farmers on the international stage. MPSG board member Ernie Sirski is the current chair of Soy Canada and has done a tremendous job ensuring western Canada is represented.

We are continually encouraged by farmer uptake on our On-Farm Network program. This year, we had about 75 trials and that is anticipated to grow. Farmers have an interest in learning how to conduct their own research. I think this stems from their desire for access to independent research in a sector full of information compiled and distributed by private companies.

As you harvest in unusual conditions, I urge you all to stay safe, physically and mentally and maintain perspective on what matters in this life.

— Calvin ■

Soybean Scout

What is the cause of each stem lesion?

Answers can be found on page 46

A

B

Don't miss this year's soybean session!

Wednesday | February 12, 2020
11:30 a.m. – 12:10 p.m.

with
Dr. Roger W. Elmore
University of Nebraska-Lincoln

Soybean Inoculations: Strategies with Bradyrhizobium japonicum
Understanding the soil and plant mechanisms involved and applying the facts to your fields, with a closer look at inoculation strategies for "old" soybean ground.

CropConnect Conference 2020

February 12 & 13

Victoria Inn Hotel and Convention Centre
1808 Wellington Avenue, Winnipeg, MB

- **Two full days featuring more than 30 inspiring speakers**
- **A tradeshow with access to crop-specific information**

Early-bird Deadline for sponsors and exhibitors and attendee registration – January 10.

Banquet Speaker

Steve Patterson
Award-Winning Comedian & Humour Writer, host of CBC Radio One's wildly successful "The Debaters"

Keynote Speakers

Darrell Bricker
CEO of IPSOS Public Affairs & Expert on National/ International Trends

Dr. Brynn Winegard
Award-Winning Professor and Expert in Business-Brain Sciences.

Chris Hadfield
Astronaut, First Canadian Commander of the International Space Station (2013)

visit **cropconnectconference.ca** for details and times!

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Message from Executive Director

François Labelle, Executive Director

THE AORTIC DISSECTION I suffered earlier this year was a shock — a setback — but I have been able to rehabilitate well and I have thought a lot about 2019, the year that was and the year where a lot changed. I'm sure everyone would like to see agriculture become more stable than it has been. Even a few years ago, all was good — prices, markets, production cycles with large crops. The sentiment was that farming is good and it's going to stay good forever. This has not been the case. Weather, climate, markets, governments, margins and technology have all been anything but stable this year. What will next year bring us?

CLIMATE AND WEATHER

Is this weird, wild weather — drought, excess rain, snow for Thanksgiving — what we can expect for the future? Is it a result of climate change?

What do we need to do to adapt to this wild weather? Over the last many years, we have heard from government that we need to be storm ready, have food, water and supplies to last for a minimum of three days without help. My wife and I had no power for almost four full days, so I can understand this, but what can we do on our farms to overcome this weather? Mid-summer, we would have talked about needing irrigation, then we needed better drainage, and then the October snowstorm came.

Drainage should be an easy solution, but when we are talking 10 or 12 inches of rain in a month, can we really build the needed infrastructure? Even with tile drainage, water needs to escape. Irrigation infrastructure, too, poses a challenge when the need is so great.

Increasing our resilience to unpredictable weather is not easy. It will take years and some dynamic approaches.

Do we need to start considering practices such as intercropping?

MARKETS

There were some destabilizing forces in our markets in the last year. The stability we have had for several years was a result of some efforts to have international agreements governing trade, ensuring open borders. Many agreements are now being challenged or not respected. More non-tariff barriers are being implemented as well, so we are seeing walls built all over the place.

Between protectionist attitudes and politics, unfortunately, this is not easy to fix. Many trading partners are not even talking to each other, so it's hard to move toward a resolution. You are fortunate that our industry has some strong associations, Pulse Canada and Soy Canada, speaking on behalf of farmers.

Pulse Canada works very closely with the federal government to make sure they are on top of issues that affect markets. They are also in touch with international pulse associations, as the many issues that are slowing or hampering our trade also affect other countries.

Buyers in India want our pulses, at a price. But that price works for some volume shipments. There are restrictions shipping to India, though. Our product needs to be fumigated, which is a trade barrier, but it's part of the cost calculation selling pulses to this market. Pulse Canada has been working with the Canadian government to address this and has been able to get an agreement in place to address it, but from the India side, the issue has not been taken up. Canada also has problems with weed seeds, which seems to be a topic of discussion in several markets. If countries like India put zero tolerance on weed seeds, it makes it very difficult to meet that goal. Zero is an impossible benchmark. Huge risks are involved. Containers are inspected and if they do not pass, they get rejected and either destroyed or re-exported, which requires costs at every corner. That scares many exporters away from markets. Pulse Canada works very hard to make certain the industry and government know about the issues.

Soy Canada does very similar work. We had an issue with creeping thistle (creeping thistle, AKA, Canada thistle — branded creeping as it's not native to Canada) in mainly soybeans going over to Vietnam. Since most of the soybeans exported are food-grade and have been cleaned, it's not a huge issue and exporters are watching carefully. Recently, Vietnam gave notice to Eastern Bloc countries that they will no longer import their wheat due to too many contaminated shipments. Soy Canada worked hard on this file to draft a proposal that Vietnam would accept the product subject to inspection, but knowing special protocols were followed to ensure shipments were meeting their import restrictions.

DIVERSIFICATION

As an industry comprised of growers, marketers, exporters and associations, we also need to take steps to minimize our marketing risk. Be it China for soybeans or India for pulses, we need to diversify our markets. Any market study would tell us that placing all our eggs in one basket would not be wise. Why do we keep doing this? Diversification is key.

Pulse Canada has been working on diversifying the pulse market. Their latest campaign, called 25 by 2025, is to push 25 percent more product into new markets, domestically and internationally. The processing industry is a real plus. Yellow peas sold into the protein market would fit into their campaign. That is important for our yellow pea market, and we are still working to grow the edible bean market. There is a lot of behind the scenes work and a tremendous amount of effort being made by Pulse Canada to grow this market. Growing the pulse market is good for the profitability and sustainability of our farms.

Soy Canada also has a plan to grow the market, but they don't have as many resources as Pulse Canada to make it happen. Regardless, they are doing fabulous work for our farmers.

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TECHNOLOGY AND MARGINS

Can we afford all the new ag technologies, and are they useful? We're not strangers to technology, but, like our cellphones, do we fully understand and utilize what's available?

Every year, new technologies are coming out that boast features few people use. These new technologies cost more money.

Everyone looks at technology differently. I had a farmer comment, "Do not bring me an autonomous planter. That is such an important part of farming. I want to be on the tractor planting. I know other farmers who think differently and hire custom operators to plant their crops."

Be it electronic technology, new seed varieties, new chemistries, additives or iron, farmers need to assess what is needed. The salespeople will tell you that you've got to have it, and that you need all the bells and whistles. And we all want new stuff, don't we?

The real measure is how these technologies improve the bottom line. We'll need to watch our margins.

ON-FARM NETWORK

MPSG is building on the On-Farm Network (OFN) and we have more and more people getting involved. Our goal is to have independent research that will let you, the farmer, decide if all the must-haves are really helping your bottom line. And through the OFN, we want to give you the tools to be able to conduct trials on your own farm.

WHAT'S NEXT?

I don't think market, trade or price stability will happen over winter. Markets will move and who knows what forces will affect them — politics, environment, greed, who knows.

Please check out MPSG's Getting it Right Conference on January 29, 2020. It's always a good farmer-only event full of information that can be put to use on your farms.

Think about getting involved in the On-Farm Network. Talk to us at Ag Days, CropConnect, or wherever you see us, about how you can participate. Check out our website for results and see if any of these trials would fit on your farm.

Most of all, look after yourselves and your families. Maintaining physical health is important and make sure to watch for signs of mental health issues around you.

Let's plan for a great 2020!

— François ■

Getting it Right 2020
CROP PRODUCTION MEETING

This farmer-exclusive event is free for MPSG members to attend.

WEDNESDAY · January 29

CANAD INNS DESTINATION CENTRE
PORTAGE LA PRAIRIE

9:00 AM – 4:00 PM

Register online at manitobapulse.ca
or contact Laura at **laura@manitobapulse.ca**

Registration closes January 24, 2020

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Jay Toews
Pulse & cereal grower
Peace Country, AB

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MPSG Check-Off Dollars – They are Worth the Investment

We want you to have access to all the benefits of being a member of Manitoba Pulse & Soybean Growers (MPSG). Not only do your investment dollars go towards the production of materials aimed at ensuring you are able to grow the best pulse and soybean crops possible, but they also go towards helping your farm's bottom line by way of tax incentives.

MPSG asked accountant Alexander George of George & Associates, Chartered Professional Accountants Inc., to comment on the Government of Canada's Scientific Research and Experimental Development (SR&ED) tax incentive program.

Here is what he had to say about your investment dollars:

From a taxation standpoint, it's not very often that the Canada Revenue Agency is accommodating enough to allow for a double-dip. The double-dip is a special treat, where the taxpayer gets to claim the expenses as a deduction and also claim a rebate. Luckily for farmers, the research dollars spent by the grower organizations qualify for this treatment.

When a farmer contributes to a grower organization by way of check-off that is not refunded, a portion of that check-off is used to fund research and development. This research portion qualifies as a refundable rebate on the farmer's tax return, while at the same time the entire check-off qualifies as an expense.

Add to the fact that the research knowledge gained is available to the farmer free of charge, makes the entire contribution a win all around. I could only imagine if all the research was privately funded, every crop input bill would be doubled on top of an extra fee for research.

Combining the tax savings and the research knowledge gained, in my opinion, the check-off contribution is worth the investment. If you want to start claiming these rebates, just provide your accountant with:

- Check-off paid per grower association
- The association's research rate for the year (found on the association's website)

See the example below.

Manitoba Pulse & Soybean Growers (MPSG) check-off paid = $2,000

SR&ED portion = 40.05% = 2,000 x 40.05%[1] = $801 x 80% = $640 eligible SR&ED portion of check-off

Manitoba Small Business Corporate tax rate = 10% for 2018

[1]2018 MPSG SR&ED rate = 40.05%

Corporate Savings

Year 1 (2018)		
Tax deduction = 2,000 x 10% =	$200.00	reported as income next year
SR&ED ITC = 640 x 35% refundable =	$224.00	100% refundable rebate
Year 1 savings (cost)	$424.00	
Year 2 (2019)		
Tax owing on SR&ED rebate =	($20.00)	($224 rebate x 9%)
Year 2 savings (cost)	($20.00)	

After everything is said and done the corporation was able to save a net $404 in cash.

Individual Savings

Year 1 (2019)		
Tax deduction = 2,000 x 33.25%[1] =	$665.00	reported as income next year
Refundable SR&ED ITC = 640 x 15% =	$96.00	40% refundable rebate + 60% applied to taxes owing
Cash Savings	$761.00	

[1]Used second tax bracket federal (20.5%) + provincial (12.75%)

Year 2 (2020)		
Tax owing on SR&ED rebate =	$32.00	($96 rebate x 33.25%)
Year 2 savings (cost)	$32.00	

After everything is said and done the individual was able to save a net $729 in cash.

Dates to Remember 2020

Getting it Right – Crop Production Meeting
Wednesday, January 29
Canad Inns, Portage la Prairie, MB

CropSphere • January 14–15
Saskatoon, SK

Ag Days • January 21–23
Brandon, MB

FarmTech Conference
January 28–30
Edmonton, AB

Edible Bean Meetings
February 6 • Altona
February 7 • Portage

CropConnect Conference
February 12–13
Victoria Inn Hotel and Convention Centre
Winnipeg, MB

The Politics of Soybeans in Canada

Ron Davidson, Executive Director, Soy Canada

CANADIAN SOYBEAN SECTOR STANDS ALONE IN ENDURING THE BRUNT OF POLITICAL DECISIONS BY THREE GOVERNMENTS

For two successive crop years, the prospects of Canadian soybean producers have been jeopardized by the cumulative repercussions of political decisions taken by the governments of the United States, China and Canada.

Problematic Government Decisions

These decisions and their associated repercussions have included the following:

- threats by U.S. President Donald Trump in early 2018 to initiate a trade war with China in an endeavour to achieve objectives unrelated to the agriculture sector;
- identification of soybeans by the Chinese government as a sensitive and highly vulnerable U.S. target for a retaliatory tariff;
- reports on May 2, 2018 by U.S. exporters that Chinese importers had ceased the purchase of U.S. soybeans;
- imposition on July 6, 2018 of U.S. import tariffs on Chinese industrial products;
- immediate retaliation by China including a 25% retaliatory import tariff on U.S. soybeans;
- collapse by 21% between May 21 and July 6, 2018 of soybean futures prices on the Chicago Board of Trade;
- announcement by the U.S. government on August 27, 2018 of a compensatory payment of US$1.65 per bushel to indemnify American soybean producers for the *estimated impacts of unjustified retaliatory tariffs* (note: addition of the US$1.65 compensatory payment to the US$8.48 average farm price resulted in U.S. producers receiving US$10:13 per bushel for the 2018 harvest, a US$0.65 per bushel premium over the US$9.33 per bushel average farm price for 2017);
- detention on December 1 by Canadian officials, at the behest of the U.S. government, of high-profile Chinese citizen and Huawei executive Meng Wanzhou;
- announcement by the U.S. government on July 29, 2019 of a compensatory payment for the 2019 crop based on *estimated impacts of unjustified retaliatory tariffs* of up to US$150 per acre (equivalent of up to US$3.20 per bushel for an all-soybean farm with an average yield of 46.9 bushels per acre) to *ensure farmers will not stand alone*;
- announcements by the U.S. government on January 31 and July 25, 2019, of the allocation of US$34,632,165 to the American Soybean Association for investment in a *a comprehensive marketing effort by the U.S. soybean industry that has increased exposure in more than 50 international markets*; and,
- announcement by President Trump on October 11, 2019, of a Chinese commitment to purchase US$40 billion to US$50 billion annually in agriculture products from the U.S.

Injurious Repercussions of Government Decisions

The injurious impacts of these political decisions on the Canadian soybean sector include the following:

- reduction of Canadian soybean selling prices in both the Canadian and global marketplaces to remain competitive with U.S government-supported American exports:
  - $43.67 per tonne contraction in producer prices for Manitoba soybeans between May, 2018 and August, 2019;
  - $61.82 per tonne contraction in producer prices for Ontario soybeans between May, 2018 and August, 2019; and
  - $46.00 per tonne contraction in producer prices for Quebec soybeans between May, 2018 and August, 2019;
- major distortion of traditional commercially-based trade flows in both the Canadian and global marketplaces:
  - reduction of 1 million tonnes (69%) in soybean exports to the vitally important European Union countries

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between crop year 2017/2018 and crop year 2018/2019;
  - dramatic but one-occasion increase of Canadian exports to China to 3.2 million tonnes between September and December 2018;
  - cessation as of January 2019 of purchases of Canadian soybeans for processing by China, by far the world's largest market for soybeans; and
  - unprecedented increase from 383,105 tonnes to 958,040 tonnes in imports of U.S. subsidized soybeans into Canada thereby displacing Canadian produced soybeans and accounting for the equivalent of 47% of the soybean crush in this country; and
- uncertainty that the critically important Chinese market (accounting for 57% of global imports) will be open to Canadian crushing beans during the 2019/2020 crop year.

Canadian Government Missing-In-Action

Taking into account the serious price and trade injury arising from government decisions, the soybean sector initially sought compensatory support from the Canadian government in September 2018. This request has been reiterated both verbally and formally as early concerns progressively transitioned into lived reality.

Nevertheless, unlike the U.S. government in the case of American soybean producers, and the Canadian government in the case of industrial products and other commodities, the federal government has not been responsive to the prospect that market-based soybean production in Canada, this country's third most valuable field crop, may be replaced by subsidized production from the other side of the Canada-U.S. border.

Soy Canada will continue to advocate on this topic, notwithstanding the suggestion that producers respond to the price-reducing and trade-distorting impacts of the political decisions enumerated above by switching other crops.

SOY CANADA MARKET DEVELOP MISSION TO THE EUROPEAN UNION

Soy Canada is organizing a trade mission to Belgium, Germany, Italy and the Netherlands from November 21–29. Promoting both commodity and identity-preserved soybeans, the program in each country will include a seminar for importers and end-users, a business-to-business export café and site visits.

CANADIAN SOYBEAN INDUSTRY RESEARCH AND INNOVATION STRATEGY WORKSHOP

Three years have passed since the first *Canadian Soybean Industry Research and Innovation Strategy Workshop* convened in June 2016. Taking into account production and marketing experiences since 2016 as well as varied research funding organization responses to recent public sector consortia research proposals, Soy Canada is organizing a follow-up soybean research and innovation workshop to be held at the Toronto Airport on February 5, 2020. ■

Pulse Canada's Vision for the Future: 25 x 2025

Pulse Canada

GLOBAL USE OF pulses in the food manufacturing and pet food industry has increased 500 percent over the last decade. In North America, 1,241 new food and pet food products containing pulse ingredients were launched in 2017, up from 171 new products in 2005.

Despite the substantial increase in the number of products that use pulses as primary ingredients, the volume of pulse flours and fractions (fibre, protein, and starch) is relatively low. The volume of flours and fractions utilized in the U.S. food market in 2015, for example, was estimated to be 41,000 tonnes for snacks and pasta, 45,112 tonnes for use in dips and 145,000 tonnes in dog and cat food in 2016 in North America.

In an effort to move significant volumes of Canadian pulses into new processing and value-added applications, Pulse Canada has implemented a "25 by 2025" strategy — a goal of having 25 percent of Canadian pulse production utilized in new market and use categories by 2025. This translates into new demand for 1.1 million tonnes of peas, 625,000 tonnes of lentils, 100,000 tonnes of faba beans, 100,000 tonnes of chickpeas and 75,000 tonnes of beans by 2025. Crop-specific targets are based on anticipated production levels, ingredient supply constraints, an in-depth assessment of market opportunities and volume use potential, food industry consultations and strategy consensus among pulse growers and exporters.

Achieving the Canadian pulse industry's volume targets will require that Canadian peas are preferred by fractionators and usage of these pea protein ingredients continues to grow in applications like meat analogues, dairy/dairy alternatives and bakery products. Expanding use of pea starch and fibre is also critical to achieving the target for peas. Growth in lentil flour processing and use of lentil flour in applications such as snacks, bakery, pasta and blended meat products will also be needed to increase demand for a significant volume of Canadian lentils. For the Canadian bean industry, focusing on domestic consumption and utilization of beans in Canada will diversify the market and has potential to have a meaningful, significant volume impact for the Canadian industry.

Regardless of the end-use market application or ingredient format, there are opportunities for all pulses to be positioned for their unique attributes. These include the quality of protein, carbohydrate profile, functionality, health and sustainability benefits. Focusing on marketing the attributes that are unique to Canadian pulses will ensure pulses become incorporated into the food supply as a core food and ingredient that maintains a Canadian advantage.

Given the importance of pulses to the Canadian economy and the role of pulses in cropping systems to reduce environmental impacts of agricultural production, it is critical that market diversification goals are achieved so that Canada remains a leader in pulse production and exports. Creating new demand for Canadian pulses will ensure that this 25 by 2025 goal is achieved. ■

Look for this symbol on grocery store shelves

PULSES

Putting More Farmers in Front of Policymakers More Often

Erin Gowriluk, Executive Director, Grain Growers of Canada

WHAT A DIFFERENCE an election year makes. Despite a resurgent Bloc, who claimed 32 of Quebec's 78 seats, and the Conservative Party of Canada (CPC) holding massive sway in the Prairies, the Liberal Party of Canada still managed to clinch a minority government on Oct. 21. This was due in large part its ability to hold on to the key Greater Toronto Area (GTA) ridings in vote-rich Ontario.

The electoral results represent a bitter but symbolic victory for the CPC under Andrew Scheer. The CPC increased its seat count with an extra 26 seats and — critically — won the popular vote (34.4% vs. 33.6%) but failed to topple the Liberals. However, as a result of this seat allocation, Liberal minority will command much less authority in a fractured Parliament and will need the support from all parties to implement its agenda.

This year's decision day revealed an increasingly polarized electorate and a country split along regional lines. National unity has not been a major question for Canadian governments for nearly a generation, but it has come to the forefront again with the resurgence of western alienation and Quebec nationalism. The Liberal minority government will be walking a tightrope. They must deal with the west to stem the tide of alienation while ensuring that policies also meet Quebec's interest to prevent lasting damage to the national fabric.

Regardless of the challenges that come with navigating a minority government, the Grain Growers of Canada (GGC) are ready to engage with policymakers as soon as Members of Parliament return to Parliament Hill. The GGC team will initiate a series of introductory meetings with parliamentarians to pave the way for our 2020 member outreach program — which, for the first time in the organization's 20-year history, will see GGC members meeting with parliamentarians in the nation's capital all winter long. This consistent and proactive outreach is intended to fulfill one of GGC's strategic priorities: put more farmers in front of policymakers — more often.

We will kick things off with GGC's annual Grain Week, Feb. 18–20, 2020, during which time members from across the country will introduce the association and its priorities to a new government. GGC will also take this opportunity to invite new and old friends alike to celebrate our 20th anniversary on Feb. 18. Following that, regional member teams will participate in monthly outreach throughout the winter and spring to ensure that our members' priorities are top of mind for government officials. We are pleased that Manitoba Pulse & Soybean Growers will be joining GGC members from Saskatchewan and Manitoba in the nation's capital in March.

While the scope of our policy priorities is always national, there are real benefits to deploying regional teams. For example, the Prime Minister's Office (PMO) has established "regional desks," which employ advisors whose job it is to understand the concerns and priorities of the constituents in a particular part of the country. The staff on the PMO's Prairie Desk, for example, consult with stakeholders from Alberta, Saskatchewan and Manitoba. Regional outreach is also an effective way for farmers to establish relationships with their Members of Parliament (MPs). MPs are directly accountable to the constituents in their respective ridings and they will often go out of their way to meet with them when they are in the nation's capital. These relationships are tremendously valuable because these MPs will often become champions for the ag sector's policy priorities.

> *There is nothing that has more of an impact than policymakers connecting directly with farmers.*

Having a consistent presence in Ottawa ensures that the conversation between government officials and Canada's export-oriented sector is one that progresses and evolves. Infrequent contact can often mean that stakeholders are starting from scratch every time they visit the Hill. While the GGC team maintains a consistent presence in the nation's capital — there is nothing that has more of an impact than policymakers connecting directly with farmers.

We look forward to welcoming our national and regional farmer delegations to Ottawa and reporting back to members on their successes. ■

Clancey's Stats

Pulse market analysis

Brian Clancey, Senior Market Analyst and Publisher, STAT Communication

PULSE MARKETS ARE starting the 2019–20 marketing campaign with a fair amount of uncertainty. Not only are there worries about crop quality in parts of Canada and the United States, but doubts remain about market access in some destinations.

Frictions with China are making field pea exporters nervous. India's continued use of high import duties and calls for imports of more types of pulses to have volume limits has made some lentil exporters uncertain. Increased tensions in the Middle East have the potential to interfere with trade flows.

WEATHER IMPACT ON WORLD MARKET

The weather could also become an issue for other parts of the world. Mexico continues to suffer from unusually dry conditions, which should result in a further reduction in dry edible bean production. But, diets appear to be changing in the country and consumption seems to be trending lower. Brazil is also worried about its conditions, which could result in a modest reduction in national output. Meanwhile, Australia is concerned that the late withdrawal of the monsoon from India.

In releasing the October seasonal weather outlook, Andrew Watkins of the Australian Bureau of Meteorology said, the country is "likely to see warmer and drier than average conditions for the coming months. That is largely due to a record strong positive Indian Ocean Dipole, which leads to drier air than usual over northwest Australia that supplies much of Australia's rainfall.

"The increased odds of warmer than average days, coupled with a very dry landscape and a likely late start to the northern wet season, give a clear indication that we're likely to see more heatwaves than normal."

That may not have much impact on this year's pulse harvests in Australia but has the potential to not only reduce summer grain and oilseed production but get next year's pulse crops off to a poor start.

FABA BEAN PRODUCTION

This year's faba bean harvest in Australia is expected to reach 301,000 metric tonnes (MT) from 194,000 hectares, compared to 217,000 from 178,000 hectares last year. However, stocks in the country tightened considerably across its 2018–19 marketing year, with the result available supplies could be unchanged at 325,000 MT.

The implication is that if exports are similar in 2019–20, residual supplies should decline, leaving markets vulnerable to a supply problem if next year's seeded area or average yields drop because of dry growing conditions. As it stands, the price performance of faba beans should stimulate an increase in seeded area to at least 245,000 hectares in 2020. But, poor seeding conditions could see that number drop, while a dry year could see yields fall below average.

Canada's faba bean harvest is expected to reach 91,400 MT from 58,600 acres. Yields are expected to be above average because of a wet growing season, but because of frost events before all fields were fully matured, there could be a high proportion of off-grade beans. Unfortunately, faba beans can look good even when the interior is green. That has the potential to result in huge quality claims if farmers and processors do not make sure the beans are mature by breaking some open.

An Opportunity for Canada to Fill a Gap

Egypt is the world's largest buyer of consumption-quality faba beans. Suppliers in Canada, Australia, France and the United Kingdom compete for available demand. The United Kingdom is once again facing quality issues with its crop, resulting in exporters focussing more on livestock feed markets than those for human consumption. That creates some opportunities for a good quality product from Canada to fill in gaps left by Australian exporters as long as all market participants pay attention to quality.

Faba beans remain a small part of the North American dry edible bean industry. Production of all other classes is expected

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to reach 1.48 million MT in Canada and the United States, compared to 1.54 million last year and 1.71 million in 2017. If this summer's carryover is 327,000 MT, available supplies of all classes of beans in the two countries will drop from 1.89 to 1.8 million MT.

Production in the United States is expected to reach 1.127 million MT, down from 1.172 million last year and below the recent five-year average of 1.21 million. Canada's crop is expected to reach 356,100 MT from 350,950 acres, down from 367,000 MT from 363,000 acres last year.

DRY EDIBLE BEAN PRODUCTION

Production will not be broken down by class in the United States until the December crop report. But the data suggests the pinto bean harvest will drop from almost 416,000 to around 406,000 MT, while black bean output will advance from 237,000 to 270,000. Total white bean output also looks to be down. Navy production is expected to drop from 185,000 to 161,000 MT, while great northern slips from just over 53,000 to under 50,000 MT.

The shifts in dry edible bean output in the two countries come at a time when Mexico expects a smaller crop. Government estimates remain optimistic, but it would not be surprising to see the harvest drop from 949,000 to 861,000 MT. In recent years, dry edible bean consumption has averaged 1.16 million MT per year. The implication is that imports may need to expand from an estimated 199,000 MT in 2018–19 to 217,000 to prevent a fundamental shortage of product.

Under the North American Free Trade Agreement, Canada and the United States maintain duty-free access to the market. But, Mexico will open quotas for suppliers in other countries to help prevent prices for imported beans from rising too sharply. Most imports are coloured beans, resulting in net exporting nations like Argentina and China looking for chances to ship product to Mexico.

Production in China has been declining in recent years, while Argentina's capacity to export large quantities of black beans to Mexico depends in part on how many beans Brazil needs. That country expects the 2020 harvest to slip under three million MT, compared to its recent five-year average of 3.05 million. If the harvest is smaller, imports could reach at least 155,000 in 2020, compared to an estimated 152,000 this year and just under 110,000 MT in 2018.

This combination of events suggests demand for dry edible beans will remain relatively stable across the 2019–20 marketing campaign. Potential quality problems make it more important for growers to understand what they have in their bins and make sure immature beans because of frost are not accidentally shipped to human consumption markets. Reputation is more important than price. ■

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Stress on the Farm? We've Got You Covered.

Janet Smith, Program Manager, Manitoba Farm, Rural & Northern Support Services

IF YOU FARM in Manitoba there is a good chance that this year has been a bit of a rollercoaster. Spring drought, record rainfalls and an early winter snowstorm made 2019 one for the records — and not in a good way.

At the Manitoba Farm, Rural and Northern Support Services (otherwise known as *The Farm Line*), we're no stranger to farm stress. This year we've been hearing from farmers struggling to feed their livestock, get the crop off, and make tough decisions within an increasingly volatile global market. They tell us it helps to talk to someone who listens and understands, and who can help them get 'unstuck.'

Our callers tell us agriculture is in their blood. They love to farm, and can't imagine doing anything else. At the same time, farm stress can be very real and, at times, debilitating. Financial worries, volatile markets, animal and crop disease, weather, family disagreements, technology and equipment breakdowns are just some of the issues farmers face on a daily basis. When stress goes on a long time, and there is no resolution in sight, it's not unusual for normal coping mechanisms to break down. That doesn't make you weak. It just makes you human!

Stress can affect our mind, body and emotions. Some common signs of stress include:

- **Physical ailments** — headaches, muscle pain, high blood pressure, fatigue, sleep problems, frequent colds and feeling 'run down';
- **Mood changes** — feeling irritable, anxious, angry, depressed, overwhelmed, or having suicidal thoughts;
- **Cognitive problems** — inability to concentrate, impaired decision-making, forgetfulness, and negative or ruminating thoughts.

Our relationships often suffer when we are stressed, which is one reason we hear from many spouses concerned about their partners. Our loved ones know us best, so they are often the first ones to notice that you are 'not yourself.' Unfortunately, many farmers are reluctant to admit to themselves, let alone anyone else, that they are struggling. Farmers tend to think of themselves as strong, independent people who don't want or need help. While this is thankfully changing, it is still hard for many farmers to open up and talk about their feelings and emotions.

For some, there is a huge stigma attached to mental health. While it is okay to talk about our physical health, many people do not look at mental health in the same way. Having depression or anxiety, for example, should not be seen any differently than a diagnosis of diabetes, yet it can go undiagnosed for years, due to stigma.

In addition to being reluctant to reach out for help, many farmers don't know *how* to get help. Navigating the mental health system can be confusing, but a good place to start is with your family doctor. They can assess both your physical and mental health, offer treatment options or refer to a mental health expert. Manitoba also has a system of free crisis and non-crisis services in every RHA. Visit www.gov.mb.ca/health/mh/crisis.html for a list of what is available across the province and in your region.

Another way to reach out for help — either for yourself or a loved one — is through the *Farm Line*. We provide free and confidential information, support, counselling and referrals. You don't have to share your name or where you are

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Meet Garrett Sawatzky

He's passionate about agriculture.

Toban Dyck, Director of Communications

Garrett and Desiree Sawatzky with their new addition to the family, Beckham.

YOU'D PROBABLY GET along with Garrett Sawatzky. Meetings are not his favourite way to spend an afternoon. Being on a board and taking part in commodity group politics weren't on his bucket list. The desire was there; it just wasn't burning. But, he's passionate about agriculture and understands that a strong sector requires grassroots participation.

"I had an objective of joining a commodity group at some point," said Garrett. "But I wasn't sure about the timing. When I got tapped on the shoulder last winter, I decided to give it a try. I wouldn't say that meetings, boards and politics are at the top of my list of passions, but I've learned that if you care about something, getting involved is the best way you can make sure whatever it is you are passionate about can thrive."

Meet Garrett, Manitoba Pulse & Soybean Growers's newest board member. He and his wife, Desiree, along with his parents and brother, farm northwest of Altona, Manitoba. Their farm is diverse. Impressively so. They grow fall rye, spring wheat, oats, soybeans, yellow peas, dry beans, corn and canola.

But that's not the whole picture. On October 1, Garrett and Desiree brought Beckham Greyer Sawatzky into this world. And, according to Garrett, "He has already been helping influence sound management decisions such as choosing to grow less later season crops this year due to his arrival." That is lofty praise, as Garrett himself teaches Farm Management in the University of Manitoba's Agriculture Diploma program.

Congratulations to Garrett and Desiree and we wish you all the best in your advisory role, Beckham.

Garrett officially joined the association's ranks during MPSG's AGM held at Manitoba's annual CropConnect conference in February of 2019. MPSG had always been on his radar. His farm has been participating in the association's On-Farm Network for the past several years, a program for which Garrett has a profound level of respect.

Garrett's passion for agriculture doesn't need to be sold. His involvement paints a picture of an industry leader.

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calling from. When you call (or chat with us online), we will listen to what is happening, help you find ways to cope in the present, and brainstorm how to manage in the future. We can even do call-outs to a person you know who may be struggling.

Counselling doesn't have to be scary or mysterious. It is merely a way to help you sort through your thoughts and emotions and get 'unstuck.' That will help you, your loved one, and, ultimately, your farm. We've got you covered!

Manitoba Farm, Rural & Northern Support Services can be reached at 1-866-367-3276 or 204-571-4180. For more information or to chat online, visit www.supportline.ca. You can also check out Klinic's free App and website: www.calminthestormapp.com to learn how to assess and manage your stress. The MFRNSS is a program of Klinic Community Health.

If you or someone you know is in crisis, visit your nearest emergency department or call 911. ■

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"Every March for Canadian Ag Literacy Month, I speak to several elementary school classes in southern Manitoba and Winnipeg about Agriculture through Ag in the Classroom – Manitoba," said Garrett, responding to a question about what he does besides farm. "I serve as a delegate for District 3 for Keystone Agricultural Producers; my wife and I enjoy travelling, although that pastime will be taking a break for the time being; we are Winnipeg Jets and English Premier League (soccer) supporters."

The issues facing farmers are top-of-mind for Garrett, who deals with these topics as an instructor but also as a farmer. His farm's diversity is no accident and neither is his commitment to generating off-farm income. These are elements of his farm that he believes are valuable and effective strategies for dealing with the challenges the ag sector is currently facing.

"As everyone has felt, trade tensions and tariffs have affected us all in some form," he said. "As we now can see, the importance of portfolio diversification applies not only to our enterprise selection but also where our end marketing options are for our products. I am also concerned about biosecurity with pests that could change how we farm, such as tall waterhemp, palmer amaranth, SCN, clubroot, etc."

The challenges the industry faces are the challenges MPSG faces, too. Garrett believes this. He has witnessed the boom in soybean acres in Manitoba and the subsequent decline. Garrett, like many other pulse and soybean farmers, is curious about where MPSG's acres will level off.

The boom years were positive and presented great, unprecedented opportunity, but, according to Garrett, the challenge now is to figure out how all of that scales against a reduction in acres and thus, a reduction in check-off investment dollars to put to use.

It's a challenge, but Garrett believes MPSG's value in the face of hard times can't be understated.

"The most evident value that MPSG delivers to Manitoba farmers is the gathering and distribution of relevant information that farmers can use for decision making," said Garrett. "This is through *Pulse Beat*, *The Bean Report*, SMART Day, production resources, and more. If you need Manitoba-made research on pulse crops, MPSG is the place to look. Another integral area that MPSG contributes to adding value is through market development for Canadian pulse products."

Garrett is young. He's forward-thinking and he's eager to learn, contribute and help MPSG and the industry it represents thrive. And, perhaps, once he's done with board life, Beckham will be there to take his seat.

If you see Garrett, say hi. I think you'd get along with him. We do. ■

Do you have a production question related to pulse or soybean crops?
Maybe you're looking for an opinion or advice?
Write to us!

Email Cassandra Tkachuk
cassandra@manitobapulse.ca

We Grow it, They Move it: The Marvel of Supply Chain Logistics

Toban Dyck, Director of Communications, MPSG

THE PORT OF Vancouver is the largest export port and the third-largest overall in North America. It is a marvel of innovation, human potential and global relationships.

It's mind-bending to fathom a container train full of Manitoba crops cutting through the Rocky Mountains and snaking its way through the dense and congested heart of Vancouver in order to arrive at either the north shore or south shore of the port, either destination a tightly wound sliver of tracks, roads, bridges, crossings and shipping terminals situated between high-end housing and the water.

A carload of your soybeans has likely stopped traffic in Vancouver, either frustrating commuter traffic or sparking the curiosity of someone who may not have any clue about that train's connect to the prairie provinces.

On Sept. 27, 2019, a handful of writers attending the Canadian Farm Writers' Federation conference in New Westminster, B.C., toured the Alliance Grain Terminal (AGT) situated along the 300 kilometres of shoreline occupied by the Port of Vancouver.

It has two deep-water loading berths and is now capable of loading an entire Panamax without needing to spin it around. This is an efficiency that has made a significant impact on the terminal's ability to move product through its facility and off to market. More than 3.5-million metric tonnes of product moves through AGT, annually.

Inside the terminal itself is room upon room of specialized employees monitoring and directing what needs to be a well-oiled process. It wasn't discussed, but a hiccup at any point from rail to ship would have cascading and stressful consequences. Every employee I saw sitting at a desk had multiple monitors.

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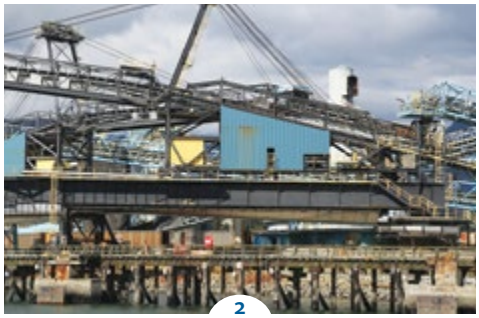

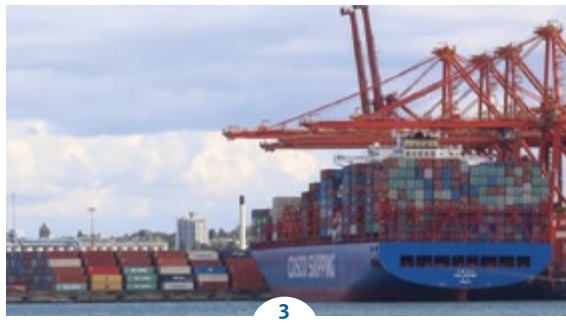

1 *A ship waits at a Richardson terminal berth.* **2** *A glimpse of the shipyard infrastructure.* **3** *A loaded container ship and containers ready to be loaded at the Port of Vancouver, North America's largest export port.*

A sample from every load of product entering the terminal goes to AGT for logging, but one also travels directly to the Canadian Grain Commission (CGC), where it's inspected and archived.

The accountability measures taken at these port terminals is something I knew little about — CGC inspects the grain, and the Canadian Food Inspection Agency inspects the ships themselves, looking for bugs, infrastructure imperfections or anything else that could affect a shipment's quality and/or jeopardize its approval on the receiving end.

The goal of any well-functioning terminal is to move product through its guts as fast as possible. Considering the rate it receives grain and the rate in which that grain leaves on a vessel, AGT has enough bulk storage for two and a half days. It can process up to 2,000 tonnes of product per hour, 900 railcars per week and it is hoping to increase its 3.5 million tonnes annual capacity in the near future — all while continuing its 100 percent trace-ability mandate.

It was a lot to process and my camera's SD card was running out of room. According to our itinerary, we were to have lunch on a boat. Our tour guides called it a yacht, but c'mon, a yacht to me, is a term reserved for the rich and famous. Being on a boat with food service and a bar was in and of itself exciting enough for my prairie-dwelling colleagues and me. But there was more. We were getting a tour of the Port of Vancouver — a bucket-list item for me. And something that would help place AGT in context. Many of the big grain companies have terminals in Vancouver, after all.

The Vancouver Fraser Port Authority is a federal entity that oversees the port's operations and uses the money it receives from the 28 major terminals operating on its lands to upgrade infrastructure and advance Canada's trade interests overseas.

It moves about 145 million tonnes of product per year. It represents more than 115,000 jobs and is the conduit through which $200-billion of trade occurs annually. Its vision is, "To be the world's most sustainable port."

It's a busy place. Our small tour vessel needed to remain vigilant. Our captain was, no doubt, accustomed to navigating the port's bustling waters, but I, a Manitoban, was struck at a deep level at the scale of things.

The terminals that dock and fill those ships are even more massive and the entire value chain that feeds it, the veins of which flow through our continent, is as complex as it is vital.

We slowly trolled past a container vessel. From my perspective, it seemed as though there were tens of thousands of containers aboard. It was huge. This is the world we live in. We order things, be it wheat, canola, soybeans, beans, meat or t-shirts from another country, and they have to get here somehow. Ports and transportation infrastructure, in general, have become such a highly-evolved, yet rarely thought about, feature of modern life.

It churns in the background to service consumers and us farmers. It employs the services of smart, specialized people who are not intimidated by the scope of their responsibility, nor paralyzed by the scaled-up consequence of failure.

This point was galvanized recently during the annual Fields on Wheels Conference, an event that brings together industry professionals (such as executives from CN and CP and the ports) to tackle issues related to the grain supply chain. This year's theme was logistics and value-added processing of field crops.

The 24th annual Fields on Wheels Conference in Winnipeg is a transportation-focused event that brings together industry professionals from across the grain supply value chain.

Dr. Sylvain Cherlebois, colloquially known as the Food Professor, spoke about the rise of fake meat. He related his take on veganism and people's changing diets back to what's happening in the ag world around proteins.

Phrases such as plant-based proteins and animal-based proteins are finding their way into the public lexicon. And that's really quite something. Linguistically, I would have never thought such terminology would strike a chord with the average consumer.

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"What's happening with proteins is fantastic, said Charlebois. "Everybody has unique dietary needs and that needs to be recognized."

Charlebois also praised Manitoba for what it is doing on the protein front, urging everyone in the audience to get the Manitoba story of Roquette, Merit Functional Foods, sustainable hydroelectricity and great transportation infrastructure out there to attract further investments.

Supply chain management professor Dr. Barry Prentice agreed. "Where the plants get built, that's where the industry stays," he said.

The conversation then went from processing and proteins to a more explicit conversation about transportation with a panel featuring CP, Parrish & Heimbecker and the Hamilton-Oshawa Port Authority.

Twenty years ago, about 50-million tonnes moved off the prairies. For the last two years, that number increased to 80-million and by 2030, panel moderator and Quorum President Mark Hemmes predicts the prairies will produce more than 100-million tonnes of grain. "We're going to have to look at things differently," he said of the increased capacity and the associated transportation demands.

Joan Hardy, Vice-president of sales and marketing for CP, spoke about the rail company's increasing capacity and commitment to handling prairie grain.

"Grain represents 22 percent of CP's business," she said. "Two-thirds of the grain comes from Canada and one-third from the U.S."

Eighty percent of the grain CP transports is destined for Vancouver, according to Hardy, who said, "CP is investing in larger sidings, longer yard tracks and increased locomotive capacity."

Rail companies, such as CP, have, like the ports they service, invested heavily in finding efficiencies. Hardy said her company now has 120 locomotives in storage as surge capacity and they've implemented technology that allows them to monitor the temperature of wheels, which has allowed them to perform preemptive maintenance without disruptions.

What became clear from the Port of Vancouver tour and the Fields on Wheels conference was that when our soybeans and pulses enter the value chain, either via an elevator or processing facility, they are in good hands.

Agricultural transportation systems, such as our ports and rail, need to be held accountable. That goes without saying. But as farmers, we can rest assured that there is a strong determination along the value chain to remain a marvel of innovation and human potential.

There are more ports in Canada than Vancouver's; just as there are more rail companies than CP. All of these companies are unique and service the ag industry differently. Traceability and transparency are becoming more and more common. Check out their websites. See where your product is going ■

Follow us! @MbPulseGrowers

2019 Growing Season Review

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

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

ACRES AND VARIETIES

In 2019, 1.39 million acres were seeded to soybeans in Manitoba. That marks a decline by approximately 504,000 acres from 2018. This is also the second drop in acres since soybeans peaked at 2.26 million in 2017 (Figure 1). However, soybeans are holding strong, still ranking as the third-largest crop in Manitoba.

Field peas and dry beans were a different story. Pea acres increased to 112,700 acres, up by 28,500, and dry beans rose to 155,700 acres, up by 34,000. The most dramatic increase occurred for navy beans, by about 23,000 acres. But we also saw a rise in pinto, kidney and other (e.g., pink, yellow, Great Northern) bean acres.

We generally see one or two dominant varieties for each market class of dry beans, according to the MASC variety market share report. In 2019, Vibrant (50.7%) unseated Windbreaker (34.7%) as the top pinto bean variety, T9905 (79.9%) remained the top navy bean variety and Eclipse (76.4%) remained the top black bean variety. For smaller-acre beans, Red Hawk (44.7%) and Pink Panther (28.9%) were the top kidney bean varieties, Crimson (36.5%) and Chianti (27.7%) were the top cranberry bean varieties and Merlot (97.3%) was dominant for small red beans.

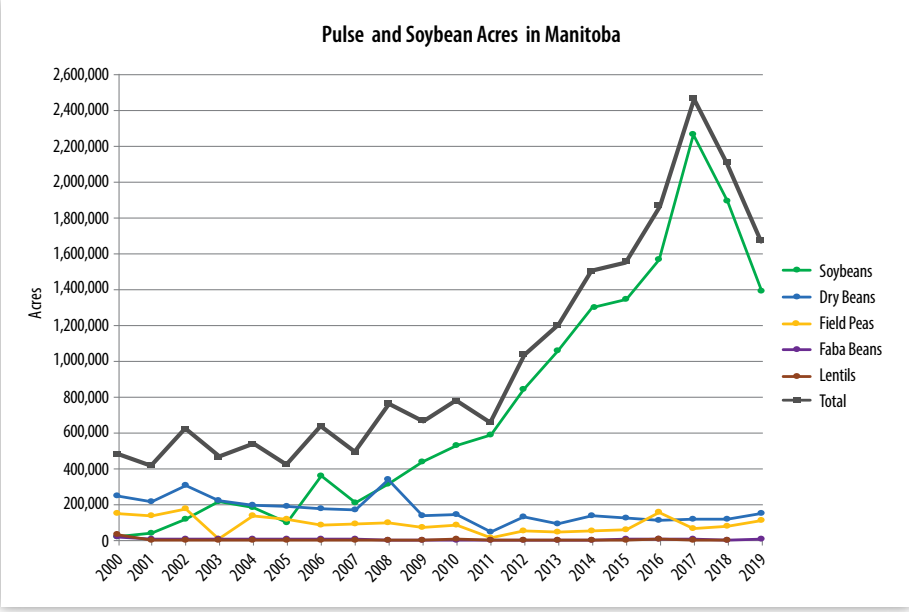
There have been four popular pea varieties over the past two years. CDC Amarillo (21.2%) held its top spot in 2019, followed closely by AAC Carver (19.3%), CDC Meadow (14.2%) and Abarth (13.4%).

Soybean variety market share cannot be summed up so concisely. The top variety grown in 2019, S007-Y4, held 14.2% of the market share. From there, we see the remainder distributed among a long list of soybean varieties. In a nutshell, the market is flooded, but a wide range of choices and competition in the marketplace are good things.

A COOL, DRY SPRING

The 2019 growing season may be remembered by most as the third dry year in a row in Manitoba. This is nothing new for pulse crops like peas that prefer drier conditions, or edible beans that have a longer history in Manitoba. But this did present a relatively new challenge for our long-season, water-loving soybean crops.

Figure 1. Seeded acres of soybeans, dry edible beans, field peas, faba beans and lentils (2000–2019).



What drove plant development was not just the amount of rainfall but the timing. Most of Manitoba faced dry conditions until an extreme rainfall event on July 9–10 that dropped as much as 6–10 inches of rain at certain locations. Some areas within the northwest, central and Interlake regions seemed to be hit especially hard by dry conditions, where this substantial rainfall event was the only precipitation fields received.

Spring started with slow seedling emergence due to both cool and dry conditions. Scouting in May consisted mainly of seeding depth assessments as we patiently waited for pulses and soybeans to emerge. Dry soil at seeding again tempted farmers to push the boundaries on seed depth to access precious moisture. Yellow cotyledons and swollen hypocotyls (Figure 2), the stress symptoms of deep seeding, were a common sight this past spring as in the previous two years. Delayed and non-uniform emergence was also common, where seeds that were either placed very shallow or placed very deep, emerged later.

Figure 2. Swollen hypocotyls of edible bean seedlings on June 6 due to deep seeding in dry soil conditions.

Growing degree-days (GDD), the measure of heat accumulation relevant to pulses and soybeans, remained low throughout May and June. So, lack of heat also played a role in slowing plant development. By June 24, 2019, GDD across agro-Manitoba ranged from

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66–91% of normal (283–468 GDD) compared to 108–143% of normal (469–699 GDD) by June 24, 2018. GDD accumulation somewhat caught up in July but was still below normal.

At the time of flowering in 2019, soybean crops were about two to three trifoliate stages behind those grown in 2018. In other words, we saw less vegetative growth prior to flowering from these cool, dry conditions. That may be one contributing factor to yield loss.

A significant wind event occurred on June 7, which I fondly refer to as "dust bowl Friday." It was the type of weather that filled your vehicle with soil if you opened the window to snap a photo. Damage occurred in some fields as abrasion to seedlings or a pinched hypocotyl where wind spun the plant around. Plants grew past it or branched out to compensate for lost stand and it was eventually unnoticeable.

THE YEAR OF THE INSECT

Another thing we will remember about 2019 was the insect pressure. For pulse and soybean crops, the main culprits were cutworms and grasshoppers. It seems that we saw more cutworm and grasshopper pressure than ever in these crops. Several crops were sprayed more than once, some were reseeded and crops like peas and faba beans showed their ability to regrow following cutworm damage (Figure 3).

Green cloverworm, a noted insect pest of soybeans and dry beans, and thistle caterpillar were also present in 2019. Last seen in great quantities in 2017, thistle caterpillar can often appear to be more of a pest than it really is due to its ugly presence in the upper canopy. A few fields in 2019 had damaging populations, but most bean crops did not experience significant defoliation and yield loss from these two pests.

Figure 3. Missing plants in a pea seed row from cutworm damage and regrowth from below-ground growing points on June 5.

For a full review of insect pressure in pulse and soybean crops, refer to Manitoba Agriculture Entomologist John Gavloski's article on page 31.

FIELDS TURNING YELLOW

In some regions of Manitoba, we saw curious mid-season yellowing of soybean crops. There were a few potential causes that could not be diagnosed from the road.

The most common cause was a late flush of iron deficiency chlorosis (IDC) in soybean crops. Soluble salts and carbonates are the main drivers of IDC. Since there is a naturally high carbonate concentration across much of Manitoba, this IDC was likely brought on by the rise of salts to the upper soil profile via mid-season rainfall. Depending on its persistence in a field, IDC could be another source of yield loss in 2019.

Thirsty pinto beans with flipped leaves on July 31.

It is important to note that pulse and soybean crops have a lower tolerance to salinity than other crops. That means excessive salt concentrations will injure these plants by disrupting water and nutrient uptake into the roots. An increase in salinity over the past couple of years has been noticed in some areas. We recommend keeping an eye on soluble salt concentrations each year to gauge your risk.

Other (less common) causes of yellowing would have been nitrogen deficiency due to inoculant failure or the presence of root rot. However, we saw less infection in 2019 from soil-borne pathogens such as Fusarium spp. or Phytophthora root rot, which prefer wetter soil conditions. That is one good news story from 2019.

Variable soybean maturity on August 26 due to soil moisture differences across the field.

NEW PESTS – A WEED, A DISEASE AND AN INSECT

In 2019, we identified three new economically important pests. But these findings don't come as much of a surprise. We have been actively monitoring for these pests and expecting their arrival.

Tall waterhemp

Tall waterhemp was reported by farmers who noticed large, surviving weeds in their fields. A few tall waterhemp plants had been found previously in Manitoba, but more significant populations were found in 2019. This weed is worrisome because it is a prolific seed producer with documented resistance in the U.S. to at least seven herbicide classes. It is also a Tier 1 noxious weed that has to be destroyed.

To date, tall waterhemp has been identified in four different municipalities – Dufferin, Rhineland, Ste. Anne, Reynolds and Whitemouth. Manitoba Agriculture and Resource Development Weeds Specialist, Tammy Jones, has been working with farmers to prevent the spread of tall waterhemp and communicate our concerns about this pest. For everything you need to know about tall waterhemp, check out Tammy's article on page 33.

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Soybean cyst nematode (SCN)

The presence of SCN was confirmed in Manitoba in 2019 due to monitoring led by Dr. Mario Tenuta at the University of Manitoba. It was detected in four out of 106 fields and four out of 18 rural municipalities (Emerson-Franklin, Montcalm, Rhineland and Norfolk-Treherne) in total throughout the entire survey's history. Thankfully, SCN populations are extremely low and consistent with the recent establishment of the pest. Unfortunately, once present, this pest cannot be eradicated from a field and can spread rapidly

Preventing soil movement is the best way to keep this pest out of your field. SCN populations can also be managed by rotating to non-host crops (soybeans, dry beans and peas are all hosts), growing resistant varieties, controlling host weed species and reducing tillage. To learn more about this pest and the findings in Manitoba, refer to the SCN article on page 37 and visit scncoalition.com.

Pea leaf weevil

Pea leaf weevil, a pest of peas and faba beans that we have been tracking across Western Canada, was officially detected in Manitoba for the first time in 2019. This detection was made by an agronomist in the Swan River area. Active monitoring also took place in the highest-risk pea growing areas along the Saskatchewan border, led by John Gavloski.

Pea and faba bean growers, especially those in the western areas of the province, are advised to scout for this pest throughout the coming growing season and assess the impact in individual fields before adjusting management practices. Plans are in place to continue monitoring for pea leaf weevil in 2020. For more information, visit John Gavloski's article on page 31 and visit manitobapulse.ca.

DELAYED HARVEST

When we thought our crops had been through enough, the rains finally came at harvest. This left some dry bean crops sitting in windrows or standing in the fields, and most soybean crops still standing. Some quality loss was noted at the time, including sprouting. But most crops were still looking good.

Repeated wetting and drying of plants can be blamed for twisting soybean pods open. This left seeds susceptible to quality loss and infection of diseases such as Phomopsis seed decay (*Phomopsis-Diaporthe* disease complex). This disease is not new to Manitoba, but it is an infrequent pest.

A major snowfall event on October 10–11 dropped heavy, wet snow on these remaining crops. Varying degrees of lodging occurred, but most crops were still standing and looked as good as could be expected. At this time, harvest progress was halted at about 40–50% completion for dry beans and 20% completion for soybeans.

The yield story is incomplete at the time of writing this article. But we can say that yields were generally lower in some eastern areas of the province, and

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Investments in Plant Breeding

Optimizing the use of check-off dollars

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

A SURVEY CONDUCTED by prairie farm policy groups showed low farmer satisfaction with the two seed royalty options currently on the table. As individual farmers weigh the cost of accessing the best genetics, grower-led associations such as Manitoba Pulse & Soybean Growers (MPSG) are prompted to consider the role check-offs will play in future plant breeding programs.

Traditionally, farmer funding has played a major role in supporting public breeding programs operated by universities and governments. It seems like a good time to review this tradition as efforts to revise seed royalties seek to encourage private sector investment in plant breeding.

Following tradition, MPSG provides funding to several publicly owned plant breeding programs. These contributions enable government cash to flow to the program and allow the host institution to free up researchers' time and physical infrastructure to carry out genetics research and plant breeding on our behalf.

The results of this work reveal to scientists the genetic basis of crop traits. Some scientists pass the knowledge along to plant breeders in the public and private sectors. That occurs either through an open exchange of knowledge or through business agreements that license the acquisition and use of intellectual property.

Several research programs funded by MPSG put the knowledge to work internally, producing market-ready varieties that are, likewise, licensed to private sector seed companies. Also, in accordance with tradition, MPSG forgoes any commercial rights to the results leaving the host institution free to maximize their licensing revenue. That is in line with MPSG's mandate to pursue the broader good for farmers and to enable on-going public research. Under this system, funders such as MPSG seek a return solely in the form of new varieties which they will have the option of purchasing through the retail market.

PLANT BREEDING ACROSS CANADA

Comparing MPSG's investments in plant breeding with other pulse and soybean grower organizations highlights the fact that MPSG's involvement is relatively modest. Growers in Alberta, Saskatchewan, Ontario and North Dakota are more deeply invested in plant breeding largely as a result of their historical links with local universities and government agencies.

Manitoba's public research organizations have placed less emphasis on plant breeding. The exception is cereal breeding, where AAFC is very active at its two centres in Manitoba — Brandon and Morden. Overall, when it comes to pulse and soybean breeding, MPSG most often partners with its sister organizations to fund breeding work in their provinces. Specifically, MPSG contributes to field pea programs at the University of Saskatchewan and AAFC-Lacombe (Alberta), in partnership with the Saskatchewan Pulse Growers and Alberta Pulse Growers.

A DEEP DIVE ON VARIETY DEVELOPMENT AND IMPROVEMENT

Improving pea varieties requires a great deal of "upstream" research. For example, disease resistance is a primary objective for pea breeders, but resistance genes are like needles in the haystack. That's why

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anywhere from poor to very good toward the west. As we learn more about soybean performance in Manitoba, it will continue to be our goal at MPSG to understand what makes a 20 vs. 40 bu/ac crop.

Interestingly, this growing season will not go down in history as a drought year due to the late-season rainfall included in average precipitation calculations. As frustrating as harvest has been, these late-season rains were crucial for moisture replenishment. Moisture that we may be thankful for next spring.

WHAT HAVE WE BEEN UP TO AT MPSG?

In 2019, MPSG research and production staff participated again in soybean and field pea disease surveys to supplement AAFC pathology research. Surveying fields in this capacity, in addition to our regular scouting efforts, is an excellent way for us to see what's happening in our crops at a more detailed level.

MPSG's On-Farm Network made a shift in 2019 to more intensive measurements in our field-scale research plots. Sometimes we see differences between treatments. Sometimes we don't. The goal of this work is to better interpret the data we are generating with farmers. Watch for this info coming from the On-Farm Network.

Each year, we brainstorm ideas and set priorities with other pulse and soybean specialists to deliver the most relevant production tools and information to you. Development of these resources can sometimes take months of planning, photography and information gathering. What you can expect to see in 2020:

- Dry bean desiccation and harvest guide
- Field Pea Scouting Calendar
- Dry Bean Scouting Calendar
- Updates to our Bean App

Do you have ideas for new resources or information we can deliver to you? Share your ideas with us! ■

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the AAFC pathology teams, including those at Brandon and Morden, are called upon to sift through the pea genome to identify disease resistance genes. MPSG customarily funds such behind-the-scenes research as a precursor to actual plant breeding.

With no commercial claim to these genes, MPSG members simply wait for those genes to be transferred into genetic lines with elite agronomic traits and turned into new and improved varieties. It's a system of funding that has worked in peas, as evidenced by a steady stream of improved varieties from the public system. Farmers seem to have accepted their role as funders at multiple points, starting with upstream research grants, progressing through plant breeding and ending with the retail cost of seed, including the royalties paid to the public breeding institution.

With respect to soybeans, MPSG has partnered with Ontario and Quebec growers in a breeding program at AAFC-Ottawa and soybean genetics research at Université Laval. Soybean breeding is a different game because, in contrast to peas, almost all soybean varieties grown in Manitoba are developed from the ground up by the private sector.

Theoretically, farmers provide funding to public agencies so that the type of upstream discoveries made in peas can also be found in soybeans, then licensed to private companies for inclusion in their mostly herbicide-tolerant varieties. Grower-funded findings can also be incorporated into conventional varieties developed by the institutions. Indeed, if Manitoba's conventional soybean production was more of a going concern, these varieties would be grown more extensively.

For certain, MPSG's joint investments at Ottawa and Laval are helping uncover some key upstream knowledge on yield, disease resistance and protein. As opposed to funding the development of new varieties, it is more likely that investments in protein and disease improvement will pay dividends back to Manitoba farmers in the near term.

Dry bean breeding in Manitoba

One program in which MPSG is deeply invested is dry bean development at AAFC-Morden. MPSG is the sole non-government funder of this work. Like other public programs, Morden's dry bean program, one of three operated by the federal government across Canada, generates new varieties as well as knowledge and germplasm.

Private plant breeders currently play a dominant role in the dry been seed market. As with other crops, the output from public programs is shared or licensed to public and private breeders. Recent advances include resistance to common bacterial blight and anthracnose. Again, these advances build on upstream pathology studies, also supported by growers.

The rate of new variety release from Morden is anticipated to increase as

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2019 Variety Market Share Summaries – Soybeans and Pulses

Variety information from the 2019 seeded acreage report was compiled from the Manitoba Agricultural Services Corporation (MASC) database as of September 11. Note that crops with less than three contracts or those with less then 500 acres were excluded from the data set. This report lists genetic origin of seed and does not necessarily reflect certified seed sales. Reseeded acres are also "double counted" in the analysis.

VARIETY	% MARKET SHARE
SOYBEANS	
S007-Y4 RR2Y	13.9
S0009-M2	5.5
LS Mistral	4.6
DKB005-52	4.1
Akras R2	3.7
No Variety	3.6
P005A27X	3.2
25-10RY	3.1
24-10RY	3.0
TH 87003 R2X	2.7
P007A90R	2.4
PS 0027 RR	2.3
NSC Watson RR2Y	2.2
Isis RR	1.8
LS Solaire	1.6
S006-W5	1.6
DKB003-29	1.6

VARIETY	% MARKET SHARE
soybeans continued	
23-60RY	1.6
S006-M4X	1.7
LS 003R24N	1.3
Mahony R2	1.3
P002A63R	1.3
TH 87003R2X	1.4
NSC Richer RR2Y	1.1
LS Eclipse	1.2
NSC Sperling RR2Y	1.2
NSC Gladstone RR2Y	1.1
DKB0005-44	0.9
P00A49X	0.9

TOTAL ACRES = 1,388,899

FIELD PEAS	
CDC Amarillo	21.4
AAC Carver	20.0
CDC Meadow	13.7

VARIETY	% MARKET SHARE
field peas continued	
Abarth	12.5
AAC Lacombe	6.8
4010	3.6
CDC Spectrum	3.0
CDC Saffron	2.8
Agassiz	2.5
CDC Raezer	2.3
CDC Inca	2.1
No Variety	1.5
Livioletta	1.3
CDC Greenwater	0.9
CDC Striker	0.8
ORGANIC FIELD PEAS	
CDC Greenwater	48.6
CDC Amarillo	40.7
4010	10.8

TOTAL ACRES = 556

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the breeding cycle reaches advanced generations. In the dry bean business, uptake by buyers and consumers is an important feature of new varieties. Improved agronomic traits for the farmer don't automatically translate into demand from the buyer; there needs to be something in it for the processor or consumer.

That raises an additional question about where grower investment should go. Increasingly pulse and soybean quality traits are developed to meet specific market requirements. It has been assumed that farmers have a stake in improving the quality of the crop by funding research in genetics and breeding. Indeed, MPSG is currently partnered with its sister organizations across Canada to research the cooking and milling quality of dry beans. There is a large bank of farmer-funded knowledge on the health attributes of dry beans as well as projects currently underway to improve protein content and quality in peas. However, in contrast to improved production traits such as disease resistance, unless farmers are being paid on a quality basis, the benefits flowing back to the farmer from these investments are less noticeable.

Soybean protein and return on investment

Sometimes, farmers do have a direct interest in the genetics of crop quality. In the case of soybean meal, growers face a potential discount for low protein. As a result, MPSG is actively funding research to increase protein. First, though, we must figure out how the plant manufactures protein in our northern climate. Much like upstream pathology, investments in university and government investigations into the genetic determinants of protein are helping figure this out.

Our neighbours in North Dakota are doing the same thing but are going one step further. The North Dakota Soybean Commission's funding for soybean breeding has enabled North Dakota State University to release a soybean with off-patent herbicide resistance. This variety is distributed through a system that, at the end of the day, makes seed more affordable for farmers in the marginal soybean production areas. Those growers don't have to look far to see the value of their check-off investment.

As governments and variety developers debate the future form of seed royalties, farmers need to consider the direct role grower organizations play in variety improvement. With success in public programs based on licensing to the private sector, farmers will remain vigilant over where their dollars are going and what is coming back. ■

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VARIETY	% MARKET SHARE
LENTILS	
CDC Maxim	28.3
No Variety	27.9
CDC Imvincible	15.4
No Variety (French)	15.2
Indianhead	8.1
No Variety (red)	5.2
TOTAL ACRES = 1,542	
PINTO BEANS	
Vibrant	50.7
Windbreaker	34.7
Monterrey	5.8
SV6139GR	3.0
SV6533GR	2.2
Island	1.8
CDC WM	1.3
TOTAL ACRES = 55,924	
NAVY (WHITE PEA) BEANS	
T9905	79.9
Indi	15.5
Envoy	2.1
Portage	1.1
T9903	1.0
TOTAL ACRES = 43,665	

VARIETY	% MARKET SHARE
BLACK BEANS	
Eclipse	76.4
CDC Blackstrap	18.6
Zenith	3.0
CDC Jet	1.0
BL Black tails	1.0
TOTAL ACRES = 27,308	
KIDNEY BEANS	
Red Hawk	44.7
Pink Panther	28.9
LRK Big Red	8.2
Dynasty	5.5
Cabernet	4.1
Montcalm	2.7
No Variety	2.1
Red Rover	1.8
Foxfire	1.2
TOTAL ACRES = 12,358	
CRANBERRY BEANS	
Crimson	36.5
Chianti	27.7
Bellagio	17.5
Etna	10.6
No Variety	7.7
TOTAL ACRES = 7,931	

VARIETY	% MARKET SHARE
SMALL RED BEANS	
Merlot	97.3
No Variety	2.7
TOTAL ACRES = 7,931	
PINK, YELLOW, GREAT NORTHERN BEANS	
No Var (Great Northern)	32.1
Beryl	16.9
No Var (coloured beans)	16.2
Rosetta (pink beans)	11.5
Hime	9.5
Pink Floyd	8.4
99131	5.4
TOTAL ACRES = 7,363	
2019 FABA BEANS	
Snowbird	58.7
Tabasco	26.9
Taboar	7.5
Florent	3.2
CDC Snowdrop	2.4
DL Tesoro	1.0
TOTAL ACRES = 8,052	

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GET TO KNOW THE HEROES AND VILLAINS IN YOUR PULSES.

PEA LEAF WEEVIL

These root nodule destroyers are small, white c-shaped larvae. Adult pea leaf weevils eat foliage and are slender, greyish-brown beetles – about 5 mm long with a broad-shaped snout.

CARABID GROUND BEETLES

(Bembidion quadrimaculatum)

These small, dark-brown beetles devour pea leaf weevil eggs. Look for four pale yellow or orange spots on the bodies of these Field Heroes.

PEA APHID

These plant sap suckers are green and pear shaped. They're just 3 mm long and 1.5 mm wide with long slim legs.

LADY BEETLES

Also know as Lady Bugs, the larval form is alligator-like in shape. The larvae is black with white, yellow, red or orange markings. These Field Heroes can eat as many as 160 aphids in 24 hours.

PARASITOID WASPS

Aphidius ervi are small, black wasps with brown legs. Females lay a single egg inside of an aphid, which hatches into a larva that consumes the aphid from the inside out.

CUTWORMS

Cutworm larvae eat through young plants. These caterpillars are about 3 to 5 cm long, with 3 pairs of true legs and 5 pairs of false ones. They hide in the day and feed at night. Their colour ranges from pale to black, and their markings may be lines or spots.

GROUND BEETLES

A ground beetle's head is narrower at the eyes than the section behind head and its front wings may have striations or pits. There are 400 species of this Field Hero on the Canadian Prairies. Depending on their size, ground beetles may attack eggs, larvae or pupae of cutworm.

PARASITOID WASPS

Depending on the species, parasitoid wasps can be extremely tiny. For smaller species, 4 or 5 will fit on the head of a pin, which makes them difficult to identify. These Field Heroes lay their eggs and pupate within cutworm, causing the pest to become a "mummy."

FIELD HEROES

THINK BENEFICIALS BEFORE YOU SPRAY

- Scout for pests and predators
- Only spray when economic thresholds are exceeded
- Use selective insecticides, where possible
- Consult the label for best time to spray
- Rotate crops
- Maintain habitat for beneficial insects

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2019 Review of Insects in Pulse and Soybean Crops in Manitoba

John Gavloski, Entomologist, Manitoba Agriculture and Resource Development

WHILE DOING GENERAL field scouting of pulse and soybean crops, it is not unusual to find a lot of insects in the fields. That is not always a bad thing, as many times, most of what is there are beneficial insects (decomposers, predators, parasites) or insects not capable of causing significant yield or quality problems. But there are a few insects that can cause significant harm to pulse and soybean crops, and some of these were at levels that were capable of causing damage in 2019. This article will focus on those insects that were of economic concern this past growing season, plus a potential pest of peas that was found for the first time in Manitoba in 2019.

CUTWORMS

Cutworms were of economic concern in dry beans, faba beans, peas and soybeans in 2019. There were extensive insecticide applications, as well as some reseeding of soybeans, peas and faba beans.

Cutworms overwinter in Manitoba, so farmers and agronomists will want to make scouting for them a priority as the crop starts coming up in 2020. They can be a tough insect to monitor because they are nocturnal, spending the day hiding under debris or in the soil, and coming out at night to feed.

Redbacked cutworm larva and pupae

Several species of cutworms can be present in pulse crops and their lifecycles can differ. That can result in cutworms being present for quite an extended period in the spring if the population is a mix of species. The dingy cutworm overwinters as partially grown larvae, while the redbacked cutworm overwinters as eggs. These are two of our common species of cutworms in Manitoba. Different species may result in there being some variability in sizes of larvae and extend the length of time cutworms are actively feeding.

Cutworm populations can be quite patchy and levels can vary greatly between nearby fields. Because of this, field scouting is important. Levels may be low and uneconomical in some fields and higher in others. Even within a field, the population can be high in a patch or specific area of the field and lower in the rest of the field. If this is noted, then controlling cutworms in the infested patches may be the most economical option.

Some crops, such as peas, have the ability to compensate for some of the feeding by cutworms, while other crops have little ability to compensate. Peas cut early and at the soil surface regrow or branch from subsurface nodes.

GRASSHOPPERS

Reports of high grasshopper populations and control were more common in soybeans than pulse crops. Grasshoppers were of concern and insecticides were applied to control them on soybeans in many areas. In some instances, just headlands were treated. Harvest of nearby crops at times resulted in grasshoppers moving into soybeans. Some noticed grasshoppers moving into fields after field margins or ditches were mowed.

Although pulse crops do not seem to be preferred by grasshoppers, they will feed on them, particularly when other crops have started to mature, and later-harvested pulses and soybeans are among the few green options available. Often with pulse crops and soybeans, the infestation is much heavier around the field edge and treating the field edge is all that is needed, although, in years of high grasshopper populations, there can be exceptions to this.

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

Scouting for grasshoppers should begin early in the season. Our pest species of grasshoppers overwinter as eggs and hatching usually starts in late May or early June. In many instances, most grasshopper eggs will have been laid at the edges of fields, or along the roadsides. Since young grasshoppers can't fly, early-season populations are often concentrated around field edges. If high populations are detected early, early season control along the field edges may prevent more serious problems later in the season. Also, lower rates of insecticides can be used on young grasshoppers than adult grasshoppers.

If grasshoppers do start feeding on pulse crops, realize that low levels of defoliation will not cause economical yield losses. Research in Ontario indicated that prior to flowering, beans are able to tolerate up to 50% leaf loss with minimal losses in the final yield. Complete defoliation prior to flowering delayed maturity by 30 days. Lower levels of defoliation did not delay maturity. The impact of defoliation is more significant at later stages. Losses will depend on the growing conditions and the ability of the plant to recover. Losing more than one-

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third of the leaves during flowering or pod fill can greatly reduce yield.

Action thresholds for grasshoppers in dry beans are 35% defoliation before bloom and 15% defoliation after bloom. Often a border spray is all that is needed. Thresholds for grasshoppers are similar for soybeans. A rescue treatment may be warranted if the defoliation exceeds 30% during pre-bloom (i.e. vegetative) stages; 15% from bloom to pod-fill; or 25% from pod fill to maturity (unless pod feeding is observed).

THISTLE CATERPILLARS

Thistle caterpillars are the larvae of a butterfly called the painted lady butterfly, which overwinters in southern California and Mexico. They migrate towards the prairies, often arriving in June, although in some years they can be entirely absent. They normally prefer to lay eggs on Canada thistle plants, but under some conditions will lay eggs on other plants, such as soybeans or sunflowers, as well. Large amounts of painted lady butterflies began to be noticed in early June in some areas this year. Thistle caterpillars started to be seen in soybean fields in late June. Some soybean fields in the northwest and eastern regions were sprayed to control thistle caterpillars in earlier/mid-July. Thistle caterpillars were also noticed on Canada thistle and round leaf mallow.

Larvae feed on leaves of their host plants and also build a nest by producing a loose webbing, which at times may result in the leaves being folded or tied together. Frass produced by the larvae may become entrapped in the nest.

Thistle caterpillars on soybeans

A suggested threshold for thistle caterpillars in soybeans is 25 to 30% defoliation of plants on average before bloom; 20% after bloom or pod set. In some literature, you will see a nominal threshold in the pre-bloom stages of soybeans as 40% defoliation. Regardless of which is used, soybeans can handle a fair amount of defoliation before yield is significantly impacted. It would be rare for soybean fields to, on average, have this level of defoliation from thistle caterpillar, although plants or patches within a field can certainly go beyond this. When assessing a plant for the level of defoliation, make sure to consider all the leaf material on the plant. Sometimes individual leaves are heavily defoliated, while other leaves have very little.

Unlike many crop species, soybeans have a remarkable capacity to withstand a lot of defoliation without significant yield loss. They do this by both tolerating and compensating for leaf loss. Yield losses are prevented because soybean plants typically produce excess leaves. Also, when leaf loss becomes too high, plants can help compensate for losses by retaining older leaves and maintaining high levels of photosynthesis. Soybeans can also compensate for stand losses. Usually, gaps in soybean stands are filled by additional growth and branching of the remaining plants. In this way, soybean yields are maintained despite substantial defoliation or reductions in plant population. These tolerance and compensatory traits of soybean reduce the need for insecticides or other management tactics in many situations.

In soybeans, a 40% leaf loss during any vegetative stage will result in a three to seven percent yield reduction. Defoliation of 20% during the pod-forming and pod-filling stages will result in similar yield reductions. This information can help you gauge the economics of defoliation and whether insecticides would be economical.

PEA LEAF WEEVIL

Larvae of pea leaf weevils feed on the nitrogen-fixing nodules on pea roots. High levels of such feeding inhibit the nitrogen-fixing ability of the plant, which can reduce yields if the soils are nitrogen deficient. The first record of pea leaf weevil in Alberta was in 1997, and it was first found in Saskatchewan in 2007. At the start of this year, it had not been confirmed from Manitoba but had been detected in eastern Saskatchewan.

Pea leaf weevil

An agronomist from northwest Manitoba sent in four weevils collected in early September from pea stubble near Swan River. The agronomist commented that they are easy to find in harvested pea fields. The weevils were identified as pea leaf weevils. That is the first confirmation of pea leaf weevils in Manitoba.

Only field peas and faba beans are potentially at risk of damage from pea leaf weevil. Other crops in the bean family may be fed on by adults but do not suffer significant damage from larvae.

In 2020, we will be trying to determine the range of pea leaf weevil within Manitoba. That will require us finding the adult weevils. They can be captured in pheromone-baited traps, or collected from plants they may be feeding on. Adult weevils chew the leaf margins, resulting in a characteristic notching along the leaf margins. Pea growers or those scouting pea crops who think they may have pea leaf weevil in their field are advised to contact John Gavloski, entomologist with Manitoba Agriculture, or a production specialist with Manitoba Pulse & Soybean Growers. That will assist us in tracking the distribution of pea leaf weevil in Manitoba. ■

www.manitobapulse.ca

The severity of the waterhemp infestations in Manitoba this year were a significant cause for concern.

Waterhemp in Manitoba

Tammy Jones, Weed Specialist, Manitoba Agriculture and Resource Development

PIGWEED HAS BEEN an issue in Manitoba bean production (edibles and soys) in previous years with confirmation of more populations of Group 2 herbicide-resistant redroot pigweed and increasing occurrences of green pigweed/Powell amaranth. But another pigweed species caught many by surprise in 2019, even though the threat was imminent.

Waterhemp was confirmed in four new municipalities in the province this summer. While plants have been sighted in Manitoba in previous years, the severity of the infestation this year was a significant cause for concern. Previous discoveries in Manitoba involved small patches or individual plants, but this year's detections involved a substantial number of acres and significant hours of roguing, mowing and spraying to destroy plant material. That will also mean years of monitoring and surveillance to ensure this Tier 1 noxious weed has been eliminated, as required by current legislation.

DISTRIBUTION OF WATERHEMP IN SURROUNDING AREAS

Waterhemp had been detected in the US Red River Valley in the 1990s, with the first confirmed herbicide-resistant populations discovered in Iowa and Illinois in 1993 to the Group 2 herbicide imazethapyr. The first Canadian confirmation of herbicide-resistant waterhemp (to that same active ingredient) occurred in 2002 in Ontario. And while the waterhemp populations were spreading in the U.S. and developing different combinations of herbicide resistance (to Groups 2, 3, 4, 5, 9, 14, 15 and 27), Manitoba had been relatively lucky to see a minimal number of detections. Media sources indicated that the threat was creeping closer, spreading across eastern North Dakota and being found in more counties in Ontario. So when the calls started coming in 2019, there should have been no surprise. As many have said, weeds do not respect borders.

IDENTIFICATION

Waterhemp has oval to lance or spear-head shaped waxy-looking leaves that grow three to six inches long with an alternate leaf arrangement on a hairless stem. It typically grows four to five feet tall but can grow to more than 10 feet tall. Waterhemp is dioecious (meaning there are distinct male and female plants) and many small green flowers form an inflorescence in July-September. The terminal inflorescence can be more than one foot long, with many thin lateral branches that produce, on average, 250,000 seeds per plant.

While the description of waterhemp does not sound at all like redroot pigweed, as small plants, they can look very similar. Two differentiators that are mainly used to identify waterhemp versus redroot pigweed are hairs on the stem and the seed head.

MANAGEMENT

There is no easy answer to controlling waterhemp. It germinates throughout the summer when there is sufficient sunlight, which means that one herbicide application is unlikely to be effective for row crop situations. It is important to note that there are extremely limited post-emergent control options in edible beans and a few more options for soybeans as we see new herbicide-tolerant traits commercialized. Even with these options, weed control must be done when the weeds are small, less than 10 cm or four inches. "Rescue treatments" of herbicides on waterhemp result in poor

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Counties in North Dakota confirmed to have waterhemp are highlighted in red. Source – Joe Ikley NDSU.

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Redroot pigweed (left) has hair on the stem while waterhemp (right) is hairless.

Redroot pigweed (left), green pigweed (centre) and an early stage of a male waterhemp inflorescence (right).

control, at best. In addition, the Ohio State University Extension Agronomy team has indicated that the trend is for waterhemp to develop resistance to any new herbicide sites of action that are used in post-emergent treatments within about **three** cycles of use.

Crop canopy closure is key to reducing the germination and competition from waterhemp. That can be accomplished in a number of ways:

- Use of soil residual herbicides
- Narrow row spacings
- Inter-row cultivation
- Cover crops
- Increased seeding rates

These strategies, in addition to crop rotation, machinery sanitation to prevent seed spread and destruction of escaped weed patches, will slow the spread of this significant weed. If a field becomes infested with waterhemp, Ontario counterparts estimate that weed control costs will increase by $45 to $60/acre. That is is why the eradication of waterhemp is the ultimate goal. ■

Waterhemp will survive a normally effective herbicide, if applied after the recommended staging.

Instagram
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Photo: Prograin

Conventional Soybeans – Are they an option for my farm?

Dennis Lange, Industry Development Specialist – Pulses, Manitoba Agriculture and Resource Development

IN 2019, MANITOBA growers planted approximately 13,000 acres of conventional soybeans. These acres are small in comparison to the 1.3 million acres of herbicide-tolerant lines. Conventional soybeans are used for products such as tofu and soymilk and require specific varieties to meet the end-user requirements. Growing conventional soybeans requires more traceability and segregation than herbicide-tolerant lines, and these requirements should be discussed with your buyer to determine what is needed. This article will look at some of the agronomy behind growing conventional beans.

The first step in growing conventional beans is identifying the buyers. In Manitoba, there are four buyers — Prograin, Sevita through Nadeau Seeds, DNS Commodities and Hensall Co-op. Recently, there have been a few interesting premiums for conventional beans, with some reports of levels being offered from $2–$2.50 per bushel above commercial crush beans. Having a conversation with the people who are going to buy your beans will help you identify premiums, choose preferred varieties, and understand what quality factors are required to grow and market these beans. These companies export conventional beans into some of the major markets such as Japan, China, Korea and Malaysia.

So what varieties are available and how do they yield compared to the herbicide-tolerant varieties? A good source of information is *Seed Manitoba*. Here you can find both information on agronomic performance and market representatives of these lines. *Seed Manitoba* 2019 shows the check variety OAC Prudence has a long-term yield of 48 bushels/acre averaged across 125 site years. That is close to the check herbicide-tolerant variety, TH 33003R2Y, that has an average of 50 bu/ac averaged across 50 site years. These are test plot results, but it does show how the conventional varieties can yield when a high-quality seed is used and when weed control is well managed. Several new lines coming to market have suitable maturity and improved yield potential. For more information on new lines, check out *Seed Manitoba* or Manitoba Pulse & Soybean Growers *Pulse and SoybeanVariety Guide*.

Weed control for conventional soybeans is a different management package than herbicide-tolerant systems. First, start with a relatively clean field, avoiding fields that have persistent and challenging weed problems such as wild buckwheat, lambsquarters and kochia (Group 2 resistant). You should start with a pre-plant incorporated and/or pre-seed burn off herbicide. That is a great way to start and will help to control early-season weeds. That should be followed up with early and timely weed control throughout the season. Weed control products can be found in the *Manitoba Field Crop Protection Guide* and include, but are not limited to, post-emergent products such as Basagran Forte, Odyssey and Viper ADV. Weed control does take more management and expense than the herbicide-tolerant system, but can be done successfully.

One key to help with weed control is plant stand establishment. Choosing a variety and seed lot with good germination and vigour will help to establish a strong plant stand that will

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help to compete with weeds. Growers should target the range of 140–160,000 plants/acre established. That means, with factoring in germination and overall seed mortality, growers may be targeting a seeding rate of 200,000–210,000 seeds per acre in a solid-seed operation. I would like to see growers shoot for the higher side of that number to ensure the plants can compete with weeds. If you are planting row crop soybeans, I would recommend the same established plant stand, but you may be able to drop your seeding rate based on your planting equipment to 180–190,000 seeds/acre.

Seed contamination is another important consideration to keep in mind. Keep two full growing seasons between herbicide-tolerant varieties and conventional soybeans to avoid the risk of GMO soybean contamination. Volunteer corn is also a contamination risk, so avoid conventional beans on corn ground.

Proper inoculation will help to supply the plant with the needed nitrogen for the growing season. That means using an on-seed inoculant combined with a granular in-furrow inoculant on fields with a short history of soybeans.

Overall soil fertility should be managed through the crop rotation versus management of the phosphate and potassium in the soybean crop. Get your field ready for conventional beans ahead of time. First, identify any nutrient deficiency through soil testing and try to build your nutrient levels ahead of soybeans in the cereal and oilseed years. That is done through higher allowable seed-placed fertilizer rates, banding of fertilizer whenever possible to raise your phosphate levels to the range of 10–20 ppm Olsen and managing other nutrients such as potassium when necessary.

In conclusion, a checklist has been included to help get you started when considering growing conventional soybeans.

Following these suggestions will help you successfully grow conventional beans. The marketing conversations you have with the buyers will help you determine if these beans have a fit on your farm. ■

Checklist for Growing Conventional Soybeans

1. Find a buyer and determine whether the premiums and buyer requirements are suited to your farm operation.
2. Select fields with low weed pressure, good fertility and avoid fields where volunteer herbicide-tolerant soybeans and corn could be an issue.
3. Choose high-quality seed and use appropriate plant populations.
4. Maintain good weed control throughout the growing season
5. Before harvest, ensure proper combine and bin cleanout to avoid any contamination from GM soybeans.

Findings of Soybean Cyst Nematode in Manitoba

Laura Schmidt, Extension Specialist, MPSG

SOYBEAN CYST NEMATODE (SCN) is a microscopic roundworm that parasitizes soybean roots. Different types of nematodes can commonly be found in Manitoba, but not all are harmful to crops. SCN is a harmful type of nematode and one of the most damaging pests to soybean crops in North America. Preventative action, early detection and timely management are vital in avoiding significant yield loss from SCN.

Infection of SCN can impact growth and yield by removing plant nutrients, disrupting nutrient and water uptake and impeding root growth. It can also reduce the number of root nodules and therefore inhibit nitrogen fixation. SCN-infected plants may also be more susceptible to the development of root rot and seedling diseases, due to openings in the root created by cysts. Once above-ground symptoms are noticed, up to 30% yield loss can already be expected.

STATUS IN MANITOBA

The presence of SCN has been confirmed in Manitoba. This confirmation was made possible due to survey efforts led by Dr. Mario Tenuta and his laboratory (University of Manitoba) that have taken place from 2012 to 2019. SCN was identified by visual and molecular DNA methods in four out of 106 fields and four out of 18 municipalities sampled across all surveys.

Rural municipalities where SCN has been detected are Norfolk-Treherne, Rhineland, Emerson-Franklin and Montcalm (Figure 1). Given the large gap between regions with positive identification, there is a possibility that SCN may be present in fields that were not included in the survey. Further, SCN may have established in a field since sampling has occurred.

Cyst populations found in these four fields are extremely low and consistent with the recent establishment of this pest. The arrival of SCN in Manitoba is not surprising, given the northward spread and distribution across North America.

PREVENTION AND MANAGEMENT

Once SCN has arrived, it cannot be entirely eradicated and spreads rapidly. Anything that causes soil movement can contribute to the spread of SCN, including field equipment, floodwater, birds, footwear and clothing. Cleaning soil from equipment, vehicles, soil sampling equipment and clothing will reduce the risk of introduction or spread.

Eggs can survive for several years in the absence of a soybean crop. However,

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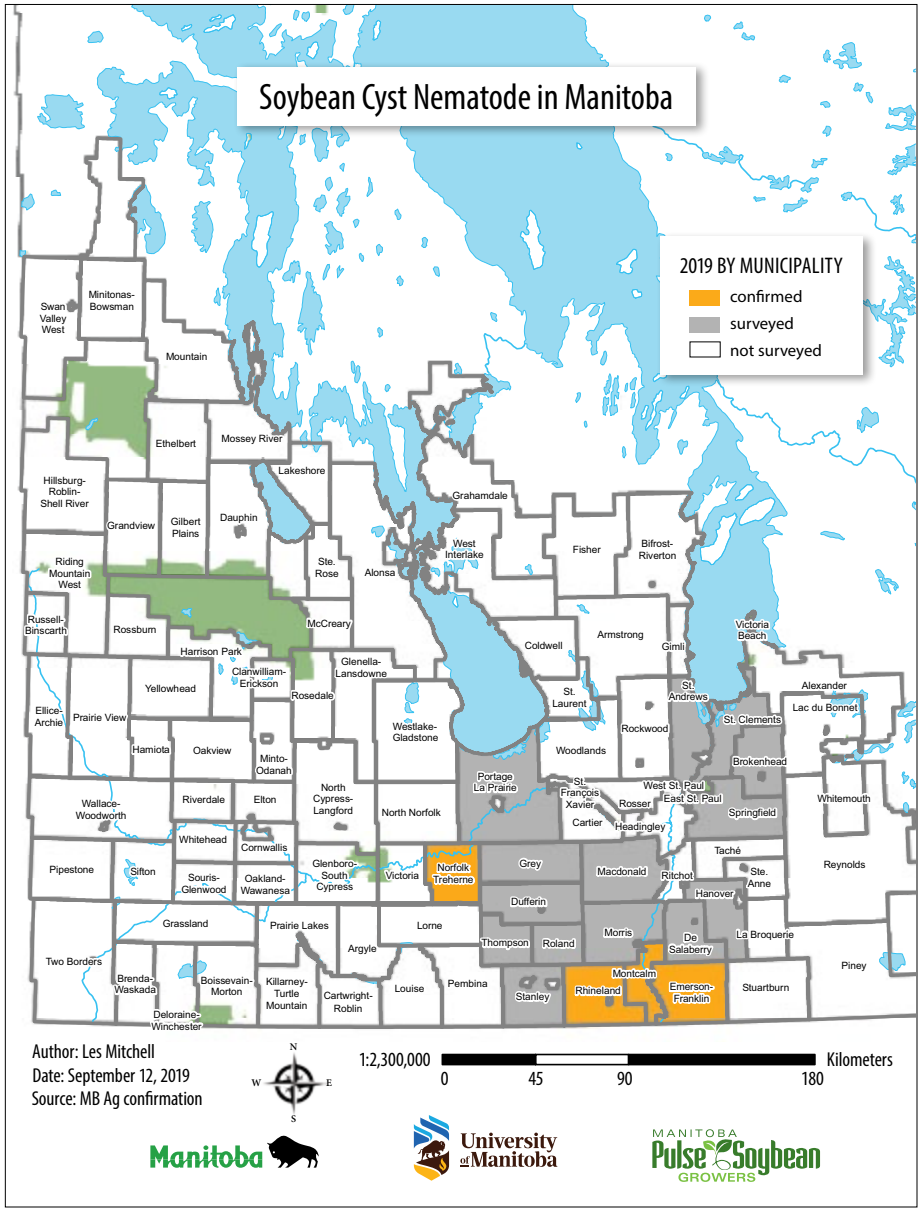
Figure 1. Soybean Cyst Nematode in Manitoba



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SCN requires a host plant to reproduce. Management options to minimize the population of SCN include rotating to non-host crops, growing SCN-resistant varieties, growing cover crops, reducing tillage and controlling host weed species.

SCOUTING AND IDENTIFICATION

Scout for SCN from late July through September, during the reproductive stages until maturity, by gently digging up roots and examining them for cysts. Roots should be soaked in water to avoid breaking off any potential cysts. Late-season scouting should be done before any tillage operations. Assess the most high-risk areas of a field, including:

- Approaches and entrances
- Low spots
- Shelterbelts
- High pH areas
- Any generally low-yielding areas

Unfortunately, there are no distinct, above-ground symptoms specific to SCN. So it is possible that we may already be seeing it but have not identified it. At low levels of infection, plants may still appear healthy. At high levels of infection, plants may appear stunted and chlorotic or necrotic. Symptoms may resemble nutrient deficiencies, drought stress or other abiotic factors. Therefore, digging up the roots is the best way to identify this pest.

Below-ground symptoms are more unique due to the presence of white, lemon-shaped cysts on the roots. These cysts are much smaller than root nodules and may require the use of a magnifying lens.

SOIL TESTING FOR SCN

If SCN is suspected, soil samples can be collected and submitted to Agvise following the correct soil sampling protocol:

- Target soil collection from suspect areas.
- Sample after harvest and prior to soil freeze-up. If sampling after soybean harvest, sample directly within harvested rows prior to tillage. Following other crop harvest, sample after fall tillage if this is your common practice.
- Collect 15 cores from every 20 acres. Sample the top eight inches using a push probe or small diameter soil auger.
- Mix soil cores in a pail and place in a zip-lock bag. Label, refrigerate and submit to Agvise as you would with other samples.

If results come back positive, contact MPSG and Dr. Mario Tenuta, Soil Ecology Lab, University of Manitoba.

Survey Details

Dr. Mario Tenuta and his students have sampled commercial fields since 2012, detecting SCN through molecular methods.

Cysts were recovered from 12/30 fields in 2017. Most of these cysts were broken and not filled with eggs, preventing accurate identification. Intact cysts were recovered from 7/12 fields. Only 4/7 fields had cysts in good enough condition for molecular testing.

Molecular DNA analysis of eggs in cysts was conducted using multiple methods. That included two diagnostic polymerase chain reaction (PCR) tests and sequencing of multiple DNA gene targets.

Cyst populations from the four fields were extremely low and consistent with the recent establishment of the nematode. Populations were 2, 1, 14, and 14 cysts per 5 lbs soil in each of the fields. That is compared to 3,000–4,000 cysts per 5 lbs soil in areas of Ontario and the U.S. Midwest, where the nematode has been present for many decades.

The four fields with positive cyst identification were revisited and sampled again in May 2019. These four fields again had cysts similar to soybean cyst nematode in appearance. Two of the four fields had cysts in good enough shape to examine their molecular DNA, which matched the DNA of soybean cyst nematode.

One field with a relatively higher cyst population was revisited and sampled again in August 2019. Roots were randomly examined for cysts and some plants had a few white to yellow lemon-shaped cyst nematodes on their roots. There were no visible above-ground symptoms (e.g., stunting, poor canopy closure, chlorosis).

This research is conducted by Ph.D. student Nazanin Ghavami at the University of Manitoba. It is a collaborative effort between the university, Manitoba Pulse & Soybean Growers and Manitoba Agriculture and Resource Development. Funding was provided by Manitoba Pulse & Soybean Growers, Manitoba Agriculture and Resource Development and the Western Grains Research Foundation. Albert Tenuta of the Ontario Ministry of Agriculture, Food and Rural Affairs is a project collaborator.

Visit manitobapulse.ca for additional resources on SCN. ■

Dry Bean Research Balances Agronomy and Quality

New varieties must combine field performance with canning and cooking quality.

Parthiba Balasubramanian, Agriculture and Agri-Food Canada

WHEN A CONSUMER opens a can of Canadian beans, whether they realize it or not, they're gazing at a thing of beauty. Every bean in the can needs to be comparably sized, evenly coloured and pleasingly shaped, with nary a broken bean in sight.

This simple but essential quality experience is only possible because of the hard work of bean breeders across Canada. In one aspect of their work,+ breeders like Alberta's Parthiba Balasubramanian develop varieties in different classes of dry beans that perform well in the field.

That's not all. In addition, no new Canadian bean variety is registered without painstaking research into its canning and cooking qualities. With Canada being the fourth largest exporter of dry beans worldwide, and more than 98% of dry bean production consumed as food, there's a lot resting on getting it right.

In 2018, a five-year funding commitment from the Canadian Pulse Science Research Cluster was announced, ensuring Balasubramanian's long-standing work will continue. His task? Ensure Canadian dry beans meet exacting processor and consumer expectations.

QUALITY IN, QUALITY OUT

"A seed that's nice going into the can usually comes out nice after canning as well," said Balasubramanian, Dry Bean Breeder with Agriculture and Agri-Food Canada (AAFC) in Lethbridge. "In the early part of the breeding program, the focus is primarily on the seed quality: size, shape, colour and seed coat."

As Balasubramanian explains, lines failing to meet these quality demands are discarded early in the process. Only advanced lines of cultivars that have been through six years or more of development and breeding will face the final hurdle.

Harvesting 200-gram bean samples for each cultivar, Balasubramanian and his team work cooperatively with the Ontario Pulse Crop Committee on a project to cook, can and evaluate lines being considered for registration.

"For example, hard seeds don't absorb water easily but they will absorb water during the canning process," Balasubramanian said. "When they absorb water inside the can, they cause plumping that might break the seed during processing."

Of dry bean cultivars that enter the canning and cooking evaluation program, only a select few will have what it takes to move on to registration trials. Those cultivars are high-yielding, disease resistant — and, in the case of Manitoba — early maturing, along with the consistent quality that food processors and consumers demand. Many are tested, but few are chosen.

So, when an Manitoba grower puts a new dry bean variety in the ground, they can be sure it's going to be agronomically sound and produce high-quality food.

"I work with a great team here," Balasubramanian said. "We have good germplasm and good funding. We want to make sure that any improvement we make is directed back to the growers. I am confident we will do that." ■

PROJECT AT A GLANCE

PROJECT TITLE Identification of dry bean lines in Ontario and the Prairies with improved canning and cooking quality traits

PROJECT LEAD Parthiba Balasubramanian, Agriculture and Agri-Food Canada

TOTAL VALUE OF PROJECT $100,000

START DATE April 1, 2018

COMPLETION DATE March 31, 2023

On-Farm Research – by Farmers, for Farmers

Megan Bourns, On-Farm Network Agronomist, MPSG

IN TODAY'S ERA of high input costs, low margins and considering the ever-increasing need to improve sustainability of the farm operation, validation of agronomic management decisions made on-farm are ever-more important. Agronomic recommendations are usually generated by small-plot research, which can efficiently and effectively compare numerous treatments in the same location, at the same time. But what happens when those treatments deemed most effective by small-plot research are used at a field scale? Do they behave the same? Are they just as efficacious? Are they economical? On-farm trials can help answer these questions.

MPSG'S ON-FARM NETWORK – WHAT'S IT ALL ABOUT?

Manitoba Pulse & Soybean Growers (MPSG) began funding on-farm research trials back in 2010. In 2014, MPSG made a commitment to expand its on-farm research program throughout the province, and in April of 2014 MPSG's On-Farm Network (OFN) was officially launched. The OFN is a network of pulse and soybean research conducted on-farm, fully funded and directed by pulse and soybean producers in the province. The goal of the OFN is to test new products and practices for pulse and soybean production while empowering farmers to conduct straightforward, reliable research on their farms. Three principles guide the OFN:

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

Since its beginning, the OFN has facilitated approximately 335 trials (Figure 1, Table 1). In the 2019 growing season alone, the OFN conducted 51 soybean trials, six dry bean trials and eight pea trials, covering a range of agronomic questions from the efficacy of fungicide applications in soybeans, peas and dry beans to soybean seeding rate, and several in between.

Figure 1. Locations of MPSG's On-Farm Network trials from 2012–2019.

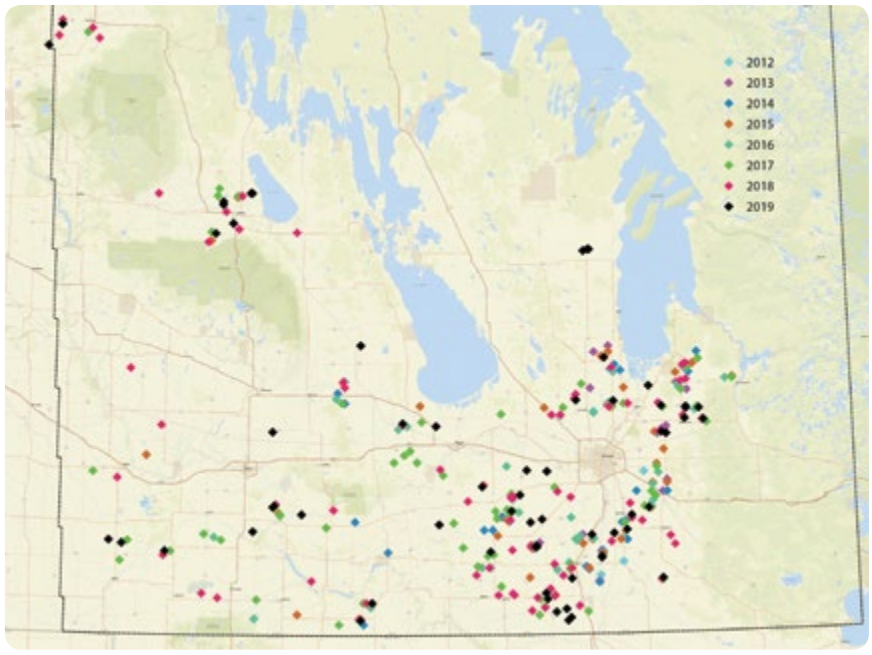

Table 1. Number of On-Farm Network trials for soybeans, peas, dry beans and faba beans from 2012–2019.

Trial Type	Crop	Number
Rolling	Soybean	12
Row Spacing	Soybean	10
Seeding Rate	Soybean	23
Fungicide	Soybean	62
	Pea	20
	Dry Bean	14
	Faba Bean	1
Seed Treatment	Soybean	44
Inoculant	Soybean	70
	Dry Bean	1
Biological	Soybean	1
Nitrogen Fertility	Dry bean	2
Potassium Fertility	Soybean	21
Residue Management	Soybean	1
Population	Soybean	53
	Total	**335**

MPSG'S ON-FARM NETWORK – WHAT TO EXPECT

Conducting on-farm research through the OFN is a collaboration between the producer and the MPSG on-farm research team. On-Farm Network research is producer-centric; trials are selected, designed and implemented to address the questions of MPSG farmers. This means if, as a farmer, you come to us with a question about agronomic management on your farm or are curious if a new-fangled biological product your chem guy has been trying to convince you to buy for months actually works, we will help you design a trial to find those answers. Working with MPSG through the OFN, you don't just get trial design — we will be involved in every step of the process from trial setup, establishment, midseason data collection and harvest. We want to facilitate the type

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of first-hand research that will help you as a farmer make management decisions going forward.

An important aspect of collaborating to conduct on-farm research through the OFN is the ability to build large datasets to answer production questions across space and time. Many farmers have the same questions — for example, is a fungicide application in soybeans necessary? Or, what N rate should I put on my dry beans? Do I need to double inoculate after multiple years of growing soybeans? By conducting trials to answer these questions over a number of farms and a number of years, trends can be analyzed. In this way, on-farm research through the OFN not only enables individual farmers to see first-hand benefits of research conducted on their own farms, but it also facilitates answering larger questions by pooling data from several farmers together.

SO, WHAT ARE ON-FARM TRIALS?

On-farm trials are large, field-scale trials established with field-scale equipment by the farmer. Unlike small-plot trials which have a lot of treatments in a small area, on-farm trials compare just a couple of treatments but over a much larger area. The difference in scale between small-plot and on-farm trials results in differences in background variability across the trial area (Figure 2). Small-plot researchers generally want very uniform site areas. However, in on-farm research we want to capture as much representative field variability as possible to determine how a treatment behaves at the scale it would be applied if it were to become normal farm management practice.

There are a couple of key considerations to make an on-farm trial useful. A specific question will help guide treatment selection, trial location and design. Because on-farm trials are testing treatments to see if they should be adopted on the farm, the treatments selected should be realistic to normal farm operations. Physical layout of the trial is also important. Although an on-farm trial can encompass variability across a field, the variability within the trial area should not unnecessarily introduce bias to the trial results. For example, locating a trial where a field drain runs the length of an entire strip could skew the trial results. Replication of treatments across the field is important to determine whether yield differences are actually a result of the treatment, rather than simply a result of field variability within the trial area. Randomizing the order of treatments within the replicates helps reduce any bias the natural field variability could introduce into the data. Figure 3 shows an example of a randomized and replicated trial layout. Collecting midseason data, whether it be plant counts, nodulation ratings, disease ratings or otherwise, depending on trial type, can help validate yield results at harvest. Harvest data from each individual strip should be collected either with a weigh wagon, grain cart with a scale or using a calibrated yield monitor. Once all the data has been collected, statistical

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Figure 2. Schematic of small-plot and on-farm trial layouts, with clear differences in the background variability within the trial area indicated by the NDVI

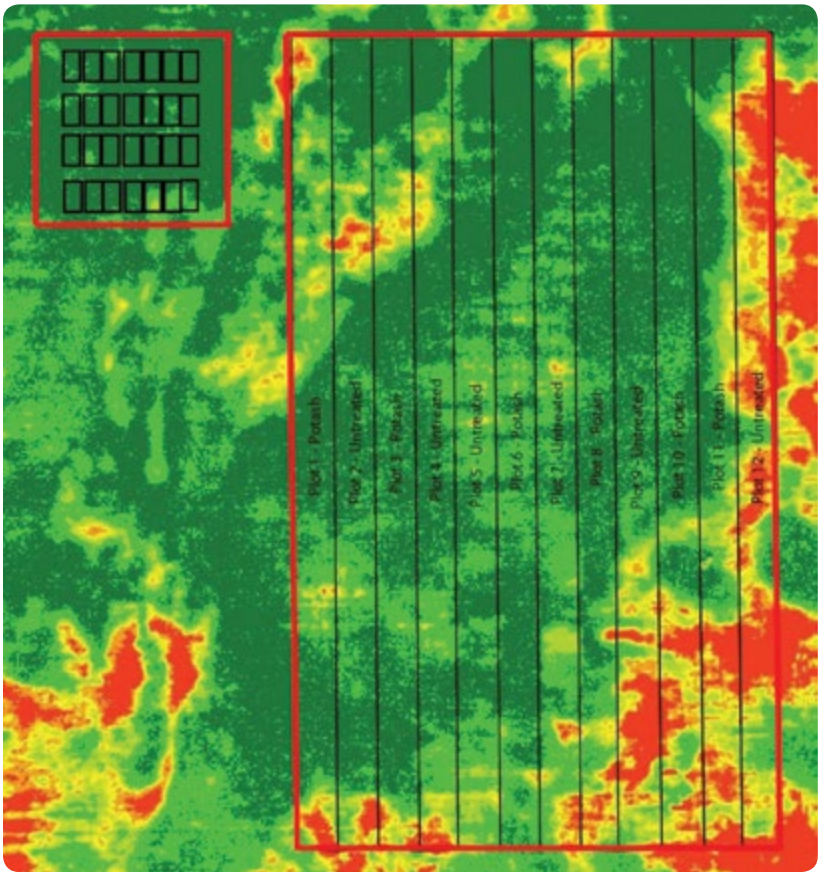

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Figure 3. A typical on-farm trial plot layout with randomization and replication of two treatments within the trial area.

analysis is required to determine if any numerical differences in yield are actually a result of the treatment applied.

DEMONSTRATION VS. ON-FARM TEST — WHAT'S THE DIFFERENCE?

On-farm tests are not the same as in-field demonstration plots. A demonstration generally consists of individual strips of varieties or products, showcased side-by-side, that are not randomized and replicated. Demonstrations can exemplify visual differences between varieties or certain products but cannot be used to determine the efficacy of one over another. When it comes to a question of what treatment, variety or management practice results in more yield, a replicated, randomized on-farm trial is the way to go.

ASK QUESTIONS, FIND ANSWERS

At the end of the day, on-farm research is done by the farmer, for the farmer. Well-conducted on-farm trials investigate questions and outcomes on a case-by-case basis while evaluating the overall effects of management decisions through combining data across trial locations and years. Facilitating trials to generate meaningful results is a balance between our efforts and producer efforts. For producers, there is time involved in conducting the trials on-farm, particularly at seeding and harvest, two of the busiest times of the growing season. But, this investment of time generates valuable information on the agronomics and economics of different management practices and products. Results from on-farm trials can be used to shift management practices or validate current practices on individual farms, but they can also be pooled together across space and time to gain an overall, big-picture understanding of the impact of a treatment or decision. ■

on-farm network
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Interested in learning more or getting involved?

CONTACT **MEGAN BOURNS**
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Intercropping to Meet Production and Environmental Goals

Dr. Martin Entz, University of Manitoba

IN NATURE, PLANTS rarely grow alone. In some agricultural production, farmers have followed the lead of nature and grown two or three crops together in the same field. This practice is referred to as "intercropping," and it was widely used in ancient agricultural systems. First Nations farmers, who grew corn, potatoes and squash in places like Netley Creek, MB thousands of years ago, practiced intercropping. Today, intercropping maize with pigeon pea is a popular practice in parts of Africa. An important incentive to intercropping is yield stability. If one crop fails, the other can fill in. Therefore, intercropping is a useful strategy for food security.

Intercropping is making inroads in Canada and farmers are now experimenting with a wide range of crop types. My first encounter with intercropping was "Peola," the mixing of peas and canola, at the Melfort research station of Agriculture and AgriFood Canada in the 1980s. In the early 1990s, my then U of M colleague, Kevin Vessey, and his graduate student, John Waterer, conducted field studies on this crop mixture and confirmed its "over-yielding" potential in Manitoba. A few years later, former U of M weed scientist Rene Van Acker and his graduate student Tony Szumigalski went on to test peola and other intercrops under low and high crop input scenarios. They found that the pea/canola intercrop reliably resulted in yield increases, but canola/wheat and pea/wheat intercrops were a bit less reliable. The first organic grain intercropping study in Manitoba was conducted by my graduate student Jackie Pridham in 2003 and included a wide combination of cereals with pulse and oilseed crops. More recently, excellent intercropping research has been conducted in Melita, MB by Scott Chalmers while Lana Shaw conducts intercropping research across the Saskatchewan border near Redvers. Scott and Lana deserve a great deal of credit for demonstrating practical intercropping systems to farmers.

Farmers have also been innovators. My research group has had the privilege of interacting with Saskatchewan farmer Colin Rosengren who has long intercropped canola and various pulses on his no-till farm. Other mainstream farmers have followed in Colin's footsteps. Organic farmers have designed their own intercrop combinations. Intercropping and workshops and field days are very well-attended by farmers and agronomists.

Now that intercropping is becoming mainstream, it is important to understand the mechanisms involved. Chinese farmers have intercropped for centuries and Chinese researchers have more recently tried to understand the scientific basis for this practice. Perhaps the leading Chinese intercropping scientist is Dr. Long Li of China Agricultural University in Bejing. I have followed Dr. Li's work for many years and I recently had the opportunity to sit down to discuss the topic with him. Other scientists, especially in Scandinavian countries, but also here in Canada have conducted intercropping research. Here are some points from the work that are relevant to the questions farmers are asking today.

DOES NITROGEN (N) TRANSFER OCCUR BETWEEN PULSE CROPS AND NON-N FIXING INTERCROP PARTNERS?

Yes. In the 1990s, researchers in Scandinavian countries established that N from peas and faba beans was transferred to cereals such as barley. The mechanism was first confirmed in greenhouse studies using a split-root technique. For example, in 1996, Jensen observed that barley received 19% of its N requirement from the pea intercrop. Other research measured the N transfer from grain legumes to cereals grains at 15%. Recent work in China confirmed this N transfer from legume to non-legume intercrop in the field. The primary mechanism responsible for this N transfer is the pulse crop sending some of its N into the soil rhizosphere (the soil immediately around the root) and then the intercrop partner scooping the N up.

Work at the University of Manitoba (U of M) by Sawatsky and Soper (1991) did not test the interaction, but they did observe that a significant amount of N from peas was indeed deposited into the rhizosphere. This confirmed that N leakage from pea plants also occurs in Manitoba. Some studies have shown that below-ground networks of mycorrhizal fungi can also transfer N from one plant to the next, but to date, this is reported mostly in perennial forage systems. What does this information mean for N fertilization in intercropping systems? It is safe to say that we need more research here. But on some commercial farms, N is mid-row banded between two rows of the non-legume, while no N is applied between the two rows of legume. In other cases, farmers avoid N fertilization of their pea/canola intercrops altogether.

DOES ADDING AN INTERCROP INCREASE N FIXATION IN THE LEGUME PLANT?

Yes. Pea/barley intercrop studies in Alberta in the 1990s showed that adding barley to peas increased the percent N fixed by pea from 62 to 82%. Studies on pea/canola in Manitoba and Saskatchewan showed an increase in N fixation in pea by about 10%. These pea/canola intercrops received 10 kg N/ha as fertilizer. One lentil/flax intercrop study from Saskatchewan showed lentil received 77% of its N from the fixation of atmospheric N when grown alone compared with 85% when intercropped with flax. The reason for greater N fixation in legumes grown with intercrops is thought to result from less available N in the soil system, causing the legume to become more independent in terms of N fixation — it forces the legume to work harder. Szumigalski and Van Acker reported that

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canola/pea grown together resulted in a 15% boost in grain N compared with growing the crops separately. European research has shown that organic grain legumes growing in the presence of weeds sometimes become more efficient in terms of N fixation. It appears that the same mechanism is at work. Fertilizer rate matters too. It has been confirmed that as the rate of N fertilization increases, the N fixation in intercropping decreases.

WHAT ABOUT PHOSPHORUS (P)?

There is some evidence to suggest that intercropping can increase the P status of both intercrop partners. Using permeable and impermeable root barriers, Dr. Long Li found that maize overyielding, when intercropped with faba bean, resulted from its uptake of P mobilized by the acidification of the rhizosphere by faba bean roots. There was a 12 to 50% increase in maize P from intercropping with faba bean. Another of Dr. Li's studies showed that chickpea allowed wheat access to more soil P. The mechanism was that chickpea increased the phosphatase enzyme in soil. Phosphatase is an enzyme that helps plants access P. Most phosphatase enzymes in the soil come from the soil microorganisms (e.g. bacteria) and not the plant. In one study, it was observed that when bacteria evolved in intercrops, production of phosphatase enzyme was increased 16% compared with bacteria from monoculture. At the Glenlea long-term organic crop rotation study, we have observed more soil phosphatase activity in the organic plots compared with the conventional plots.

ANYTHING ELSE ABOUT P?

Yes. A large proportion of phosphorous in prairie soils is in the organic form, called organic P or microbial biomass P. This P is not detected in most standard soil tests. Researchers in France found that microbial biomass P was significantly increased in the rhizosphere of intercrops, while sole crops did not show any significant increase in microbial P in the rhizosphere. The French example was with chickpea and durum wheat. Microbial P was higher in the rhizosphere of chickpea and durum wheat when the crops were grown together compared to when the two crops were grown on their own. As prairie soil health improves through several different beneficial practices that farmers are now using, I predict that biological nutrient sources within intercrops are going to become more important to understand and manage.

Many other questions need to be addressed so that farmers can intercrop with more confidence. One question regards insects. Evidence shows that certain insects are reduced with intercropping, but more research is required. Another question concerns diseases. If we intercrop, what are the consequences of root diseases? In other words, is it better to grow a crop like peas more frequently by intercropping, or should we respect the rotation interval of four (Canadian recommendations) or six (older European recommendations) years between pea crops? I know scientists are working on these questions now and I look forward to learning about their results.

One last point. We know that plants "talk" to each other and this makes future intercropping prospects exciting. One example of such "cross-talk" comes from California. Researchers conducted field experiments to test the hypothesis that wild tobacco plants become more resistant to stress when grown near a sagebrush neighbour that has been experimentally clipped. It worked. In the coming years, we will learn more about how plants communicate when grown in intercrops and I believe farmers will use that knowledge to optimize their intercropping systems. ■

Figure 1. In Manitoba, varietal differences became prominent later in the growing season, as soybeans matured. For example, on August 26, 2018, maturity group 1.3 (left) planted beside 00.0 (right) in the field experiment in Carman. Observed differences between varieties at flowering in Manitoba were less obvious.

Soybeans in the Spotlight: How sensitive are they to day length?

Nathaniel Ort, Dr. Yvonne Lawley, University of Manitoba and Dr. Malcolm Morrison, Agriculture and Agri-Food Canada

MANITOBA IS A part of the northern frontier of soybean production in North America. Photoperiods here are longer than those experienced in traditional soybean growing regions. Understanding the physiological mechanisms and genes controlling photoperiodism in soybeans has been crucial for breeders developing suitable varieties for Manitoba.

Some plants are sensitive to the amount of light they are exposed to in a single day. This period of light is called photoperiod, but is more commonly called day length. Soybeans can start sensing photoperiod as early as the unifoliate stage. This phenomenon in plants is called photoperiodism. Long photoperiods have a delaying effect on the time to first flower in soybeans. However, soybean varieties vary in their sensitivity to photoperiod. Most varieties with an earlier relative maturity rating have been selected to have decreased sensitivity to photoperiod and may even be termed "photoperiod insensitive."

A study led by Dr. Malcolm Morrison (Agriculture and Agri-Food Canada, Ottawa) and Dr. Yvonne Lawley (University of Manitoba, Winnipeg) was designed to evaluate soybean phenology in Manitoba relative to Ontario. Field experiments were conducted by graduate student Nathaniel Ort to compare the same ten soybean varieties with relative maturity groups ranging from 000.9 to 1.3 over five years in these two provinces.

From 2008 to 2010, the experiment was conducted in Morden, Manitoba (49.2°N) and Ottawa, Ontario (45.4°N), while in 2017 and 2018, the experiment was repeated in Carman, Manitoba (49.5°N) and Ottawa. The two study locations in Manitoba were about 4° north of Ottawa, which translates into a photoperiod that is 49 minutes longer in Manitoba during the summer solstice (the longest day of the year). We recorded soybean growth stage for each variety three times a week, from emergence to maturity.

In Manitoba, differences in days to maturity between varieties were observed, which of course, was expected given the range of maturity groups tested. Despite these differences in maturity group, the days to R1 were the same on average for the range of varieties tested. That suggests the varieties we tested had a similar response to Manitoba's photoperiod and temperature during the vegetative part of their life cycle. It was later on during the reproductive stages that varietal differences became prominent. For example, there was a three-week difference in time to maturity between a soybean variety with a relative maturity of 1.3 planted right beside a variety rated 00.0 (Figure 1) in our 2018 field experiment in Carman, MB.

When the same ten soybean varieties were grown in Ontario, flowering occurred 14 to 19 days earlier than in Manitoba. Because flowering occurred much earlier in Ontario, more time was spent in the reproductive stages compared to Manitoba (Figure 2). This difference resulted in fewer crop heat units (CHU) being recorded from planting to R1 in Ontario than in Manitoba (Figure 3). Soybeans grown in Ontario accumulated more CHU to R8 than in Manitoba. Soybeans in Ontario also matured in fewer days than when they were grown in Manitoba. That was because the daily accumulation of CHU in Ontario was greater than in Manitoba. This difference in CHU accumulation is partly due to nighttime temperatures that are lower in Manitoba than in Ontario, especially at the tail end of the growing season.

The differences observed in time to flowering and duration of flowering may affect final yield. Seed yield is dependent on the number of flowers a plant has produced and the length of time it spends in the flowering stage. Because soybeans grown in Manitoba spend more time in the vegetative stage and less time in the flowering stage, it is likely that they will yield less than when grown in Ontario. In our experiment, soybean yields in Ontario were consistently higher, though only

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Figure 2. Percent of total days soybeans spent in critical growth stages in Manitoba and Ontario averaged over five site years for all varieties tested.

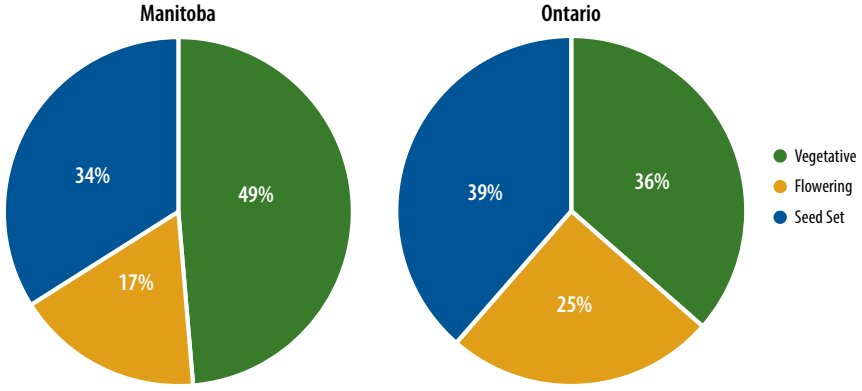

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Figure 3. Accumulated crop heat units (CHU) to critical growth stages for soybeans grown in Manitoba and Ontario averaged over five site years for all varieites tested.

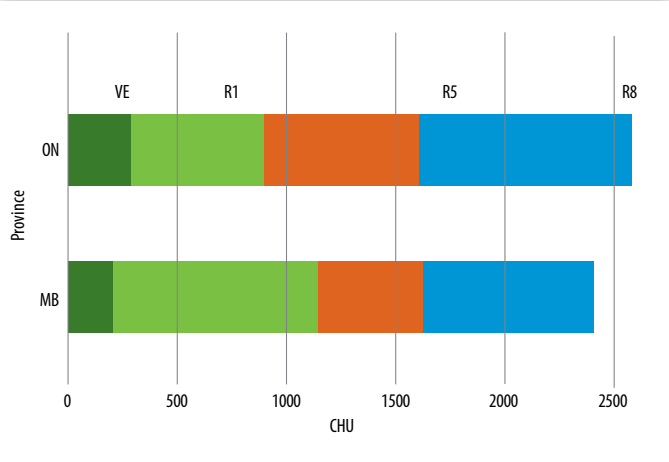
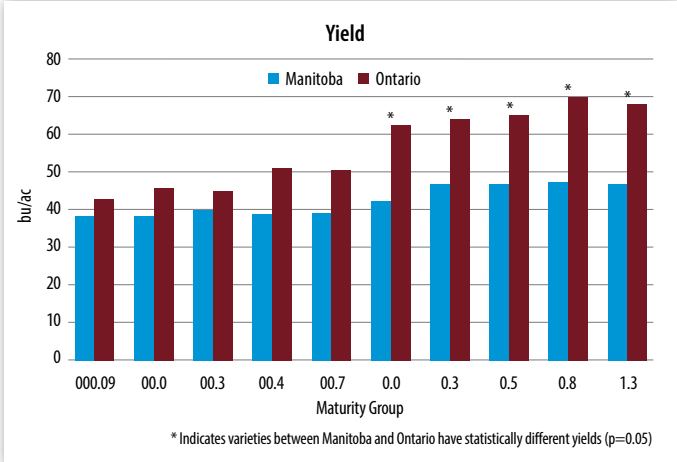


Figure 4. Seed yield for ten soybean varieties with a range of maturity groups grown in Manitoba and Ontario averaged over five site years.



significantly more in the later maturing varieties (Figure 4). A shorter flowering window may also put the crop at greater risk of yield loss from extreme weather events, such as heat or drought stress, which leads to increased floral damage and ultimately reduced yield.

GROWTH CHAMBER EXPERIMENT

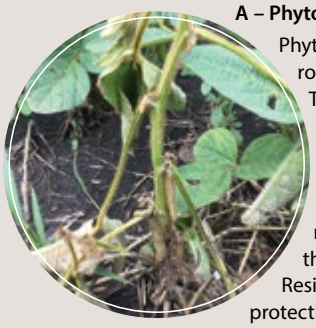
In our field study, it was nearly impossible to isolate photoperiod effects from differences in temperature and moisture when comparing the two growing environments. Growing conditions varied between the two environments every year the field experiment was conducted. That sparked an idea for a controlled environment experiment in a growth chamber to isolate potential photoperiod effects on the same soybean varieties that were grown in the field. Varieties were grown in 14-, 15-, 16- and 17-hour days with a constant temperature (25°C, for both day and night).

All varieties grown in the field experiment were significantly affected by photoperiod in the growth chamber. The longest photoperiod treatment (17h) extended the time from planting to the first flower by two to three days compared to when it was grown in the shortest (14h) photoperiod treatment. The rate of development from planting to R1 was slower for varieties with a later rated maturity group than the earlier maturity groups tested.

NEXT STEPS

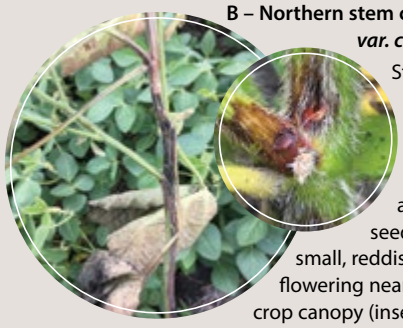
Photoperiodism in soybeans depends on two things: variety and photoperiod. Soybean varieties differ in their photoperiod sensitivity and will respond differently to short vs. long photoperiods or latitudes. That continues to be important for soybean breeders that are selecting varieties for northern growing environments that will yield similarly to soybeans grown in Ontario. The next step in this project is to develop a growth stage model specific to Manitoba, based on temperature and photoperiod. This growth stage model, coupled with local variety trials, will be helpful to farmers when selecting varieties suited to their respective growing regions. Until then, local replicated variety trials, or variety trials conducted at similar latitudes, remain the best sources of information to consult before selecting the right varieties for your farm. ■.

Soybean Scout ANSWERS



A – Phytophthora root and stem rot *(P. sojae)*

Phytophthora is an economically important root and stem disease of soybeans. This disease prefers saturated field conditions and can infect soybeans at any growth stage. Late-season symptoms include wilted leaves still attached to the plant, rotting roots and a chocolate brown lesion that extends upward from the soil line. Resistance to *P. sojae* (Rps) genes provide protection against certain Phytophthora races or pathotypes and are available in some varieties. Partial resistance or field tolerance, which is on the radar of seed developers, may also provide protection. Proper identification of this disease will determine the need for resistance genes and fungicide seed treatment.



B – Northern stem canker (*Diaporthe phaseolorum var. caulivora*)

Stem canker is one pathogen that is commonly mistaken for Phytophthora root and stem rot. It is part of the *Diaporthe-Phomopsis* disease complex, linked to pod and stem blight and Phomopsis seed decay. Initial symptoms are small, reddish-brown lesions that appear after flowering near the nodes in the lower third of the crop canopy (inset). These lesions expand and turn grey-brown in colour. As stem canker is solely a stem disease, green tissue may be present below the lesion and roots will be healthy. Other symptoms include interveinal chlorosis and necrosis of leaves. Crop rotation and incorporation of infected residue will help reduce future infection of both diseases.

Manitoba Pulse and Soybean Buyer List – November 2019

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

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

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

Questions regarding licensing and security should be directed to the CGC at 800-853-6705 or 204-983-2770. MPSG's pulse crop buyers list contains the names of companies actively purchasing pulse crops in Manitoba. For a complete listing, please visit our website manitobapulse.ca. To be included on this list, contact MPSG at 204-745-6488 ext 103 for the buyers registration package.

Recipe Corner

Chickpea-Crusted Pizza Skillet with Roasted Beets, Feta and Caramelized Onions

Servings: 6–8 Wedges Prep time: 25 minutes Cook time: 10 minutes Total time: 35 minutes

Crust

2/3 cup chickpea flour
1/3 teaspoon salt
1 cup water

Toppings

1 roasted beet – sliced
1 onion caramelized
1/2 cup feta cheese
1 spring picked fresh thyme

Method

Sift the flour with the salt into a medium bowl and slowly add 1/4 cup of the water and mix until smooth. Add the remaining water, mix and let the batter stand at room temperature for 30 minutes.

Heat 1 tablespoon of canola oil in a non-stick, ovenproof skillet. Pour batter into skillet and cook the batter over moderately high heat until the bottom is golden brown and the top is almost set (approximately 3 minutes).

Place toppings on the chickpea crust and place under broiler for 4–5 minutes.

Chocolate Chip & Cranberry Lentil Granola Bars

Servings: 20 bars Prep time: 15 minutes Cook time: 20 minutes Total time: 35 minutes

Ingredients

1 cup red lentils
1 ¾ cups water
3 cups rolled oats
3/4 cup wholewheat flour
1/4 cup ground flax
1 cup walnuts – chopped
2/3 cup peanut butter
3/4 cup corn syrup
2 teaspoons vanilla
1 teaspoon cinnamon
1 teaspoon salt
1/2 cup dried cranberries – chopped
1 cup dark chocolate – coarsely chopped

Method

Preheat oven to 350°F.

Put water in saucepan and bring to a boil. Add red lentils and reduce heat to a simmer – will take approximately 20 minutes to cook, uncovered. Remove from heat, drain excess liquid (if any) and allow to cool.

Combine oats, flour, flax, walnuts and cinnamon in a large bowl and whisk together.

In a separate bowl, combine lentils, peanut butter, honey, corn syrup and vanilla. Blend with a whisk until fully incorporated.

Add the dry ingredients to the wet ingredients and mix fully. Fold in chopped cranberries and chocolate.

Press the mixture into a 9" x 13" baking pan and bake for 25 minutes.

When done, allow to cool and cut into desired bar-shaped size.

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

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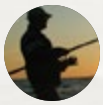

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