

pulse *beat*

Fall/Winter • No. 79, 2016

A Tour of the CANADIAN INTERNATIONAL GRAINS INSTITUTE

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The Bean Report – Kristen talks about KEEPING THE SOYBEAN HONEYMOON ALIVE

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WHEN TO PLANT SOYBEANS IN MANITOBA Should soil temperature be your guide?

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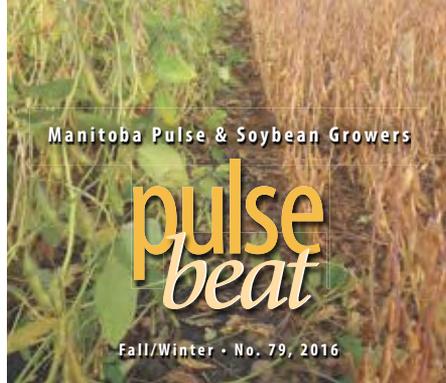
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Publisher Manitoba Pulse & Soybean Growers

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Design & Production Imprint Media Services Inc.

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

Publications Mail Agreement #40016070

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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 3,900 and distributed to farmers, government, researchers and industry involved in the pulse and soybean crops field.

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Cover photo courtesy of Laryssa Grenkow, MSPG

Manitoba Pulse & Soybean Growers – 2016 Board of Directors and Staff

Elected Producer Directors

- Chair – Jason Voth – *Altona*
- Vice Chair – Frank Prince – *Deloraine*
- Ben Martens – *Boissevain*
- Calvin Penner – *Elm Creek*
- John Preun – *St. Andrews*
- *Melvin Rattai – *Beausejour*
- Ernie Sirski – *Dauphin*
- Albert Turski – *La Salle*
- Rick Vaags – *Dugald*

**Appointed Director*

Advisory Directors

- Anfu Hou, Agriculture and Agri-Food Canada – Cereal Research Centre
- Dennis Lange, Manitoba Agriculture
- Yvonne Lawley, Department of Plant Science, University of Manitoba

Staff

- Executive Director** – François Labelle
Email – francois@manitobapulse.ca
- Business Manager** – Sandy Robinson
Email – sandy@manitobapulse.ca
- Production Specialist** – Kristen Podolsky
Email – kristen@manitobapulse.ca
- Director of Communications** – Toban Dyck
Email – toban@manitobapulse.ca
- Research Manager** – Laryssa Grenkow
Email – laryssa@manitobapulse.ca
- On-Farm Specialist** – Greg Bartley
Email – greg@manitobapulse.ca
- Program Administrator** – Wendy Voogt
Email – wendy@manitobapulse.ca

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2017 ANNUAL GENERAL MEETING



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Carman, MB R0G 0J0
Phone 204.745.6488
www.manitobapulse.ca

NOTICE IS HEREBY GIVEN that a meeting of the members of Manitoba Pulse & Soybean Growers (MPSG) will be held at the Victoria Inn Hotel and Convention Centre, 1808 Wellington Avenue, Winnipeg, MB during the CropConnect Conference on **February 15, 2017, from 8:00 a.m. to 9:00 a.m.**



Agenda

1. To approve the minutes of the 2016 members meeting
2. To receive the financial statements of MPSG for the current fiscal year
3. To appoint the auditor of MPSG
4. To receive the board and executive director's report
5. To elect directors to the MPSG Board of Directors

Nominations to serve on the board of directors can be made by submitting the candidate's name to the Nominating Committee or the MPSG office prior to the commencement of the meeting.

Each year director positions come up for election.

If you are interested in becoming a director on the MPSG board, now is your opportunity. This year, the director terms of Frank Prince, Ernie Sirski, Albert Turski and Rick Vaags are expiring.

If you are a farmer of pulse and/or soybean crops and are in good standing with MPSG (you have not requested a check-off refund but have sold a pulse/soybean crop in the past two years), and would like more information in becoming a director, contact:



Nomination Committee

Cal Penner – cgpenner@inetlink.ca

John Preun – longlakefarms@explornet.com

Rick Vaags – rivaal@mts.net

Jason Voth – jason@vothfarms.ca

Elections will be held at the MPSG Annual General Meeting February 15, 2017.

2016 MPSG COMMITTEES AND REPRESENTATIVES

MPSG COMMITTEES – *The first named is chair*

Executive – J. Voth, F. Prince, E. Sirski, F. Labelle

Governance/HR – F. Prince, E. Sirski, F. Labelle

Finance – J. Preun, R. Vaags, F. Labelle, S. Robinson

Resolutions – J. Preun, C. Penner, A. Turski, B. Martens

Nominations – J. Preun, C. Penner, A. Turski, B. Martens

MPSG REPRESENTATIVES

Canadian Grain Commission Pulse Sub-Committee
– F. Labelle

Grain Growers of Canada – B. Martens

Keystone Agricultural Producers – R. Vaags, C. Penner, F. Labelle

• **General Council** – F. Labelle

• **Pulse/Oilseed Sub-Committee** – F. Labelle

• **Commodity Group** – R. Vaags, C. Penner

MCVET – L. Grenkow, D. Lange

Communications/Member Relations/Market

Development – E. Sirski, R. Vaags, T. Dyck, C. Penner, F. Labelle, K. Podolsky, S. Robinson

Research – A. Turski, J. Voth, R. Vaags, B. Martens, F. Prince, J. Preun, C. Penner, F. Labelle, K. Podolsky, L. Grenkow, W. Voogt, G. Bartley, industry advisors

PGDC/PRCPSC – B. Martens, L. Grenkow, D. Lange

Pulse Canada – R. Vaags, B. Martens (alt), F. Prince (alt)

• **Sustainability** – F. Prince

Soy Canada – E. Sirski

Western Canadian Pulse Growers Association

• **WGRF** – Corey Loessin (SPG)

• **CGC Western Grain Standards Committee** – E. Sirski (exp. 2018) *This is a four-year term that rotates between APG, SPG and MPSG.*

MESSAGE FROM BOARD CHAIR



Jason Voht
Chair

WHAT A YEAR IT HAS BEEN

On our farm in the Altona area, 2016 has been a challenge. Planting season started out dry and then the May long weekend came and it didn't stop raining. Yields have been reduced due to water stress and getting the crop off at harvest was a challenge. Many farmers in our area had to purchase tracks, floater tires, and/or rear-wheel assist for their combines and grain carts. All this was just so we didn't stay stuck all day.

Dealing with the mess we made will be the next challenge, which I am hoping we can deal with this year. I am hopeful that we can get some of this work done once the ground freezes, which will make spring go a lot smoother.

For the rest of Manitoba, 2016 has been a different story. From the reports that I have been hearing, there have been some excellent crops grown in much of the province. Certain areas dealt with moisture at different times of the year, but as they say, "rain makes grain."

MPSG UPDATES

Collaboration – We are currently in discussion with several other commodity groups regarding working together on some fronts. The conversation at this point has been positive, with lots of interest in how we can invest check-off dollars to get the best return. There are some efficiencies to be had by working together. There are things that we do at MPSG that overlap with other commodity groups. These things we could do better together.

Things like better crop rotation research, messages to the provincial or federal government, or just the good news story about agriculture in general. When working on things like transportation, carbon tax and exports to foreign countries, there should be no commodity group throwing another group under the bus to gain the upper

hand. The thought is that since no one farms only one crop, we need all the commodities in the province to be working together to benefit our farms as a whole. This is a short-term goal as well as a long-term one.

Research – I would like to thank all of our hardworking staff for a great summer. Full-time or part-time, there was a lot to do and not much time to do it. With the year nearing completion, we will soon have all the data from our large assortment of On-Farm research. Now the job is to put everything together and get it out for everyone to see. It will be very exciting to see some of the results when they are published. Make sure to attend CropConnect this

winter or take a look at our website to get the latest updates on our unbiased, independent results.

I am sure everyone reading this is already looking forward to 2017. Some of us are thinking we just want to put 2016 behind us and others are looking to duplicate what they achieved in 2016. With that being said, I think that our overall pulse acres in the province will be up in 2017. The pea acres may see a slight decrease, but edible bean acres will most likely remain at around 100,000 acres. And MPSG is expecting soybean acres to increase. Some even suggest that we could see two million acres of soybeans planted in 2017.

See you at CropConnect in February! ■



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CropConnect Conference

Victoria Inn Hotel & Convention Centre
1808 Wellington Ave, Winnipeg, MB

Featured Sessions

- **Sprayer Speed – What Do The Numbers Say About Coverage?**
Tom Wolf, Agrimetrix Research & Training
Embassy A-C 3:25 – 4:15 February 15, 2017
- **Demand Isn't the Problem – It's Four Consecutive Record World Crops**
Mike Krueger, The Money Farm
Embassy A-C 11:20 – 12:00 February 16, 2017
- **Working with Micro Nutrients**
Neal Kinsey, Kinsey Agricultural Services Inc.
Embassy D-F 10:05 – 10:45 February 16, 2017



Tom Wolf



Mike Krueger



Neal Kinsey

This event includes the eight participating organizations' Annual General Meetings – register today!



www.cropconnectconference.ca

MESSAGE FROM EXECUTIVE DIRECTOR



François Labelle
Executive Director

One growing season wraps up and we are already well into planning for the next one.

This year has been a trying one for many farmers, but overall there was a record crop of soybeans. Acres are up, as are yields. What will next year bring – two million acres?

CHANGES

Production Specialist, Kristen Podolsky will be leaving MPSG to take the position of Research Agronomist-in-Residence at the University of Manitoba. This is an initiative started and funded, in part, by MPSG to increase research capacity and also build the connections between farmers, industry and the University. We have also obtained some matched funds from the province for this program.

We are very excited to see Kristen take on this roll and we are certain we will still see great results from her work. We expect to hear from her on an ongoing basis.

RESEARCH – STAFF – PROGRAMS

It was a busy summer for all our staff and I can say with confidence that they all did a great job.

There were frustrations – when our hail damage trials were wiped out by hail. We had some great results the first year we ran that project, but now it'll be delayed a year.

Research programs are being set in place for 2017 and beyond, but we always like to hear from you. If there are production problems or concerns you have, we can include them in our future programs.

INTERNATIONAL YEAR OF PULSES

It has been an interesting year with lots of developments on the pulse side.

The education component of our campaign had a tangible effect on the consumer market. The grocery industry recorded increases in pulse

and pulse product sales. Also important was the increase in use of pulses and components of the crop into other products such as breads, crackers, etc.

There was lots of interest from the government about pulses and our association. We were able to distribute a package to all the current MLAs. The package talked about the importance of the pulse and soybean industry in Manitoba, and highlighted some of the great, independent research projects we've conducted or helped fund.

We also distributed a pulse-themed cookbook (more copies were requested later on). On the day we handed out the information, Agriculture Minister Ralph Eichler addressed the Chamber, talking about the great things MPSG is up to and urging all the MLAs to eat more pulses.

We do hope that this will increase demand for pulses. Crops like our edible beans have seen narrow demand – dry product or canned. With its use in flours for breads, pulses could see increased demand and Manitoba could see more acres. To get the acres, prices will need to be competitive.

Even though we had a really good year on the pulses side, it's not over. We will need to continue telling people about how healthy, versatile and affordable pulse crops are.

AG POLICY FRAMEWORK

Commodity groups are already preparing for the release of the next

NEW RESEARCH AGRONOMIST AT U OF M

Thanks to \$400,000 in funding from the Government of Canada and the Province of Manitoba, along with matching support from MPSG, the Faculty of Agricultural and Food Sciences has hired a Research Agronomist-in-Residence focused on pulse and soybean production issues. This position will facilitate rapid exchange of research results to farmers and ensure researchers are better informed of evolving production issues.

MPSG's Production Specialist Kristen Podolsky will be taking on this new role. We will miss the high level of skill and expertise she brought to the association and its members. But we're quite excited about what this new position means for her and Manitoba's pulse and soybean industry.

federal-provincial-territorial agricultural policy framework, set to take effect April 2018. Involvement in the process has been very time-consuming for staff. There has been lots of consultation on what we as farmers want to see in the next program, making certain our concerns are heard. With our growth in soybeans in Manitoba, it's important we push hard to make certain we get proper recognition and investment into our crop. Five years ago, soybeans were just getting going in a substantial way, but now we have more questions, and we want to be certain we have the opportunity to match dollars for research.

continued on page 6



Soybean Scout

What disease(s) could be the cause of these symptoms appearing in soybeans in late summer?



A



B

Answers can be found on page 43



See you in the field! – A farewell from Kristen

WHEN I STARTED AT MPSG in May 2013, I was the third employee and there were 900,000 acres of soybeans planted in Manitoba. Today, there are seven full-time and three seasonal employees and we are expecting up to 2,000,000 acres of soybeans in 2017.

It was the anticipation of this growth and excitement that first attracted me to MPSG. At home, we grew our first soybean crop in 2012 and went through all the questions that new soybean growers ask – how much inoculant? What seeding rate? Can I use my air seeder?

The fire was lit inside me to provide these answers to farmers. And if I couldn't find the answer, then my goal has been to initiate the research.

My first growing season with MPSG was in 2013. I developed *The Bean Report* to deliver crop updates and production information to farmers, agronomists and industry. I spent the summers of 2013 and 2014 in soybean fields across the province, capturing information and meeting farmers and agronomists.

The most exciting part of my position has been having the opportunity to take all the questions, observations and pictures I capture in the field and transform them into fact sheets, research projects and new program initiatives.

I am passionate about delivering information to farmers and agronomists. But not just any information – research based knowledge, and not just in any form – it must be clear, concise and effective. Some of my favourite tools are the MPSG Bean App and Soybean Growth Staging guide. It is a very rewarding feeling to see these fact sheets taped to the wall in agronomists' offices or in the cab of a truck.

The best moments for me come from interacting with farmers, hearing their questions or concerns and then developing strategies to address them. An example of this is the MPSG Research and Production (R&P) strategy for 2015–2017. With this strategy came the expansion of the On-Farm Network and new production resources and extension events (Getting it Right, SMART Day).

This was an important milestone in my role here at MPSG as new staff came on board to help implement the strategy. I'm proud to work with such hard-working, energetic and motivated staff, which has led to good synergy. I'm confident even more exciting things are in the works for MPSG's future.

Four growing seasons have passed for me at MPSG and a new opportunity has presented itself. Within the R&P strategy there has been a vision to develop a Research Agronomist position at the University of Manitoba. This is an exciting new concept and collaboration opportunity for the agricultural industry in Manitoba, developed out of the need for more applied, practical research and increased extension capacity.

I am honoured and excited to accept this new mission of developing the Research Agronomist position and program. There are three broad goals of this program: to conduct applied soybean and pulse research, increase technology transfer between farmers, industry and researchers and to be involved with the learning experiences of young farmers.

In this role, I will tackle the production questions I've received over the past four years that we don't have local knowledge for – seeding dates for soybeans, fertility rates for dry beans and crop input comparisons, for example. In turn, I will relay the results directly to industry and communicate relevant results from other researchers within the Faculty of Agriculture.

To my network of farmers and agronomists – thank you for tuning into *The Bean Report*, inviting me out to your field and field days and for submitting your questions and comments. I encourage you to keep making those observations and asking those questions. It is your eyes out in the field that help guide research and program decisions to ensure they are relevant to our farms. I look forward to working with you in this new capacity. See you in the field!

– Kristen

continued from page 5

Edible beans and peas cannot be forgotten about, either. The increased acres for soybean is good, but we do not want to overshadow the importance of our other crops, as they also contribute positively to the farm economy.

We have had some good meetings with the whole industry to discuss issues we would like addressed in the next program. For soybeans, it was

interesting when we started hearing that we have lower protein in our beans than the rest of Canada. It's a problem for the crushers, but also for the exporters. Even if we do not see it affect us directly, the prices on the export market are discounted and the price paid to farmers is less. In discussion with researchers, they have material that they can bring to market that will increase

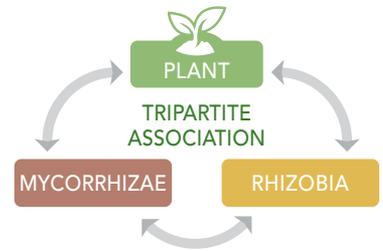
the protein with possibly no yield drag, but they have not done so, as no one expressed the need.

It's a looming issue, around the corner for us and for farmers. We'll be addressing it now, making sure research is being conducted to make sure our farmers have the best chance at making their farms profitable and sustainable. Thanks! ■

Studies regarding the addition of mycorrhizal and rhizobial inoculants, at the time of seeding, have clearly demonstrated that these microorganisms work in collaboration with legumes and play a major role in increasing crop productivity.

TRIPARTITE SYMBIOSIS = BIGGER YIELD

Mycorrhizae develop a network that explores the soil and accesses more nutrients and water to transfer to the plant; rhizobium fixes nitrogen and makes it available to the plant. By working together, they influence positively the plant for increased yield.



HELP FEED THE PLANT

N and P are major nutrients for the plant. *“Tripartite associations of host plants with both rhizobia and AMF [Arbuscular Mycorrhizal Fungi] benefit the host plant by increased P uptake through the mycorrhizal association balancing the high input of N through rhizobial N-fixation.”* (1) In addition, mycorrhizae reach more water and nutrients needed by legumes such as B, Ca, Cu, Fe, K, Mn, Mo and Zn, key components for energy production.

HIGHER PHOTOSYNTHESIS

When used in combination, mycorrhizae and rhizobium increase the photosynthetic rate by 51% (2). *“The rate of photosynthesis increased substantially more than the C [Carbon] costs of the rhizobial and AM [Arbuscular Mycorrhizal] symbioses.”* (2) The total increased sugar production by the plant far outweighs the cost to “house” the partners.

BETTER PRODUCTIVITY

Better nutrient use efficiency and bigger biomass result in higher yield from each legume plant (harvest index). For example, *“[...] it has been found that pea plants coinoculated with Rhizobium leguminosarum and AMF [Arbuscular Mycorrhizal Fungi] has shown best results regarding plant height, plant dry mass, nodule fresh weight, number of seeds, seed weight, seed yield, number of root nodules, number of pods per plant, average pod weight and pod length [...]”* (3)

Each phase of the plant growth requires a lot of nutrients and energy to obtain higher yield. *“[...] the tripartite interactions between legumes, AMF [Arbuscular Mycorrhizal Fungi] and rhizobia cause increases in legume productivity, and the N:P:C supply ratio as influenced by the tripartite symbiotic associations plays a fundamental role in controlling the legume’s photosynthetic rate and biomass productivity.”* (1)

(1) Koele et al. 2014. VFCR Report 2014/1, pp. 1-57 (2) Kaschuk et al. 2009. Soil Biol. Biochem. 41:1233-1244
 (3) Shinde et al. 2016. Int. J. Bioassays. 5:4954-4957



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François Labelle
Executive Director, MPSPG

This is going to be a long road. It already has been. There will not be a solution in the near future, but we must keep at it in order to get a worthwhile transportation system in Canada that will meet the needs of an expanding agricultural sector. It needs to be good for everyone involved, including the publicly-traded railroads (RR), whose monopoly needs to be held in check. I heard a comment a while back that the problems in today's rail system were seeded in the days of William Van Horn and continue to grow to this day.

I wrote a few years ago that I was very impressed that the industry, farmers, grain companies and several others groups were working together to effect meaningful change. This spoke volumes and the government was listening to the groups such as the AG Transportation Coalition (ATC). Unfortunately, as often happens with human nature, differing views and opinions came forward and the groups have slowly drifted apart. We are not speaking with one strong voice. This is very unfortunate and allows people, politicians and industry players to work against the other.

One of the more meaningful efforts started by the ATC is the weekly performance report. Available at www.agtransportcoalition.com/. This report is based on information from the shippers of grain on the cars they want and need for weekly periods. It then measures efficiencies in the system on how quickly grain moves to its destination. These reports have been a real eye-opener to many users, from the shippers, policy makers, politicians and farmers.

A concern going forward is on funding for this work. It's not cheap to produce such reports. Funding that was committed in 2013 for this will run out, so we will need to look to industry, grower groups, etc., to find the funds in order for such service to continue. Without good, sound information

such as that contained in these reports, it's really hard to build a case for transportation when we have a problem. We need to keep this program going and have access to that information.

The railways have not liked this report from the start and tried to discredit the numbers. Several arguments were put forward that these numbers were not accurate, but over time these have been accepted by most or all players – but not the railways. The railways have recently decided that they should put out their own numbers. And we can be certain they will tell the same story but from a very different view point, which will net a different picture.

The railways have said that all segments of the value chain need to work together to make the system more efficient. This is true, but it must also be to the benefit of all – measured correctly, with unbiased reports that are believed by all groups involved.

Transport Minister Marc Garneau has been studying the transportation file. Many groups have been pressing him for change. Grower groups, the provinces, and the grain industry have all said what they would like to see. It is important we note there are other users of the rail system in Canada and they all need to be treated fairly and equitably – users other than the grain industry, lumber, oil, coal, etc.

In early November, Minister Garneau unveiled the outline for Transportation 2030, a long-term strategy promising to pursue “legislation that will allow reciprocal penalties in service level

agreements between railway companies and their customers,” according to a government news release. Transportation 2030 will also seek to more clearly define “adequate and suitable service,” as well as tackle the future of Maximum Revenue Entitlements (MRE) and extended interswitching.

The plan also earmarks more than \$10-billion towards related infrastructure to eliminate bottlenecks and strengthen trade corridors.

It is very important that we pay attention to these kinds of announcements. When we look at a burning issue in the rail industry, we can't avoid the question: how is the aged fleet of hopper cars that will come to the end of their lives in 2022 be replaced? I am certain, when the governments of the day back in the 1970s, bought these hopper cars, they never considered when they would need replacing nor how that would happen.

There is a lot of discussion on the future of the MREs and how it should be dropped, reviewed, updated or changed. The RR wants it dropped to reflect today's economic and business reality and a truly competitive world. Since they have a monopoly on the rail movement in Canada, most players in the industry – not all – want it retained. This has been very divisive in the industry. It would have been good if we spoke with a single voice on this.

It's very important that changes today take into consideration an agriculture industry that is constantly changing and evolving. ■

Dates to Remember.....

- **GTOM – December 10, 2016**
Celebrating International Year of Pulses
- **Getting it Right – Soybean Production Meeting**
February 2, 2017
Canad Destination Centre, Portage la Prairie, MB
- **CropSphere – January 9–11**
Saskatoon, SK
- **Ag Days – January 17–19**
Brandon, MB
- **FarmTech Conference**
January 31–Feb 2
Edmonton, AB
- **CropConnect Conference**
February 15–16
Victoria Inn Hotel and Convention Centre, Winnipeg, MB

A STEP UP

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NEW OPPORTUNITIES FOR AGRICULTURE



Fiona Cook
Executive Director,
Grain Growers of Canada

If we have not already met, I would like to take this opportunity to introduce myself. I'm Fiona Cook and I am very pleased to have been chosen as executive director for Grain Growers of Canada (GGC), joining the organization in May.

While my background with the Forest Products and the Chemistry Industry Associations of Canada put me on solid footing to lead an industry organization, I had never worked directly in agriculture. It has been an exciting first six months and a bit like drinking from the fire hose to get up to speed on our issues. Fortunately, the support that I have received from GGC members has been extraordinary.

I can truly say that this has to be the most engaged and passionate group I have ever worked with. Every single member is in "farm politics" for the same reason – to develop a policy landscape that allows the industry to achieve its fullest potential. My personal views are very much in line with those of GGC members. I have always believed that respect for the environment, economic progress and human development go hand-in-hand.

I am particularly excited to be coming into a new industry with a new government in Ottawa. Fresh faces mean new opportunities for collaboration. There are close to 200

new MPs in this Parliament and we have developed an aggressive advocacy program, which started with the return of the House of Commons in September.

Prime Minister Justin Trudeau has mandated his government to place a strong focus on innovation, linking many ministries, including Agriculture and Agri-Food Canada to drive their ambitious agenda. Agriculture is one of the most innovative industries in our country, so I will be telling that story in my meetings with decision makers at all levels. GGC will be submitting our comments to the government as part of their search for creative and inspiring ideas. We will need clear examples of how grain farmers innovate on their farms and would welcome your suggestions.

One key agriculture issue with which I am very familiar is transportation. Be it chemicals, forest products, or grain, virtually all sectors of the Canadian economy are affected by the service provided by the railways. I know that the stakes are high and there have been disappointments along the way, but I believe that we must and can work with the railways and the government to find a permanent and workable solution.

GGC has been, and will continue to be actively engaged with Transport Canada as they complete their review of the Canada Transportation Act (CTA). This is an excellent opportunity for us to ensure that the needs of grain farmers are heard. Already this fall I appeared before the House of Commons Standing Committee on Transportation.

We submitted our recommendations on the CTA review and our President Gary Stanford, took part in an industry roundtable in Saskatoon with both Ministers Marc Garneau and Lawrence MacAulay.

It is through these forms of industry/government collaboration that we hope to find a permanent, workable solution. Thankfully, at the time of writing, grain is moving fairly well, but it is early days yet and most farmers have had harvest disrupted by uncooperative weather.

Sustainability is another priority area, as the need to address concerns around social license and public trust becomes more pressing. As you know, pulses are an excellent choice for increasing the positive environmental impacts and economics of crop rotation. With the federal government's recent carbon pricing announcement, the accomplishments of the grain sector in reducing its carbon footprint and the importance of research and development and new technology will become key messages in our outreach and advocacy. The work being done to promote the International Year of Pulses has helped bring this important and often under-valued grain category to the forefront. All of us at the GGC offices happily took the *Pulse Pledge* and are trying to add more pulses into our diets.

Thank you to everyone at MSPG who supported my rapid transition at GGC, and I look forward to what the future brings! ■

Trait Stewardship Responsibilities Notice to Farmers

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PRIORITIES FOR SOYBEAN INNOVATION AND R&D



Jim Everson

Executive Director, Soy Canada

One of the pillars of Soy Canada's mandate is the coordination and alignment of industry-wide research and innovation across all branches of the soybean sector.

In June 2016, Soy Canada held a research and development (R&D) workshop with the objectives of bringing together the value chain to share information on current research, come to a consensus on R&D priorities and identify next steps towards further research efforts. The meeting included representatives from provincial producer groups, food-grade and commodity soybean exporters, processors, seed companies, public researchers and cluster research organizations. Following the meeting, Soy Canada

produced an R&D Report summarizing the common themes and findings of the workshop.

In addition to priorities identified in the areas of genetics/genomics, plant pests, plant breeding, agronomy, and quality, the issue of protein levels in western Canada was a hot topic that generated significant interest from the research community. Exporters and processors reported that Canada can generate much better value for soybeans in export markets if we can improve protein levels of western Canadian soybeans.

According to the Canadian Grain Commission's 2015 annual harvest survey, the average protein level of all commodity soybeans in western Canada was 38.1 percent and in eastern Canada 40.1 percent, which is lower than our competitors in the U.S. and Brazil who experience higher protein levels because of warmer growing climates.

As a result, it was agreed that a continued focus on western protein levels would be a priority for seed

companies that continue to develop new, short-season, high-protein varieties for western Canadian farmers. Innovation in these new seed varieties will strengthen our competitiveness and position Canadian soybeans as reliable sources of quality commodity beans for the food and feed processing markets.

Prioritizing and gearing research efforts towards higher protein levels also incentivize private investment into new processing capacity in western Canada. Manitoba Pulse & Soybean Growers are eager to attract a crush plant in Manitoba, an effort that is strongly supported through research and investment in high protein.

Soy Canada is continuing to work towards the coordination and advancement of the soybean sector's R&D priorities together with industry and government partners. As the federal government develops the next Agricultural Policy Framework, we will be working hard to ensure that the necessary funding and resources will be made available for the soybean industry's research community to achieve the objectives outlined by our sector.

Soy Canada is also highly engaged in a number of market development activities. After recently hosting a successful program for an incoming mission of Chinese grains and oilseeds stakeholders in October, Soy Canada also participated in a ministerial trade mission to China where the delegation held seminars and roundtables with a number of Chinese industry associations and government representatives from November 1-12. During the mission, Soy Canada discussed how Canada can build on its half billion dollar soybean trade relationship with China by overcoming regulatory trade barriers. Soy Canada is also undertaking market research studies in the Chinese and Indonesian soybean markets and planning for a trade mission to Japan in the coming months.

We invite readers to contact Soy Canada at info@soycanada.ca with any questions. Readers can also visit the "Resources" tab on the Soy Canada website at www.soycanada.ca where they can download the full R&D Workshop Report deriving from the June meeting. ■

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UPDATE FROM KEYSTONE AGRICULTURAL PRODUCERS



TAKING THE LEAD IN CARBON PRICING DISCUSSIONS

The federal government has announced it will impose a carbon tax by 2018 on provinces that don't have a carbon pricing mechanism in place, and the provincial government indicated it will be creating a "made-in-Manitoba" solution. KAP recently met with Manitoba Agriculture Minister Ralph Eichler and the province's special advisor on climate change, David McLaughlin, to discuss in broad terms what that solution might look like for agriculture.

KAP is seeking a way to make carbon pricing work for producers. With crop prices set by the world market, a carbon tax on inputs can't be added to the selling price of Canadian crops. However, providing farmers with a way to get paid for sequestering carbon or reducing emissions could balance the effect of the tax. After consultations

with producers, KAP will be putting forward a recommendation to the province.

WORKING TO IMPROVE GRAIN TRANSPORTATION

In June, KAP lobbied for the extension of Bill 30 – the Fair Rail for Grain Farmers Act – and made a case for extending provisions of Bill C-30, both before a Senate standing committee and directly with Agriculture Minister Lawrence MacAulay. These extensions were passed, and they include keeping the interswitching kilometres at 160, instead of 30. Also included is the right of the government to set minimum volumes of grain the railways must carry, if the situation warrants.

These are good first measures, but there is so much more urgent work on this file.

The report that came out of the Canada Transportation Act Review is flawed in many ways, including the proposed removal of the maximum revenue entitlement and the phasing

out of the interswitching provision. KAP stressed they should be addressed during the consultations on the report held by Transport Minister Marc Garneau.

The industry also stressed to Minister MacAulay, at several meetings, that service levels must be improved and investment in infrastructure is a must, as is data collection and monitoring of railway performance. KAP also stressed the importance of regulating the railways.

Initially, producers were not included in the consultations with Garneau, but after lobbying efforts by KAP – along with the Agricultural Producers Association of Saskatchewan, the Alberta Federation of Agriculture and the Canadian Federation of Agriculture (CFA) – a roundtable for grain producers with the minister was held in Saskatoon on October 20, 2016.

KAP has stressed that primary producers have been viewed as an

continued on page 14

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industry that can pass its costs to someone else in the value chain. This is not the case, and producers bear all the costs of the grain-handling system with no ability to pass them on.

TAKING AGRICULTURE TO THE STREETS OF DOWNTOWN WINNIPEG

KAP participated in Doors Open Winnipeg, a heritage and architectural event across Winnipeg that is held in May, as well as Open Farm Day in September. KAP staff illustrated to the public, through walking tours featuring the buildings in the Exchange District of the city, how important agriculture was in the past, how it continues to be important, and what the future looks like. All part of ag awareness!

OFFERING MEMBERS FREE HR AND SAFETY SERVICES

KAP has hired a new human resources consultant, Janice Goldsborough, to help members with their HR concerns. She can answer questions on labour standards, overtime and holiday time for employees, how to calculate this time, performance management, discipline issues – and a whole lot more. It's confidential and it's free with your KAP membership. To contact Janice: 204-471-6530 or email Janice.Goldsborough@kap.mb.ca.

KAP has also hired Morag Marjerison as a safety consultant, to help members assess their farms for compliance with the Manitoba Workplace Safety and Health Act. She can also help members come into compliance on issues that have been

flagged during a government inspection. This service is also confidential, and free with your KAP membership. Call the KAP office at 204-697-1140, or email kap@kap.mb.ca, to arrange for your safety consultation.

STRIKING A BALANCE IN CGC LICENSING SUBMISSION

KAP worked with Manitoba Agriculture to host approximately 30 stakeholders for a day of consultation with the Canadian Grain Commission (CGC) on its proposals to license feed buyers and producer-car loading sites. Representatives from CGC, who explained the options, stressed the proposals are not written in stone and that stakeholder feedback is essential. KAP has put forward a submission that strikes a balance between the need for seller protection and prevention of over-regulation.

JOINING NATIONAL PARTNERS ON NEXT AG POLICY FRAMEWORK

KAP has worked with CFA and other farm organizations to consult with producers and develop recommendations for the next Agricultural Policy Framework. The recommendations were presented at two provincial ministerial consultations, and to AAFC and Manitoba Agriculture senior staff. During the summer, those recommendations were taken to the federal-provincial-territorial (FPT) meeting of ag ministers in Calgary.

With regards to business risk management (BRM), the organizations are stressing that cuts made to

AgriInvest and AgriStability in the current *Growing Forward 2* have undermined the programs. Producers don't see a reasonable chance to trigger a payment for AgriStability and are pulling out.

Producers need to know that BRM programs will help during the challenging times, and a number of key recommendations were put forward. These include restoring AgriStability's payment trigger to 85% of historical reference margins, and eliminating reference margin limitations.

On the non-BRM side, the CFA and its member organizations are asking for more programming aimed at helping farmers adapt to challenging production conditions, including flooding and drought. These risks are not going away, and every sector will continue to face challenges.

Recommendations include strengthening the Environmental Farm Plan (EFP) program and increasing funding for best management practices, as well as further investment in similar programs.

KAP president Dan Mazier says the FPT ministers heard the message "loud and clear." In a policy statement issued after the Calgary meeting, they indicated commitment in areas stressed as important. Specifics are yet to be developed, but this is a good sign.

The above are just a few of the issues KAP has worked on recently. Visit www.kap.mb.ca to see more. ■

Getting it Right 2017
SOYBEAN PRODUCTION MEETING

Don't miss it!

Thursday, February 2, 2017

9:00 AM – 3:30 PM

Registration – 8:30 AM

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contact Lindsey at 204.751.0091
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Registration closes January 27, 2017

HARVEST PULSES AT 6 TO 7 MPH



Farmers say the **Honey Bee AirFLEX** header speeds pulse harvest

Launched in early 2015, the Honey Bee AirFLEX™ header is winning pulse growers over with its innovative design that features sensors and air suspension to allow the draper table to float across the ground with faster harvesting speeds and increased feeding capacity.

"My first impression was 'finally.' Finally something that works. There hasn't been a step change in the technology in this industry in a long time, and this is the first time I've seen it," says Jordan Kambeitz of Kambeitz Farms at Sedley, Saskatchewan. He has used AirFLEX headers to harvest lentils, soybeans and durum.

Manufactured at Frontier, Saskatchewan, the AirFLEX header is available in 25-, 30-, 36-, 40-, 45- and 50-foot sizes. The AirFLEX can be used in flex or rigid mode with a simple push of a button in the cab of the combine. In flex mode, the AirFLEX shaves the ground and is ideal for soybeans, peas and lentils. The air suspension is light, fast-reacting and infinitely adjustable. The Optimized Header Height System always keeps the header at the perfect height in all terrain and in both cutting modes.

"The AirFLEX is all about the flex mode. The magic is in soybeans and lentils. This is superior. Last year was probably the best test because there was a severe drought and we had short lentils, and we were picking up between two and five bushels per acre over our latest CNH header," says Kambeitz.

Glenn Honey of Honey Bee says the company's objective in developing the AirFLEX was to simplify the header's design to improve capacity, and at the same time, reduce the weight to allow better floatation and wider widths.

"When we were designing for improved capacity, we ended up engineering a lot of weight off the header. The result is a simplified header with better performance," says Honey.

A reversible mechanical drive powers the drapers, knife and feed auger at the centre of the header, eliminating many hydraulic lines and other drive components. That reduced the weight of the header, and helped to reduce the need to support the extra weight at the ends of the header. The fully adjustable reel ranges from gentle to aggressive with unlimited finger spacing options to leave no crop behind. The air bags at the ends of the header are run by an electric compressor.

"The one thing I like is how quickly the AirFLEX reacts compared to hydraulic or conventional flex-type headers. The reaction time with the air system is instant, so if you hit a ridge in the field, it doesn't have that ½ second delay to figure out it has to lift up, it just lifts up. That, to me, was the reason that we could travel so much quicker," says Daryl Moffat of Path Head Farms at Cabri, Saskatchewan, who used three AirFLEX headers on over 10,000 acres. "I would say that we were probably doing an extra 20 to 25 percent per day in low crops like lentils. In cereal crops, we were doing just as much as any other draper header."

Ease of Use

The AirFLEX also eliminated the pea auger, which is commonly used on many draper headers to help move the crop to the feed auger. Instead, a shaped draper shield promotes unrestricted crop flow to the centre deck without power, moving parts or adjustments.

"My first impression of it, I guess, doing the setup, was that it was very, very simple to use. I guess the second thing that we noticed right away when we started cutting and had everything set up was that, without even thinking about it, we were probably harvesting faster than we'd ever done before, cutting lentils. We did a lot of our cutting at 6 mph but there were times when we were travelling at 7 to 7.5 mph," says Moffat.

Last year, Chris Chapple at Grandora, Saskatchewan, harvested 1,500 acres of peas and lentils with two AirFLEX headers, and found the headers easy to use with great floatation in the flex mode.

"The biggest benefit was having that adjustability with the air bags. If it rained and that ground was wet, you just bump up your air pressure a little bit and lighten the weight on the cutterbar and you're good," says Chapple. "Lentils flow onto the cutterbar with great ease. We had 8200 flex auger AGCO headers before, and we ran one of them next to these two AirFLEX headers, and we pretty much told the guy to put it away because he was losing too many lentils. We were doing peas last summer and they were lodged, laying away from the header, and we were doing 6 mph and behind the header looked like summer fallow, it cut so well."

In fact, Chapple liked the headers so much, he bought a third one for 2016 — testament to how well the AirFLEX improves harvest speed and efficiency.

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KEEPING UP WITH KID BEAN... AND FRIENDS!



Kid Bean at Gilbert Plains Parade

This summer and fall, MPSG and Kid Bean have attended many events across the province. During the heat of the summer Kid Bean marched in two parades: the Gilbert Plains and Grandview Rodeo and the Dauphin National Ukrainian Festival. Luckily, some kind Ukrainian dancers let Kid Bean hitch a ride on the back of their pickup. The route was so long, Kid Bean might have turned into a baked bean!

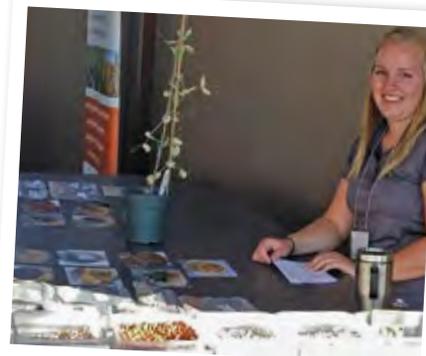
MPSG staff Lindsey Andronak, Toban Dyck and James Carriere (summer student) were at Open Farm Day at the Farm and Food Discovery Centre (FFDC). Over 500 people attended and were able to test their knowledge of pulses through a matching game and a bean dissection. Best Cooking Pulses provided samples of pinto bean flour with a brownie recipe for visitors to take home. Hands down, the kids' favourite activity was picking their own pulse pods from the plots MPSG planted at FFDC. They loved seeing what was inside and comparing them with their friends.

Some of the seeds will be planted in their own gardens at home and some kids wanted to try cooking them! VIPs attending our station included Brian Mayes, city councillor for St. Vital and Bob Lagassé, MLA for Dawson Trail.

Lindsey has also been busy visiting Winnipeg stores such as Neechi Commons and Avenue Meat Market with Food Matters Manitoba. Samples were handed out including bannock with hummus, which is a great combination. Lindsey and MPSG summer student Geertje Doornbos were also at the Winnipeg Amazing Ag Adventure, where more than 1,000 students learned about pulses. It was a busy three days! One of the evenings, we also participated in the Adult Amazing Agriculture Adventure, where adults got to experience the various stations. Celebrity guests included Ralph Eichler, minister of agriculture and our very own Rick Vaags, MPSG director.

On September 25, MPSG along with The Sentruhl Project hosted Prairie

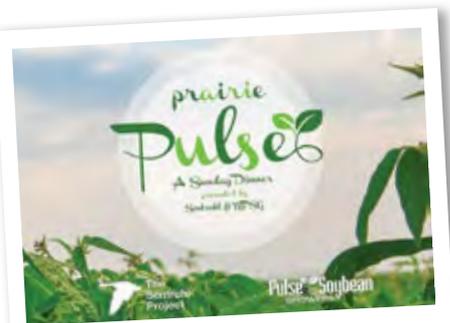
Pulse: A Sunday Dinner. The event was sold out and diners feasted on dishes such as red and yellow lentil bread with chickpeas and cream, salt and vinegar soybeans and split pea hummus. The main course was flame-roasted pulled pork with pinto beans and a marinated pear with a soy cream for dessert. It was such a success that there are rumours this might become an annual event.



Geertje at the Winnipeg Amazing Ag Adventure

Sobeys celebrated October by deeming it Pulse Month. Lindsey visited four Sobeys locations across Winnipeg and handed out recipe cards, recipe books and samples of recipes with pulses. A more formal presentation and cooking demonstration occurred at the new Sobeys Extra on Pembina Hwy. in their community room.

If you know of any events, teachers or groups that would like a visit from Kid Bean and/or Lindsey please email Lindsey at lindsey@manitobapulse.ca. And to keep up with Kid Bean, follow us on Twitter: [@eatMBpulses](https://twitter.com/eatMBpulses). ■



Prairie Pulse: A Sunday Dinner was hosted by MPSG and The Sentruhl Project



A new season is here!

Tune in to CTV on Saturdays at 6:30 p.m. for more great recipes and drink pairing from local experts.

For all the recipes visit GreatTastesMB.ca

Don't miss **Celebrating International Year of Pulses** on December 10.

Pulse Canada

Madeleine Goodwin
IYP Canada Coordinator

Increasing consumer awareness and demand for pulses both internationally and in Canada was a major goal for the International Year of Pulses (IYP). As 2016 comes to an end, the pulse industry is recognizing the strides made toward achieving this goal and is looking forward to what will be done beyond 2016.

PULSE FEAST

On January 6, more than 35 countries celebrated Pulse Feast, the global pulse industry's official launch of IYP. Roughly 140 Pulse Feast events took place around the world on that day. In Canada, 33 events were held, ranging from a lunch at a bookstore in Winnipeg to an evening reception in downtown Toronto attended by over 180 consumer influencers. Pulse Feast generated

national media coverage, including stories by CBC and the Globe and Mail.

EDUCATING CONSUMERS

An ongoing marketing campaign in North America resulted in hundreds of stories and segments featuring pulses in the American and Canadian media, reaching close to 3-billion people in 2016. The campaign is just one of many consumer-facing initiatives launched during IYP. Pulses.org is another tool being used to reach consumers. The global website provides information about the health, nutrition and sustainability benefits of pulses, and includes a database with over 300 recipes collected from 31 countries.

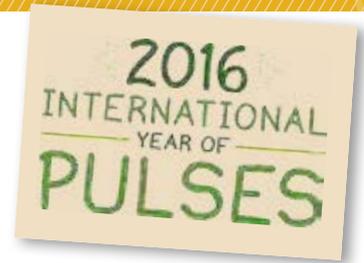
A big part of IYP in Canada has been making connections and partnerships. Teaming up with Agriculture in the Classroom Canada reached 32,000 Canadian students with pulse-focused lesson plans, interactive exhibits and gardening programs. These young students are learning about the benefits of pulses at an early age, which will

apply to their future food choices as independent consumers.

An educational exhibit developed by the Canada Agriculture and Food Museum travelled to 13 cities across Canada, teaching over 350,000 Canadians why pulses are important to health, nutrition and sustainability. The exhibit will continue visiting communities throughout the country during 2017.

A partnership was also established with Community Food Centres Canada (CFCC), to integrate pulses into community kitchens, food banks and after-school cooking programs across Canada. CFCC works in lower-income communities to increase access

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 **ROUNDUP READY 2 YIELD[®] SOYBEANS**

WHY PULSES? CHALLENGE UPDATE AND WINNERS

The *Why Pulses? Challenge* was created by MPSG to celebrate and promote pulses during the 2016 International Year of Pulses. The challenge was initiated as a way to educate consumers of all ages about these sustainable, healthy, affordable crops grown in Manitoba. Schools and community groups were invited to create an event or project that highlighted the nutritional, health and/or environmental benefits of pulses. The winning projects will receive financial support from MPSG.

We had many excellent entries, and are very happy with the level of engagement in the challenge.

The winners are:

SCHOOLS

- Louis Riel School Division students will research pulses through field trips and guest speakers and use that knowledge to develop kid-friendly pulse recipes. This will cumulate in

the production of a recipe booklet and tasting events.

- Elmwood High School will implement a student cooking club. Students will plan, prepare and freeze meals containing pulses. Students can then use these meals for nutritious lunches and to alleviate hunger, which has been identified as a school wide problem.
- Beaverlodge School will host an Empty Bowls event in support of Winnipeg Harvest. Students will paint clay bowls and serve pulse soups. A pulse soup cookbook will also be sold.

COMMUNITY GROUPS

- National Ukrainian Festival in Dauphin hosted a Best Borscht competition. Competitors had to update their borscht recipe with two different kinds of pulses.
- Winnipeg Harvest will be hosting free cooking classes and workshops using pulses. They also will be incorporating

pulses into their free meal program and providing recipe cards so participants can make these meals at home!

- The Canadian Centre for Agri-Food Research in Health and Medicine are creating a landscape picture depicting Manitoba agriculture morphing into a Winnipeg skyline all out of pulses. Through this mural, they will increase awareness of the nutritional properties of pulses.

MPSG would like to thank all the groups that took the time to participate in the *Why Pulses? Challenge*. We look forward to bringing you updates on all the projects in the coming year. ■



continued from page 17

to healthy foods such as pulses, build food skills, and provide education and engagement opportunities. Pulses are an ideal fit for the organization, aligning with their vision of a Canada where everyone has the means and knowledge necessary to access good, healthy food in a dignified way. Pulse recipes have been integrated into CFCC's cooking programs, and a social media contest in June challenged CFCC's clients to come up with their own unique pulse recipes.

ENGAGING STAKEHOLDERS

Another major focus of IYP was to increase awareness of pulses and pulse research among stakeholders in the areas of food science, health and nutrition. In November 2015, the Little Beans, Big Opportunities conference was held at the New York Academy of Sciences. The inaugural event for IYP highlighted the role pulses play in global food and nutritional security, environmental sustainability and economic development. Over 150 experts in the areas of food science, economics, health and nutrition, agriculture and public

policy attended the conference. Pulses were also featured at several technical conferences in North America including Experimental Biology, the Canadian Nutrition Society, Dietitians of Canada, the Research Chefs Association and the Restaurants Canada Show.

Throughout 2016, countries around the world held product development competitions encouraging the development of food products containing pulses. The competitions generated thousands of entries. On July 19, the top seven teams from around the world had the opportunity to demonstrate their innovations to food scientists at the LovePulses Product Showcase. This live event took place at the Institute of Food Technologists Expo, helping to put pulses on the map as a versatile and innovative ingredient.

A two-part technical workshop series held in Winnipeg and Saskatoon helped communicate the benefits of pulses as value-added ingredients to food manufacturers and ingredient suppliers. Both workshops were sold out, evidence

of the food industry's increasing interest in pulses.

A LOOK AHEAD: PULSES AND THE FUTURE OF FOOD

A recent consumer survey showed that awareness of pulses among Canadian consumers increased by 7% in the first six months of 2016. Roughly one third of survey respondents indicated that what they learned about pulses has led to an increase in pulse consumption. These statistics demonstrate that the pulse industry is on the right path to increasing awareness and ultimately demand for pulses in Canada. At the same time they show that there is still work left to do.

2016 offered an opportunity for the pulse industry to tell the world that pulses contribute to the health of people and the health of the planet. Pulse Canada is looking forward to continuing its strategic partnerships in Canada and around the world in 2017 and beyond, in a collaborative effort to increase pulse production and consumption, and to serve the interests of human health and environmental health with pulses. ■

Lindsey Andronak
Outreach Coordinator, MPSG



From the outside, 303 Main Street in Winnipeg, looks like any other downtown office building. However,

this brown nondescript tower holds a myriad of laboratory and processing equipment and a fully functional bakery, pasta, noodle, milling, extrusion and analytical facilities belonging to Cigi, the Canadian International Grains Institute.

Cigi was established in 1972 and is primarily focused on the development and use of Canadian wheat crops. Since 2003, they have expanded their scope to include pulse crops, as the acreage across Canada, particularly the Prairies, began increasing.

“There was no other place where Canadian pulses could be showcased domestically and internationally,” said Ashok Sarkar, Senior Advisor Technology. “We were an obvious place to do that type of thing.”

Cigi’s facility allows them to conduct research at both the lab scale and the pilot scale so that their findings can become a commercial reality. Pulse research at Cigi includes dehulling, milling, pasta and noodle making,

extrusion and baking. The goal with all this research and equipment is to ensure the quality and usability of pulses on a commercial scale. Cigi is a non-profit organization and receives funding from the Government of Canada, directly from farmers, commodity groups and other industry partners.

Canada is the largest exporter of pulses in the world, and through collaboration with processors and the government, an initiative was started to keep some of the nation’s pulse crop here in Canada. To accomplish that, Canadians must eat more pulses.

One way is to encourage Canadians to eat more pulses through traditional methods of preparation, such as soups, stews and salads. A lot of these ways of cooking aren’t as familiar to Canadians, so the route Cigi is using is milling pulses into flours. “To popularize pulses quickly, we want to introduce them into some form of food people are used to,” said Sarkar.

Food processors can then incorporate these pulse flours into their processed foods. Consumers are also looking for specific health benefits from these foods. Pulses can increase both the protein and the fibre amounts in foods, enabling food companies to make important health benefit claims on their packaging.

“Cigi has developed a controlled testing environment to understand how to mill pulses into flours and what kinds of traditional North American foods they should be put in,” said Peter

Frohlich, Cigi project manager, pulses and special crops.

Of course, as with any new food product, there are obstacles to overcome. One obstacle is that pulse flours do not contain gluten. Gluten, found in wheat, is a mixture of protein that provides elasticity in doughs. Gluten helps dough rise and keep its shape. When adding pulse flours to dough mix, the amount has to be carefully calibrated to ensure this elasticity. This is known as the inclusion rate. If the amount of pulse ingredients added is too high, then the product may have to be processed through a different method.

Another major obstacle is flavour. “When we travel around the globe and talk to food companies and manufacturers, they know about pulses. They’re very interested and they want to use them,” said Frohlich. “They want to add them to food products they already have a market for, but that food product is going to change its flavour. The problem with that is the consumer wants to have the same product; higher nutrition, but tasting the same.”

Frohlich, with funding from MPSG, worked on a project looking at reducing the beany off-flavours in pulses and creating more desirable flavours. One potential solution to this issue is the thermal treatment of pulses. Some flavour compounds are volatile so they are likely to be diminished by the heating process. Frohlich and his colleagues assessed different thermal treatments for the efficacy and efficiency of reducing these flavours.

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Wild Oats Grain Marketing

The *Wild Oats Grain Marketing Program* sets out a detailed marketing schedule for each of the crops we grow in Manitoba. We:

- › sometimes pre-price, when it makes sense, and always start sales when combining starts
- › keep back at least 20% until we can see the new crop growing
- › sell in 20% increments through the crop year and explain why each incremental sale is made
- › sell the entire crop within the crop year



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“One thing we don’t know is if you use thermally treated flours, does that change the end product quality? Because at the end of the day, if you approach a food processor and you want them to use your thermally treated flour, they want to know what will happen to their end product,” said Frohlich.

The final step involved a sensory analysis to obtain a consumer perspective about the food product. “If a consumer doesn’t notice a difference between the untreated flour and the roasted flour, then there is really no point in adding that extra cost,” added Frohlich. The effects on thermal treatment on nutritional quality will also be investigated, but due to the low temperatures, it is hypothesized that there will be minimal effects measured.

Heather Hill, project manager of pulse flour milling and food applications at Cigi, is also studying how food processing can affect characteristics like nutrition. “We’re really emphasizing some of the products that are under pressure from consumers because they are seen as unhealthy or not having enough vitamins, minerals, protein or fibre,” said Hill. “So we’re taking a look at breakfast cereals, instant noodles, pasta, bread and extruded snack foods.”



Extrusion is where material is forced through a specific shape under high temperature and pressure. It can be used to manipulate food ingredients into certain shapes like a Cheezie or Cheerio. This project, funded by AAFC’s Canadian Agricultural Adaptation Program and Pulse Canada, will incorporate some of Frohlich’s work improving flavour, texture and end product quality, while ensuring the nutritional benefits of pulses.



Tray of extruded snacks made from pulse flour. This is an example of a value-added product that could be made from pulses or soybeans.

Warburton's Family Bakers

Cigi and Warburton's Bakery have also partnered, along with funding assistance from MPSG and SPG (Saskatchewan Pulse Growers), to develop a line of high-protein baked goods featuring pulse flours. Warburton's bakery is the largest bakery in the United Kingdom and it's the second biggest grocery brand in the UK based on value sales, after Coca Cola. They bake approximately two million loaves of bread per day and source a good part of their wheat from Canada.

Warburton's wanted to increase the nutrition of their bread, particularly the protein content. Thanks to assistance from Cigi with milling, baking and sensory testing, Warburton's launched four new high-protein products in September 2016 using Canadian pulses. Warburton's takes great pride in the quality and consistency of their products. Cigi is helping them evaluate the effects of different varieties and environmental factors on nutritional and functional characteristics of pulses.

“What we’ve seen so far when looking at the differences among varieties is that it is quite dependent on growing locations and seasons as most varieties come from the same parent line,” said Hill. “That’s a big piece that we will be looking at in the next few projects, to answer more specific questions about varieties.”

In the future, breeders may create varieties not only with high-yielding, disease resistance characteristics, but also with nutritional characteristics

such as high protein, trying to balance the relationship between yield and protein. What all these projects have in common is the creation of new markets.

“The market for food processing is growing and [these projects] will only enhance it by attracting other companies to use pulses in their ingredients,” said Frohlich. Ideally, some of these new markets will benefit farmers as the value of pulses increases due to the work being done with Canadian pulses.

“A lot of the work we’re doing is ensuring that when a food company uses pulse ingredients they can be more successful,” said Hill. “It’s sort of a more sustainable way of using pulse flours, not just a one-time try and then leave it on the product development shelf. We can help advance this into market.”

Farmers who are interested in experimenting with turning their crops into a value-added product such as flour can often find support from the Canadian pulse and agri-food industry partners such as Cigi.

The introduction of pulses into new avenues of food processing has the ability to open up new markets that benefit both farmers and consumers. Cigi is leading the way with its state-of-the-art facility and openness to new ideas.

“It is just so interesting to be involved with pulses at this time. There’s just so much exposure now with International Year of Pulses and all the news about sustainability and health and wellness. It’s good to be a part of a Canadian crop that has a really good news story behind it,” said Hill. ■



Image courtesy of Canadian International Grains Institute

Fresh from the oven – pulse flour tortillas

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Brian Clancey

Senior Market Analyst and Publisher
STAT Communications

Excluding chickpeas, dry edible bean production in Canada and the United States now stands at an estimated 1.346 million metric tonnes, down from 1.495 million last year.

There was a net decline in white bean production from just over 323,000 metric tonnes to almost 270,000. This is down from the recent five-year average of 326,500 metric tonnes. Coloured bean output in the two countries is up modestly, rising from 1.286 to 1.298 million metric tonnes, remaining well above the previous five-year average of 1.133 million.

By contrast, production in the NAFTA region is expected to increase modestly from over 2.46 to almost 2.51 million metric tonnes, reflecting optimism that output in Mexico will rebound across its 2016–17 production cycle.

Chances that Mexico will import fewer beans during the first half of 2017 could see total export trade in beans drop from 320,000 metric tonnes last season to around 305,000. Even so, residual supplies of beans should decline from this summer's 286,000 to 241,000 metric tonnes by the end of the marketing year.

Most beans grown in Canada and the United States and virtually all beans grown in Mexico are consumed in North American domestic markets. Residual production is exported, while gaps in Mexico's supply are filled with imports of mainly pinto and black beans from the United States. Though Canada also has duty-free access under NAFTA, production of those classes is not as great and Canada faces additional logistical challenges crossing the U.S. border.

Complete statistics on Canadian production of the various classes is not readily available. Statistics Canada provides some unofficial data, which can be fleshed out when the provincial crop insurance boards publish their annual statistical data on insured acres by variety. Even so, initial indications suggest land in coloured beans is up along with modest increases in white bean area.

By contrast, there is a chance white bean output will be down from last year, while coloured bean production will rise. The United States is looking at a significant drop in white and black bean output, while pinto bean production will recover from last year's low. Even so, available supplies of pinto beans will be little changed because markets were able to reduce North American ending stocks on account of improved export movement to Mexico.

Mexican demand should remain a factor in coloured bean markets through the end of the calendar year. If Mexico is successful in increasing production in 2016–17, demand would be expected to drop back to more normal levels in the 2017 calendar year. Coloured bean markets are also being helped by problems with Brazil's crops. Though Brazil remains one of the world's biggest producers of dry

edible beans, it is also one of the largest consumers.

Crops harvested this year have been disappointing. As a result, Brazil has been an aggressive buyer of Argentine black beans. However, Argentina's crop is smaller than last year's. Consequently, Brazil has also bought product from North American suppliers, helping boost export sales from that region. Preliminary production estimates for 2017 suggest output in Brazil will be up, jumping from just 2.52 to 3.02 million metric tonnes. Even so, output will remain below the recent five-year average of 2.98 million, suggesting imports will remain relatively high at a projected 150,000 metric tonnes in 2017. How many black beans North America can ship depends on whether Argentina succeeds in expanding output next year. If so, demand for North American product will decline in 2017.

Argentina also sets the tone for white bean markets. While this year's crop was excellent in terms of quality, production dropped from 225,000 to 180,000 metric tonnes and only limited quantities of white alubia beans sized 210 grains per 100 grams or smaller were harvested. This has seen asking prices for smaller white alubia beans jump to a premium to large white alubia beans.

Egypt, which has white alubia beans sized 210 grains per 100 grams is maintaining asking prices above \$1,300 metric tonnes, hoping to take advantage of limited availability from Argentina. Great northern bean sellers in North America are also hopeful this could improve demand as packagers and canners try to substitute for 210s.

To the extent demand for great northern beans is bolstered by limited supplies of medium calibre white alubia beans, navy beans might also benefit from product substitution and improved market values for medium and smaller calibre white beans.

The bottom line for dry edible bean producers is that demand should remain relatively strong through the end of the calendar year, but could slow in 2017 as production recovers. ■

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LIFE IS GOOD!

An Afternoon with a USDA Oilseeds Analyst

Toban Dyck

Director of Communications, MPSG

Soybean prices will stabilize for a while then increase, predicted senior USDA oilseeds analyst Bill George. When he's in your truck for an afternoon, these are the kinds of questions you just have to ask.

On July 28 of this year, Mr. George and Jeff Zimmerman, agriculture attaché with the USDA's Foreign Agriculture Service stationed in Canada, spent an afternoon chatting about soybeans.

We visited MPSG director Albert Turski's farm near La Salle, as well as Roger Wohlgemuth's farm near Landmark.

He spoke with Mr. Turski and Mr. Wohlgemuth about their experience growing soybeans and based some province-wide conclusions on what

they said and the information MPSG gave him.

"Well, it's clear soybeans are here to stay," said Mr. George, who helps put out the Oilseeds: World Markets and Trade reports.

He said this referring to Manitoba, but also for the world. He doesn't anticipate demand for the crop slipping. Demand will continue to grow, he said, looking ahead five to 10 years. And the livestock industry is largely responsible, with the bulk of soybeans being processed for meal, over oil.

But, he added, increasing protein levels in Canadian soybeans should be in the plans for associations like ours. Elevators don't test for protein yet, but he sees that changing.

We had lots of questions for Mr. George. Questions aimed at determining what the future of the crop looks like in the worldwide commodities market.

In short, it looks good. He doesn't see the increase in acres cropping up in Eastern Europe as a threat to demand for Canadian or U.S. soybeans.

The U.S. continues to earmark resources for soybean research, tackling issues of fertility, herbicide usage, and much more.

Mr. George also sees acres continuing to increase in South America. Though those increases have slowed as a result of toughening environmental regulations, there is a still a willingness for governments to allow for the expansion of production.

He left impressed with Manitoba. And he left excited to head back to his Washington home to see if their soys looked as good as ours.

MPSG would like to thank Albert Turski and Roger Wohlgemuth for opening up their farms, letting us walk in their fields, and taking the time to chat soybeans. ■

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Chickpeas, Kabuli	Millet	Triticale
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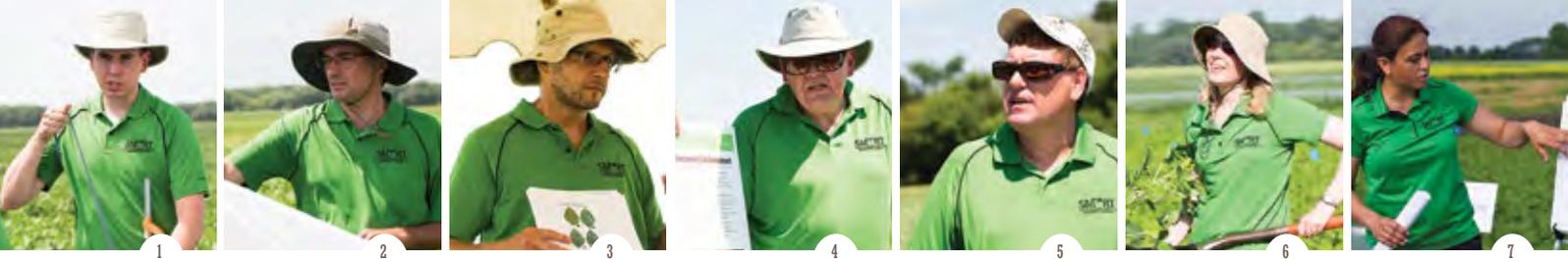


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SMART DAY

SOYBEAN MANAGEMENT & RESEARCH TRANSFER

MPSG hosted its annual Soybean Management and Research Transfer Day at the University of Manitoba Ian N. Morrison Research Farm in Carman, MB, on July 20. A total of 85 people participated in the day, an equal mix of farmers and agronomists.

Five agronomy lessons were taught by 13 public sector researchers and extension specialists from four institutions. Participants were split into groups to encourage engagement and networking among attendees and presenters. Lessons focused on helping farmers and agronomists identify and manage production constraints in soybeans and soybean crop rotations. Current soybean research being conducted at the research farm was showcased and results were presented when available. Below is a brief tour of the day, including presenter information, their topics, and their take-home messages.



Soybean Aphids and Predators: Scouting and Management

1 Jordan Bannerman showed participants how exclusion cages are used in entomological research and demonstrated the effect of aphid populations with and without exposure to natural predators. Jordan assisted participants in estimating aphid populations and discussed the aphid action and economic thresholds. Sticky traps nearby were used to demonstrate the diversity and abundance of natural local predators.

2 Dr. Alejandro Costamagna demonstrated the use of malaise traps and their use in estimating insect movement between landscapes. He explained results of his recent research, which found differences in soybean aphid suppression by natural predators based on type of vegetation surrounding the soybean field.

3 Dr. John Gavloski found natural aphid predators using a sweep net in the nearby soybean field. Participants were quizzed in their knowledge of insect identification and learned about the potential of each to suppress soybean aphids. John also showcased some defoliating insects.

Seed Handling for Improved Emergence

4 Dennis Lange, armed with damaged seed samples and On-Farm data of seed damage from various operations, advised participants to conduct a soak test to determine seed quality. Dennis emphasized the value of quantifying seed viability and moisture prior to seeding operations to not only adjust seeding rates accordingly, but also identify the potential for destructive handling operations.

5 Terry Buss showcased soybean plots of various plant populations and the consequences of poor emergence. His popular “when should I seed?” decision matrix made an appearance, outlining his discussion on soil temperature, calendar date, 24-hour forecast and tolerance to risk factors.

Soybean Nitrogen Dynamics

6 Dr. Yvonne Lawley discussed the role both inorganic soil nitrogen (N) and symbiotic rhizobia bacteria play in soybean crop nutrition. She discussed results of small-plot inoculant trials, testing the efficacy of numerous inoculant strategies and the MPSG recommendations for single versus double inoculation, which is based on results from On-Farm Network trials. Leading into a discussion on fertilizer N for soybeans, she addressed the need to assess crop N sufficiency and the balance between soil and biologically fixed N in contributing to crop nutrition.

7 Dr. Navneet Brar presented her results from the first year of a starter N fertilizer trial for soybeans. She demonstrated how chlorophyll content, nodule number and soil N levels changed over the growing season under various N fertility regimes. Participants toured this year's plots, where the same phenomena occurred. The lack of yield and seed protein response to starter N at the end of the season supports best management practices: a properly inoculated soybean crop will not require supplemental N.

8 John Heard advised participants about how to handle a crop that did not have successful inoculation. Reminding us of growth stages where peak N uptake occurs and N nutrition is critical for optimizing yield, John advised participants to assess nodulation at R-1 to R-2, ensuring at least 10 nodules per plant were present and to apply rescue N fertilizer if necessary at R-3 to R-4 (early pod fill). Demonstrations of crop injury from broadcast granular urea and dribble banded and sprayed UAN showed participants how detrimental foliar fertilizer applications can be.

Soil Erosion and Management

9 Marla Reikman led a conversation on vulnerability of soil to erosion – wind erosion, in particular. Talking through the effect of tillage and rolling on soybean production, participants learned about the trade-off between potential agronomic gains, such as improved emergence or harvestability versus topsoil and nutrient loss, soil crusting and compaction.

10 Mitchell Timmerman used a rainfall and wind simulator to physically show participants how soil type, landscape and management practices can influence water movement and risk of soil loss.

11 Patrick Walther walked participants through corn residue demonstration plots, allowing them to witness the effect of growing soybeans under no-till, disced and strip-tilled residue. With the plot-sized strip-till equipment on display, participants learned of his On-Farm research results which measured little difference in soil moisture, temperature, soybean emergence or yield amongst the various residue regimes.

Soybean Disease Management

12 Debra McLaren presented her latest results from her current soybean root rot surveys. Participants were among the first to hear about the prevalence of Phytophthora race distribution in Manitoba. Debra brought samples of various Fusarium isolates, and explained her work in developing diagnostic techniques for rapid disease identification.

13 Kristen Podolsky described how the use of root rot survey results could be used to help growers manage root rots. She covered various management strategies, including crop rotation, variety selection and seed treatments and their effectiveness for the various root rot pathogens. In addition, Kristen reviewed the symptoms of foliar and stem diseases and presented results from the On-Farm Network fungicide trials.



FARMER PROFILE – John Preun

There's a soft-spoken gravity to farmer and MPSG director John Preun. When he speaks, you listen. And what he says, you believe. There was depth to our conversation.

"Every farm has so many different dynamics. You can't use a cookie-cutter approach. Human nature comes into play," said John. "We own the farm, on paper, but, really, we're just stewards of the land here for the few decades that we're running things. In the grand scheme of things, those years don't really mean that much. Hopefully it will pass on and pass on."

John takes agriculture seriously, and so does his brother, Hubert. Together, along with their two families, they run a hog operation and grain farm of about 7,000 acres in the Selkirk area.

John and Donnalyn Preun have four children: Dustin, 30; Donavin, 27; Ethan, 25; and Shaelyn, 21. Ethan and Donavin are active on the farm. Hubert and Sherri Preun have four children, as well: Daniel, 19; Katherine, 17; Aaron, 15; and Lucas, 11.

"We know this operation will stay in the family," said Hubert. "So if we ruin it now for the next generations, they'll think, 'what in the world were you thinking, doing that?'"

And there is no shortage of thought among the Preun brothers. Manitoba Pulse & Soybean Growers (MPSG) will be encouraging its farmers to make sustainable and responsible decisions in 2017, providing quality, independent tools to do so. Healthy crop rotations are a tangible example of this.



John and Donnalyn Preun



Hubert and Sherri Preun

We know guys here who grew canola on canola on canola. Well, now they can't grow canola anymore," said John. "And now people are starting to go down this road with soybeans. I've made the comment, 'if you're not careful, this may only be a short-term gig for you. All of a sudden it will be over.' Our biggest thing here is rotation, rotation, rotation. Over the course of many years, we found that we were growing too much wheat and barley and too much canola. We needed to separate ourselves from that limited rotation. Soybeans and corn and peas have really worked out well for that. We're trying to use rotation to mitigate our long-term disease/weed resistance issues."

The Preuns tank mix their Roundup, never using the same cocktail twice.

"We've never been a farm that just sprays Roundup," said Hubert. "We never spray Roundup on its own. We always tank mix it with another chemical."

This takes foresight, which the Preuns have. This takes the ability to make decisions now for a future that

may be a generation away. Both Hubert and John have this ability, as well. It's foundational to how they farm, and this way of thinking has allowed their farm to adapt in large and profitable ways.

Collaboration is becoming more than a whisper at MPSG. We talk about it. But I didn't expect it to come up in my conversation with John and Hubert. It did, though.

Their farm, Long Lake Farms, works in collaboration with two other farmers, buying together, selling together, farming together. And when it's explained, it makes so much sense.

"On a major scale, we farm with two other farms," said Hubert. "Your beliefs and your philosophies have to be in line. A lot of our strategies are the same. We started in about 2010. We formed a company together. When we go to buy, we're buying on behalf of three farms. We still own our machinery. We still own our land. We buy together. We sell together. Collectively, we're about 17,000 acres. We get volume discounts and command better prices. We shake a bigger stick. It's made us more competitive, and we're good friends."

John's grandparents immigrated to Canada from Germany in 1927.

"My grandfather bought this farm in 1948. My dad bought it from him in 1963 and we bought it from him in 1988."

John and Hubert's dad expanded his grandpa's 400 acres into 1,700, a growth trajectory the Preun brothers have certainly continued.

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REVIEW OF MPSG LEVERAGED FUNDS FROM GF2 IN 2016

Manitoba Pulse & Soybean Growers advocates responsible use of farmer check-off dollars. That's why MPSG staff proactively seek leveraging opportunities to maximize the value of check-off through programs like those offered through the *Growing Forward 2* (GF2) federal-provincial-territorial (FPT) agriculture policy framework. In 2016, 11 projects were

awarded \$706,586 in funds from four GF2 programs. The suite of programs offered through GF2 has allowed MPSG to provide financial assistance to scientists at the Canadian International Grains Institute, University of Manitoba and St. Boniface Research Centre for research projects, as well as support MPSG extension initiative such as the Getting it Right Soybean Production

Meeting, SMART Field Day, production resources and the Bean App. GF2 funds also allowed MPSG to support a campaign for pulse promotion during the International Year of Pulses. As GF2 wraps up and we await the unveiling of the next FPT policy framework, MPSG will maintain relationships with government and co-funders to capture opportunities for leveraging. ■

Program	Project	GF2 funds	MPSG funds	Total funds
Growing Competitiveness – Agri-Extension	• Soybean management and research transfer (SMART) field day	\$5,000.00	\$11,000.00	\$16,000.00
	• Getting it Right – soybean production meeting	\$5,000.00	\$15,000.00	\$20,000.00
	• MPSG soybean and pulse production resource materials	\$7,500.00	\$16,762.50	\$24,262.50
Growing Actions	• Manitoba dry bean grower survey	\$13,246.50	\$4,415.50	\$17,662.00
	• Pulse pledge tour	\$12,713.00	\$96,297.00	\$109,010.00
	• MPSG membership survey	\$14,611.50	\$4,870.50	\$19,482.00
Growing Innovation – Grain Innovation Hub	• Research Agronomist	\$400,200.00	\$1,600,000.00	\$2,000,200.00
	• Effect of genotype and environment on pulse flour quality and baking	\$158,442.00	\$25,000.00	\$475,326.00
	• Determining efficacy of qPCR to determine <i>Bradyrhizobium japonicum</i> populations in fields	\$26,442.00	\$26,443.00	\$52,885.00
	• Cardiovascular health benefits of soybean crops	\$36,500.00	\$18,500.00	\$55,000.00
Growing Innovation – Agri-Food Research and Development	• Manitoba general and herbicide-resistant weed surveys	\$26,931.00	\$8,078.00	\$121,862.00
Totals		\$706,586.00	\$1,826,366.50	\$2,911,689.50

continued from page 25

It's a farm that has never been afraid to try things. At one point, the Preuns had a dairy, chickens, hogs, and grain.

Their dad got rid of the dairy and chickens in the late '60s choosing to focus on hogs and grain, but still with a bent towards being ahead of the curve.

In the early '80s, John and Hubert's father attempted to grow soybeans.

"They were Maple Prestos, and at Christmas time they were still green. That experiment failed miserably," said John. "We started our second round of soybean attempts in the mid '90s – '93 or '94. We had to buy soymeal from the U.S. for our livestock, so we thought we'd give making our own a try. We were too early again. The varieties weren't there. We struggled to make 30 bushels. And we needed that yield to cover input costs."

Now, soybeans work very well for the Preuns. And, while the protein levels are too low for them to use for livestock without supplement, they enjoy growing them for sale to the general commodities market.

John became a MPSG director in early 2016. He had questions about where his check-off dollars were going. He wanted answers. And he's no stranger to boards. John started as a Pork Council delegate. Then, he was a director at Manitoba Pork Marketing, where he moved through the ranks from vice-president for two years and president for five.

"I bring experience. I wanted answers, and my neighbours were after the same answers," said John. "Now, I can say that their money is being spent on things that will actually help farmers."

John maintains that more farmers need to hear about the great things MPSG does: the independent research; the policy work; market development; and more.

His message has gravity and depth. And it's one that MPSG takes seriously.

John's and Hubert's parting message to farmers is simple and profoundly relevant.

"We're in that honeymoon phase, soybean farmers. It's a great crop. If we want to keep the advantage we have, be good stewards." ■



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ON-FARM EVALUATION OF DIRECT HARVESTING PINTO BEANS



on-farm network

Manitoba Pulse & Soybean Growers On-Farm Network collaborator, Brent VanKoughnet of Agri-Skills Inc., has evaluated the suitability of select pinto and navy bean varieties for direct harvesting compared to undercut and windrowing from 2014 to 2016 in trials at Carman, Manitoba. This report summarizes the results of the pinto trial: the pinto varieties

Table 1. Pinto yields for variety, harvest method, and the interaction between variety and harvest method for 2014 to 2016.

Factor	2014	2015	2016	
Variety				
LaPaz	1980 ^a	2907 ^b	2589 ^{ab}	
Windbreaker	1905 ^a	3309 ^a	2659 ^a	
Maverick	1773 ^b	–	–	
Monterrey	–	2908 ^b	2767 ^a	
PIN1314	–	–	2430 ^b	
P Value	0.0034	<.0001	0.0091	
Harvest Method				
Cut	2071 ^a	3051	2891 ^a	
Flex	1701 ^b	3031	2331 ^b	
P Value	<.0001	0.3754	<.0001	
Variety x Harvest Method				
LaPaz	Cut	2079 ^{ab}	2891	2932
	Flex	1882 ^c	2924	2247
Windbreaker	Cut	2155 ^a	3359	3044
	Flex	1655 ^d	3258	2273
Maverick	Cut	1979 ^{bc}	–	–
	Flex	1567 ^d	–	–
Monterrey	Cut	–	2904	3012
	Flex	–	2912	2522
PIN1314	Cut	–	–	2576
	Flex	–	–	2283
P Value	0.0292	0.0546	0.0687	
Mean	1886	3041	2611	
% C.V.	13.1	7.6	16.1	

Values followed by the same letter are not statistically different at 95% confidence interval

investigated were Windbreaker (bush), La Paz (upright), Maverick (upright), Monterrey (upright) and PIN1314 (upright). The objective of this On-Farm trial was to compare harvest method (undercut vs. direct harvest) and to see if harvest method was affected by variety (i.e. bush vs. upright).

In all years, pinto beans were planted at 75,000 seeds/ac with a Case IH vacuum planter on 30" rows between May 26 and June 7. Weed management and fertility followed typical agronomic practices. In 2015 and 2016, the fields were rolled soon after planting. Varieties were desiccated prior to harvest with glyphosate and heat. Direct harvest equipment was a 635F flex header and CWS wind bar in 2014 and a MacDon FD70 FlexDraper in 2015 and 2016.

The yield difference between undercutting and direct harvesting was not affected by variety in two out of three years (2015, 2016). This is somewhat surprising given that the varieties tested have different architecture – Windbreaker was included as a check, being a traditional bush variety, while the other varieties tested are considered upright (La Paz, Maverick, Monterrey, PIN1314). Our hypothesis was that the yield difference between harvest methods would be minimized with upright varieties. However, this was not always the case and these results demonstrate the strong influence of environment.

The only year where the yield differences between harvest methods were influenced by variety was in 2014. In that year, undercutting Windbreaker yielded 500 lbs/ac more than direct harvest, while the difference between undercutting and direct harvesting

La Paz, an upright variety, was only 197 lbs/ac. This is what would be expected based on plant architecture and pod height characteristics of each variety. Maverick was also tested in 2014. The tolerable amount of harvest losses for direct harvest is likely in the range of 200–300 lbs/ac at \$0.30/lb to offset the additional labour and equipment costs associated with cutting and windrowing.

In the other two years, the difference between undercutting and direct harvest was the same for all varieties. In 2015, there was no significant difference between undercutting and direct harvesting for all varieties. In that year, growing conditions were good and plants were generally taller overall, allowing for ideal direct harvest conditions for all varieties.

In 2016, a wet growing season contributed to short plants overall, which likely masked any varietal differences. There was a significant difference between undercutting and direct harvesting (average 560 lbs/ac) with no effect of variety. In other words, all varieties showed a similar advantage to undercutting compared to direct harvest (ranging from 293 to 771 lbs/ac). Monterrey and PIN1314 were also tested in 2016.

Based on these results at Carman, the potential does exist for direct harvest of pinto beans, depending on the growing season. Variety choice can help minimize direct harvest losses, but did not have a large influence as initially expected. The growing season seems to have the greatest effect on plant architecture, therefore direct harvesting decisions should be assessed as the season progresses.

This trial will be continued in 2017. ■

› Manitoba Pulse & Soybean Growers values your opinion and is constantly striving to better serve you, the farmers.

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KEEPING THE SOYBEAN HONEYMOON ALIVE

Kristen Podolsky, MSc, PAg
Production Specialist, MPSG

We keep referring to the “honeymoon” of soybean production in Manitoba, and based on the 2016 growing season, it’s still going strong. We could likely see another provincial yield record and see acres reach two million in 2017. But with wet conditions in eastern Manitoba there were certainly some clues pointing to rough waters ahead. Disease, soybean cyst nematode (SCN), glyphosate resistant weeds and environmental variability are the key factors that could eventually end the honeymoon. How can we be proactive in keeping soybean production profitable and sustainable for Manitoba? The rough waters ahead may not be avoidable, but they can certainly be calmed with crop rotation and good management practices.

MOST COMMON VS. MOST IMPORTANT SOYBEAN DISEASES

The most commonly diagnosed soybean diseases in Manitoba are shown in Figure 1. The diseases are categorized by colour according to the part of the soybean plant the disease affects – leaves (foliar), stems and roots. Which colour group occupies the largest piece of the pie? As you can see, orange predominates the pie graph, meaning that currently in Manitoba, the most

common soybean diseases are foliar leaf diseases – Septoria brown spot, bacterial blight, leaf spots, downy mildew, cercospora blight, etc. These are the diseases you probably hear most about. The second largest pie piece is green, representing root diseases (seedling diseases, Phytophthora) followed by brown, representing stem diseases (pod and stem blight, white mould).

Now let’s take a look at what the most *economically important* diseases of soybean are in the U.S. What colour predominates the pie chart in Figure 2? As you can see, green occupies nearly 80% of the pie chart. This means that the majority of yield losses caused by disease in soybean are lost to diseases that affect the root – SCN, Phytophthora, seedling diseases, etc. Brown, representing stem diseases (sclerotinia, charcoal rot, brown stem rot) occupies the second largest piece, followed by orange, which is represented by only one foliar leaf disease – Septoria brown spot.

What does this mean? The most common and recognizable diseases in Manitoba are the least impactful when it comes to crop yield losses. We get caught up in differentiating leaf spots and trying to manage with fungicides, when the real potential for yield loss exists with root and stem diseases. Root and stem diseases build up over time

and with shortening crop rotations. Once these diseases become established in Manitoba, there will be no quick fixes like fungicide, so the longer we can keep them at bay, the better. We can start now to take proactive management – with diverse crop rotation and variety selection.

MOVE OVER LEAF DISEASES, LET’S TALK ROOT AND STEM DISEASES

SCN is the most detrimental disease of soybean worldwide. This nematode has not been detected in Manitoba yet but is expected to show up in the Red River Valley region bordering the U.S. at anytime. For now, we will focus on seedling diseases and Phytophthora root rot, the second and third most detrimental disease of soybean in the U.S. There are several pathogens that contribute to the root rot pathogen of soybean – *Fusarium* spp., *Pythium*, *Rhizoctonia*, and *Phytophthora*. *Fusarium* and *Phytophthora* are the most common in Manitoba soybean fields (see page 35).

All these pathogens persist in soil and crop residue, infecting soybeans through the root. As soybean is grown more frequently, inoculum builds in the soil leading to higher infection when conditions are favourable. In 2016, *Phytophthora* root rot was found

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Figure 1. Most commonly diagnosed soybean diseases in Manitoba (Source: M. Pradhan, Manitoba Crop Diagnostics Lab, 2010–2015)

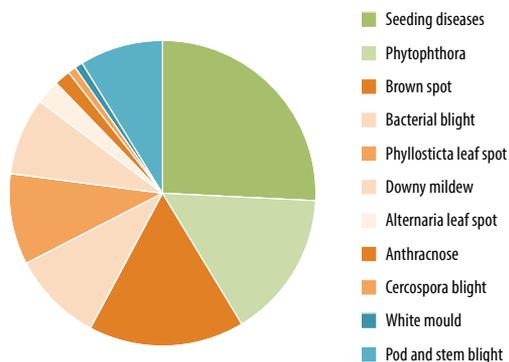
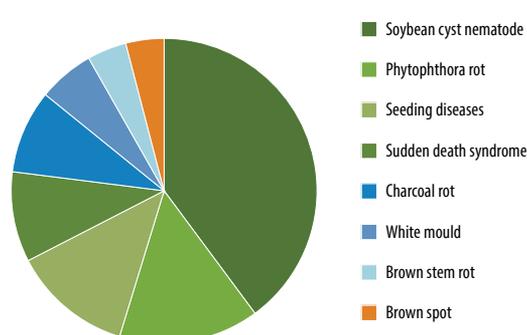


Figure 2. Top eight economically important soybean diseases in the U.S. (Source: Wrather and Koenig, Plant Management Network, 1996–2010)



in 59% of fields surveyed at an average incidence of 7%. Impact on the crop can range from discreet yield loss (few above ground symptoms but impaired root system limits water and nutrient uptake) to complete plant death at anytime during the growing season. Collectively, Phytophthora and seedling diseases account for 25% of soybean yield losses in the U.S. and are likely the most detrimental in Manitoba at present.

VARIETY SELECTION AND CROP ROTATION ARE KEY STRATEGIES

Genetic resistance for Phytophthora is available in about half of current soybean varieties. Resistance traits should be among the top selection factors for choosing a soybean variety, especially in eastern Manitoba or fields with frequent soybean in rotation. It is very easy to identify varieties with resistance to Phytophthora. In this issue of *Pulse Beat*, the *Variety Evaluation Guide* is provided. In this guide, you will find the *Soybean Variety Description Table* on page 3. In column “PRR” of this table, Phytophthora root rot resistance genes will be listed. Choosing a variety with some type of resistance will help reduce the occurrence and impact of Phytophthora root rot in your soybeans. Phytophthora does not affect other crops in rotation, so rotating away from soybean for three years is also very effective in reducing the disease. The other three pathogens that contribute to seedling diseases have a wider host range and genetic resistance is not available, however fungicide seed treatments can offer up to three weeks protection after seeding.

SCN can also be prevented with crop rotation and variety selection. Again, if you grow soybeans in the Red River Valley and have a tight soybean rotation, I would encourage you think about choosing a variety with SCN resistance as well (also found in the *Soybean Variety Description Table*). It will not do any harm to use varieties with SCN resistance even though we haven’t detected it. In fact it’s possible for SCN to be present in high risk areas without any above-ground symptoms.

Symptoms typically don’t show up until yield losses exceed 10%.

WHAT ABOUT SUDDEN DEATH, CHARCOAL ROT, BROWN STEM ROT AND WHITE MOULD?

Sudden death syndrome has not been detected in Manitoba or North Dakota, but is known to cause up to 100% yield loss in Iowa and is usually in association with SCN. This is a disease we do not want showing up anytime soon. Charcoal rot and brown stem rot have been suspected but not confirmed in Manitoba – they are common in North Dakota and are likely present at low levels in Manitoba fields. These three pathogens typically occur late-season and have the potential to severely impact soybean yields once they become established in the province. Crop rotation and prevention of SCN will help slow the development of these pathogens.

White mould caused by *Sclerotinia* has a wide host range of broadleaf crops and is common in Manitoba, especially in a wet growing season. Fortunately, soybeans are less susceptible than other crops like canola or sunflowers. In 2016, white mould was found in 33% of surveyed fields at an average incidence of 9%, the highest we have seen in many years. At an incidence level of 10%, you can expect 3–5 bu/ac yield loss, but this high incidence level is rare.

ECONOMICS OF CROP ROTATION FREQUENCY

Per long-term Manitoba crop insurance records, soybean planted on soybean produces 95% yield compared to 100% when planted on small grain stubble. Yet, the frequency of soybean planted on soybean is nearly 20%. This is a frightening statistic when it comes building disease pressure and the implications to yield as discussed in this article. Manitoba farmers have had great success with soybean production and economic returns over the past five years leading to this frequent rotation. But farm profitability needs to be a balance of short-term economics and long-term productivity. For example,

when preparing budgets and deciding crop plans, are we taking into account the 5% yield loss if soybean is planted on soybean? What if we knew that by growing soybean on a one to two year rotation, we would see pest pressure increase more quickly leading to 10% annual yield loss in five years, instead of prolonging it to 20 years? The pest pressure will not only be diseases – SCN is at our doorstep and glyphosate resistant kochia is already here.

I encourage you to think about the longer-term implications of crop rotation as you continue crop plans for 2017. It is great to see soybean acres continuing to increase and our job is to help foster this growth and ensure a profitable industry for years to come. We will be able to keep the honeymoon alive by maintaining diversity in crop rotation, choosing varieties with genetic resistance and vigilant scouting allowing for early detection of emerging pests. ■

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on-farm network

When peas and canola are grown together in the same field at the same time as an intercrop, it often over yields – the yield produced by the intercrop is greater than the yield produced by the monocrop grown on the same total land area.

MPSG's On-Farm Network collaborator, Brent VanKoughnet, of Agri-Skills Inc., has been testing this practice on his farm for two years. The trial investigates the agronomic and economic implications of intercropping peas and canola with three different nitrogen fertilizer rates compared to monocropping peas or canola.

Certified Agassiz peas and 5525 CL canola (BrettYoung) were seeded on May 10th at Carman, Manitoba with the seeding and nitrogen (N) fertilizer rates listed in Table 1. The field had a base fertilizer blend (20lbs N, 35 lbs P₂O₅, 10 lbs K₂O and 15 lbs S

Table 1. Pea and canola seeding rates and additional N fertilizer rates

Cropping System	Seeding Rate		Additional N fertilizer lbs N/ac
	Canola lbs/ac	Pea lbs/ac	
Canola	5	0	105
Peaola 0N	3	110	0
Peaola 30N	3	110	30
Peaola 60N	3	110	60
Peas	0	180	0

Table 2. Partial and total yield with land equivalency ratio (LER) for pea and canola cropping system

Cropping System	Canola	Pea	Total	Canola	Pea	Total
	bu/ac			LER		
Canola	44.5	0	44.5	1.00	0	1.00
Peaola 0N	22.9	24.7	47.6	0.51	0.64	1.16
Peaola 30N	29.3	17.7	47.0	0.66	0.46	1.12
Peaola 60N	33.0	13.2	46.2	0.74	0.34	1.09
Peas	0	38.5	38.5	0	1.00	1.00

per acre) banded before seeding, and all herbicide and fungicide applications were consistent across the trial. All treatments were direct harvested on August 31st.

2016 RESULTS

Similar to results from 2015, over yielding occurred for all pea-canola intercrop treatments based on the Land Equivalency Ratio (LER) found in Table 2. The LER is a measure of how much land would be required to achieve intercrop yields with crops grown in monoculture. When the LER is greater than one, the intercrop is more productive than the monocrop. The highest LER occurred for the pea-canola intercrop with no additional N fertilizer added (Peaola 0N), producing a total yield of 47.6 bu/ac. This is compared to a monocrop yield of canola at 44.5 bu/ac and peas at 38.5 bu/ac.

Although there is little difference between total yield for all pea-canola intercrop treatments, we see the proportion of peas and canola change as the N fertilizer rates change. There is a higher proportion of peas to

Table 3. Economic analysis of pea and canola cropping system based on seed and N fertilizer cost

Cropping System	Cost of Production [†]	Income	
		Gross [‡]	Net
Canola	\$111	\$445	\$335
Peaola 0N	\$53	\$402	\$349
Peaola 30N	\$69	\$417	\$348
Peaola 60N	\$85	\$423	\$338
Peas	\$33	\$269	\$236

[†] Cost of production is based on estimates found in MAFRD Guidelines: Crop Production Costs (2016).

[‡] Canola market price of \$10/bu. Pea market price of \$7/bu.

canola when there is no additional N fertilizer added. When the N fertilizer rate increases, the productivity of peas is decreased and we see a higher proportion of canola to peas indicated by the partial LERs in Table 2.

An economic analysis was performed taking into account only the costs that would differ between each cropping system – seed costs and N fertilizer costs. In Table 3, the pea-canola intercrop was the most profitable when no additional N fertilizer was added. ■



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COMMON BACTERIAL BLIGHT AND HALO BLIGHT OF DRY BEANS

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Development Centre

The bacterial diseases common bacterial blight (CBB) caused by *Xanthomonas axonopodis* pv. *phaseoli* and halo blight caused by the bacterial species *Pseudomonas syringae* pv. *phaseolicola* are widespread in Manitoba. The two diseases produce very different symptoms on susceptible beans. Symptoms of CBB typically appear as brown lesions bordered by yellow tissue that occur on the margins and interveinal areas of leaves and the lesions often coalesce (Figure 1). Older lesions often become brittle, which leads to the disintegration of leaf tissue and premature leaf senescence. Halo blight symptoms first appear as pinpoint-sized brown spots on the leaves, which later are surrounded by a large zone of yellow tissue (Figure 2). The yellowing of the leaf tissue is caused by the production of a bacterial toxin. Bean plants with severe halo blight symptoms often die prematurely. Both diseases cause infection of the pods, which results in the formation of circular, brown lesions and the infecting bacteria can spread to developing seeds. Seed infection results in discolouration of the seed, reduced seed size, germination and seedling vigor.

Common bacterial blight is the most prevalent foliar disease of dry beans in Manitoba. Recent surveys of commercial fields in Manitoba have shown that symptoms of CBB were present in all the fields that were examined. Most years, halo blight only occurs in a small number of bean fields and symptoms of the disease are most evident in the spring. However, occasionally severe outbreaks of halo blight have occurred.

The CBB and halo blight pathogens are usually seed-borne and cannot overwinter on infected bean stubble in Canada. Therefore, seed infection is the



Figure 1. Symptoms of common bacterial blight

most common means for the spread and establishment of these diseases. Under humid conditions, the bacteria ooze onto the leaf surfaces of infected plants, which allows the pathogens to be spread to neighbouring plants by windblown rain, hail, contact with wet, infected leaves and contaminated clothing or machinery. The buildup of CBB is favoured by warm (above 30°C), humid conditions, while halo blight requires cool conditions (lower than 25°C) for disease development



Figure 2. Symptoms of halo blight

and toxin production. For that reason, halo blight symptoms are usually most apparent in the spring. Both diseases cause significant economic losses to growers due to reductions in seed yield and quality and the cost to annually purchase disease-free seed.

Currently the best control measure for preventing yield losses from halo blight is the use of bean seed that has been certified to be disease free. The

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VARIETY RELEASE PROGRAM

The Variety Release Program (VRP) is a seed distribution program managed by the Saskatchewan Pulse Growers (SPG) where Select Status seed growers can access Breeder seed of new varieties developed by plant breeders at the Crop Development Centre (CDC) at the University of Saskatchewan.

The program's purpose is to facilitate rapid uptake and acceptance of new and improved pulse varieties. Any Canadian Seed Grower Association (CSGA) certified Select Status seed grower whose provincial pulse grower organization has an agreement with SPG is eligible to apply for Breeder seed through this program. Manitoba Pulse and Soybean Growers (MPSG) will subscribe to the VRP in 2017.

Manitoba Select seed growers who are members in good standing with MPSG have the opportunity to purchase Breeder pea (yellow, green, maple, forage) and faba bean seed from CDC. Manitoba seed growers who request a refund of their levy submitted to MPSG are unable to participate in the VRP.

Applications will be sent to eligible CSGA Select Status seed growers for 2017 seed allocations in January.

-----► For more information, contact Laryssa Grenkow (MPSG) at laryssa@manitobapulse.ca or 204.745.6488 ext. 6



use of disease-free seed is also highly recommended for the control of CBB, but this requires the importation of bean seed from the drier regions of the USA, such as Idaho and Wyoming. In the past, bean seed imported from the USA could be treated with streptomycin sulphate to reduce seed-borne transmission of CBB and halo blight, but this practice will end in December 2016 because of concerns regarding the buildup of antibiotic resistance in the soil microflora. Copper-based bactericides are available for foliar application to control CBB and halo blight, but they often require multiple applications to effectively reduce the spread of these diseases.

The development of resistant cultivars shows the greatest promise for cost-effective, sustainable control of CBB and halo blight. Over the past decade in western Canada, a number of breeding lines and cultivars with resistance to CBB have been developed by Agriculture and Agri-Food Canada

involving several bean classes that include navy, black and cranberry beans. AAFC-Morden and AAFC-Lethbridge have jointly released the CBB resistant navy bean varieties Portage and NA6-27-2 and the CBB resistant black bean cultivar AAC Black Diamond 2. Other dry bean breeding programs also have released CBB resistant cultivars, which include WM2 (pinto bean) and CDC Superjet (black bean). Field studies conducted at Morden have shown that resistant bean lines significantly reduced yield losses to less than 17%, while those of the susceptible cultivars were as high as 36% under severe disease pressure. Disease symptoms on the leaves and pods of resistant black and navy beans and seed discolouration of navy beans caused by CBB were also decreased by resistance. Seed weights were reduced by CBB in the susceptible cultivars, but the disease had little effect on the seed weights of resistant lines and cultivars. Research to develop new CBB resistant

cultivars of dry beans in all the market classes is continuing at Morden and Lethbridge.

The development of dry bean cultivars with resistance to halo blight is complicated by occurrence of different races among populations of the halo blight pathogen. A joint research study of AAFC-Morden, AAFC-Lethbridge and AAFC-Brandon recently determined that only races 2 and 6 were present in western Canada with race 2 being the most widespread, but race 6 was common in Manitoba. Resistance to race 2 was observed in the CBB resistant cultivar AAC Black Diamond 2. A number of other cultivars displayed moderate susceptibility to race 2, which slows the spread of halo blight and reduces its impact on yield. Research is continuing to identify dry bean cultivars with resistance to race 6 and to combine resistance to both races in high-yielding backgrounds. ■

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and Nutritional Science; ⁶AAFC, Lethbridge
Research and Development Centre

ROOT ROT PATHOGENS OF FIELD PEA IN MANITOBA

Fusarium root rot is a major disease of field pea in Manitoba and can cause significant yield reductions due to compromised root systems and reduced plant stands. Symptoms of root rot in the field include poor emergence, stunted growth, stand collapse and

yellow patches within the crop. Symptoms on the roots include reddish brown to blackish lesions and a red discolouration of the root's vascular system. The taproot may remain intact but fine roots can be destroyed, resulting in fewer nitrogen-fixing nodules being produced. Cultivars with complete resistance have yet to become available and control of root rot is difficult. To assess root pathogens, crops surveyed were randomly chosen from regions in south-central and southwest Manitoba, where field pea is commonly grown. The survey was generally conducted from early to mid-July, with ten plants sampled at each of three random sites for each crop surveyed. The 30 pea plants were rated for severity of root rot using a disease severity scale of 0 (no disease) to 9 (death of plant). Fifteen symptomatic roots were collected per field for isolation of root rot pathogens in the laboratory. In the last five years, *Fusarium* spp. have been the most prevalent root pathogens in

field pea surveys in Manitoba with the more common species generally including *F. avenaceum*, *F. acuminatum*, *F. solani* and *F. redolens*. Twenty-two percent of surveyed pea crops (2012–2016) had root rot severity ratings above 4 (ie., symptoms were present on 50% of the root system) and this would have had a detrimental effect on crop yield.

Aphanomyces root rot, caused by *Aphanomyces euteiches*, is a destructive disease of pea and occurs most frequently and severely in wet soil. The disease was first confirmed in peas in Saskatchewan in 2012, then in Alberta in 2013. Through collaborative research with AAFC-Lethbridge, *A. euteiches* was identified in 2 of 3 Manitoba fields in 2014 and 3 of 3 fields in 2015. Soil samples from 30 fields were collected during the 2016 field pea survey and are being analyzed for the presence of *A. euteiches* DNA. To date, seven fields have been identified as strong positives

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for this pathogen and testing continues on the remaining samples.

PHYTOPHTHORA ROOT AND STEM ROT IN SOYBEAN

Phytophthora root and stem rot of soybean is caused by *Phytophthora sojae* and can infect plants at all stages of growth when soil conditions favour pathogen development. Symptoms include seed rot, pre- and post-emergent damping-off, water-soaked lesions on seedlings, brown lesions that progress up the stem (Figure 1), yellowing of the leaves and wilting of the plants followed by death with the leaves remaining attached. This is one of the most damaging diseases of soybean, causing severe losses worldwide. In Manitoba, acreages of commercial soybeans have increased dramatically in recent years and Phytophthora was first detected in soybean samples in 2011. A step-by-step protocol was developed to facilitate the isolation and identification of *P. sojae* from symptomatic plant tissue. In

Figure 1. Phytophthora stem and root rot of soybean caused by *P. sojae*



2014, 44 soybean crops were evaluated for the presence of Phytophthora root and stem rot and symptomatic plants were collected for pathogen isolation, identification and race characterization. This pathogen can be effectively managed through the deployment of cultivars with single resistance

genes (Rps), therefore determining the races present in Manitoba was critical for effective disease management strategies. Four races were identified with race 4 being the most prevalent followed by races 25, 28 and 3. Race 4 is virulent against (can defeat) resistance genes (Rps) 1a, 1c and 7, race 25 is virulent against 1a, 1b, 1c, 1k and 7, race 28 is virulent against 1a, 1b, 1k and 7 and race 3 is virulent against 1a and 7. This is the first in-depth study of the race structure of *P. sojae* in Manitoba. Information on the resistance genes that a number of commercial soybean cultivars carry is available in *Seed Manitoba 2016* and *MPSG's 2016 Variety Evaluation Guide*. ■

Acknowledgements

The funding provided by MPSG and the Pulse Science Cluster of AAFC for these studies is greatly appreciated. Technical support provided by D.J. Hausermann, T.J. Kerley, T.L. Henderson, M.J. Thompson, W.C. Penner, D.B. Stoesz, and C. Mueller is gratefully acknowledged.



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Soybean Fertility Fact Sheet

GENERAL SOIL FERTILITY GUIDELINES SUGGESTED FOR SOYBEANS

NUTRIENT	OPTIMUM SOIL TEST RANGE	NOTES	REMOVAL	
			lbs/bu	lbs/ac*
Nitrogen (N)	Low, <50 lbs/ac	Proper inoculation will eliminate the need for N fertilizer. Soybean can be grown on fields with high N levels, but it generally reduces nodulation, contributes to iron chlorosis and can delay maturity.	3.8	152
Phosphorus (P ₂ O ₅)	Medium-High, 10–20 ppm	Soybean can be grown on fields with various P levels. They are very efficient at extracting soil P and have shown to be non-responsive to P fertilizer in Manitoba. However, a crop rotation strategy that ensures P removal rates of soybean are balanced with P inputs is encouraged. This may include fertilization of soybean. Maximum safe rate of seed-placed P is 10 lbs/ac for wide rows or up to 20 lbs/ac for narrow rows with good soil moisture.	0.85	34
Potassium (K ₂ O)	Medium-High, ≥ 100 ppm or 200 lbs/ac	Soybeans take up and remove more K than other annual crops. Soil K should be monitored where crop rotation includes frequent soybean or forages and on coarse-textured soils. If below critical levels, potash should be applied away from the seed. Deficiency of K appears as yellowing of leaf margins on older leaves (Figure 3).	1.4	56
Sulphur (S)	Medium-High, ≥ 30 lbs/ac	Soils that receive S fertilizer from other crops in rotation (i.e. corn, canola) generally provide sufficient amounts for soybean. If grown on coarse textured soil with low organic matter and no recent fertilization, soybean may benefit from S application.	0.2	8

*Based on 40 bu/ac soybean crop

INOCULATION STRATEGIES

Soybeans have the ability to meet the majority of their nitrogen (N) requirements through biological N fixation, thereby eliminating the need for N fertilizer. To facilitate N fixation, inoculation with products containing compatible rhizobia (*Bradyrhizobium japonicum*) is required. Inoculants are available in liquid, powder and granular form. Liquid inoculants are placed on-seed and/or in-furrow, while granular inoculant is placed in-furrow with the seed. Granular and powder inoculants contain a peat or clay-based carrier to increase the survivability of the rhizobia. Liquid inoculant is convenient because it can be applied to the seed before planting, but can be more prone to desiccation. The inoculant strategy you use will depend on field history, equipment compatibility, cost, etc.

1 Double inoculation for fields with little or no history of soybean

Using two inoculant formulations or placement techniques (double inoculation) is encouraged for first and second time soybean fields. A typical strategy would include liquid on-seed plus granular or liquid in-furrow. Using two types of inoculant can be considered “extra insurance.” Soybean rhizobium is not native to Manitoba soils, so inoculation in fields with little or no history of soybean is very important to ensure adequate rhizobia is introduced to the soil to infect soybean roots and facilitate good nodulation. Research studies in Manitoba show an average yield increase of 10 bu/ac and increased protein for inoculant treatments over the untreated control at sites with no history of soybean.

Figure 1. Nitrogen-fixing nodules on soybean roots



2 Single inoculation for fields with a good history of soybean

Once introduced to the soil, rhizobia survive in the soil for many years. This is why the amount of inoculant required can be reduced once soybeans have become established in a crop rotation. From 2013–2015, 25 replicated On-Farm field studies in eastern Manitoba compared double vs. single inoculation in soybean fields that had seen at least two previous soybean crops. Overall, a significant and economic yield response to double inoculation occurred in two out of 25 sites or 8% of the time (Figure 2). This data set is consistent with other growing regions and indicates that single inoculation is more economical for mature soybean fields. To help define a “mature” soybean field, use the checklist below. If a field meets all four criteria, single inoculation will likely provide a higher economic return:

CHECK-LIST FOR SINGLE INOCULATION

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

The success of inoculation strategies should be evaluated every year by assessing nodulation at R-1 (early flower). Gently dig up soybean roots and look for at least 10 healthy nodules per plant (Figure 1). Healthy nodules will appear pinkish-red when split open. If there are no nodules present and the crop looks yellowish-green, a rescue application of N should be considered at R-2 (full flower) to R-3 (early pod). In the event of nodulation failure, an in-season rescue treatment of broadcast granular or liquid N can be used if N is directed below the canopy to the soil surface and rainfall is imminent. Contact with leaf material can burn the foliage and reduce yield.

continued ➤

Figure 2. Yield response to double inoculation compared to single inoculation across 25 On-Farm trials conducted in fields with at least a two-year history of soybean in eastern Manitoba from 2013–2015.



Figure 3. A) Potassium deficiency in soybean appears as yellowing of outer leaf margins followed by necrosis, beginning in oldest leaves and progressing upwards; B) Iron deficiency chlorosis results in yellowing of new soybean leaves but veins remain prominently green.



IRON DEFICIENCY CHLOROSIS.....

Manitoba soils contain adequate amounts of iron (Fe) to meet the demands of soybean. However, some environmental conditions can reduce the availability and uptake of Fe by the soybean plant, leading to the condition known as *Iron Deficiency Chlorosis* (IDC). Conditions that can lead to IDC include excess moisture, salinity, carbonates and/or high nitrate levels in the soil. Symptoms of IDC include yellowing of new soybean leaves between the veins (interveinal chlorosis) and an overall yellowing of soybean fields, particularly during the early vegetative stages in June. It is often a temporary condition that resolves itself when soil dries up. However, if a susceptible variety is grown in a high risk field and symptoms persist for > 1 week, yield loss can occur. There is no effective in-season management option, but it is important to accurately diagnose the problem and adjust management strategies for future years. Visual diagnosis (Figure 3), tissue testing and knowledge of soil characteristics can help you diagnose IDC.

The best management tool is prevention. Soil risk factors outlined in Table 1 can be used to identify fields that are at risk of IDC ahead of the growing season. If fields planned for soybean are at moderate-

high risk of IDC, choose a soybean variety with a good (low) IDC rating. Varietal reactions to IDC (rating 1–5) are available in the *Soybean Variety Evaluation Guide*. Other management practices include improved drainage and practices that reduce N levels (cover cropping, N management in other crops). The use of in-furrow iron chelate products is currently being evaluated.

TABLE 1. FIELD RISK OF IDC BASED ON CARBONATE AND SOLUBLE SALT SOIL TEST LEVELS

SOLUBLE SALTS (mmhos/cm)	CARBONATE LEVEL (%)		
	0 to 2.5	2.6 to 5	>5.0
0 to 0.25	Low	Low	Moderate
0.26 to 0.50	Low	Moderate	High
0.50 to 1.0	Moderate	High	Very high
>1.0	High	Very high	Extreme

Resources and References

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Should soil temperature be your guide?

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Deciding when to plant soybeans remains a concern among farmers in Manitoba. As soybeans are a long-season crop, Manitoba's short growing season leaves farmers with a narrow window to plant all of their acres. Farmers would like to plant as early as the season allows. However, late spring frost can harm early-planted soybean seedlings, while early fall frost can reduce the yield of late-planted soybeans nearing maturity. Due to these limitations, farmers must strike a balance between the risks of early versus late planting.

Current soybean planting date recommendations in Manitoba focus on soil temperature and calendar date. Soybean planting is recommended

when the soil temperature has reached at least 10°C. Calendar dates during the second and third weeks in May, or prior to the end of May, are also recommended based on long-term crop insurance data (MASC, 2016). In addition to soil temperature and calendar date, soybean growers are advised to consider the weather forecast following seeding. Cool, wet conditions following seeding can potentially cause chilling injury to soybean seeds during imbibition, increasing the risk of reduced plant stands. Farmers are also advised to consider their own personal risk including the number of acres slated for soybeans compared to other crops, timeline to complete seeding and harvest, and level of frost risk based on their location within the province (Buss, 2015). Research conducted in the midwestern United States indicates that calendar date and seedbed conditions are the most important factors for

determining when to plant soybeans (Pedersen, 2006). However, these recommendations need to be validated for Manitoba's short growing season environment.

The goals of this study were to:

1. determine if soil temperature at planting was an influential factor on soybean yield and emergence, and
2. identify the soil temperature that produced the highest soybean yield.

The two-year field study used early- (DK 23-10RY) and late-maturing (DK 25-10RY) soybean varieties seeded on six different planting dates. Planting dates were determined by the target soil temperatures of 6, 8, 10, 12, 14 and 16°C.

WHAT IS SOIL TEMPERATURE AT PLANTING?

Due to the daily fluctuation of air and soil temperature, an operational

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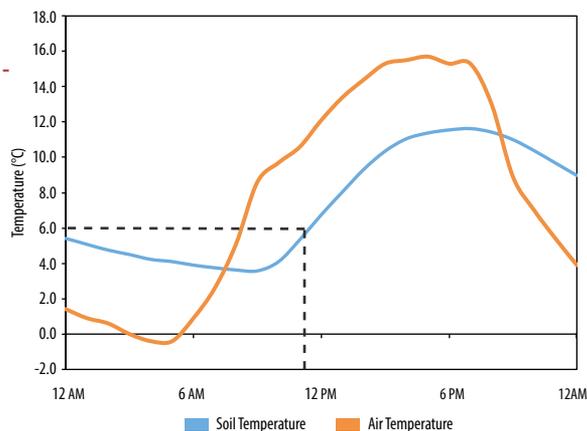
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definition to determine soil temperature was established for this study. Soil temperature for planting was defined as the temperature at a 5 cm depth at 10:00 a.m. for two consecutive days, in which seeding took place on the second day. The time of 10:00 a.m. was chosen as a “representative” time of day that allowed for morning soil warming to occur, and left enough time to seed on the same day.

DID COLD SOIL AT PLANTING REDUCE YIELD?

Growing interest in earlier soybean planting in Manitoba leads us to wonder if soil temperature at planting influences soybean yield, and what effect cold soil temperatures might have on yield. Reliable yield data was only available from two of the five site years of this study: Carman 2014 and 2015 (Figure 2). Despite the limited yield data from this study, we were surprised to find that only one site year had a significant relationship between soybean yield and soil temperature at

Figure 1. Example of diurnal air and soil temperature fluctuation at Carman, MB on May 20, 2015. This example meets the criteria for 6°C at 10:00 a.m.



planting (Figure 2B). This relationship occurred at Carman in 2015, where the “optimum” soil temperature was 9°C, resulting in maximum soybean yield. Interestingly, soil temperatures greater than 9°C at Carman in 2015 reduced soybean yield, which is the opposite of what we would expect (Figure 2B). We think this trend is driven by the latest planting date treatment at Carman in 2015, as this was the only site year with planting delayed until June (Figure 2B).

Thus, the decline in yield beyond 9°C was likely influenced by later planting rather than warming soil. In addition, no yield differences between early and late soybean cultivars occurred.

Although the reliable yield data from this study was limited, the observed trends suggest that it will be important to continue research on the topic of early planting. For the two site years with yield data, target soil temperatures

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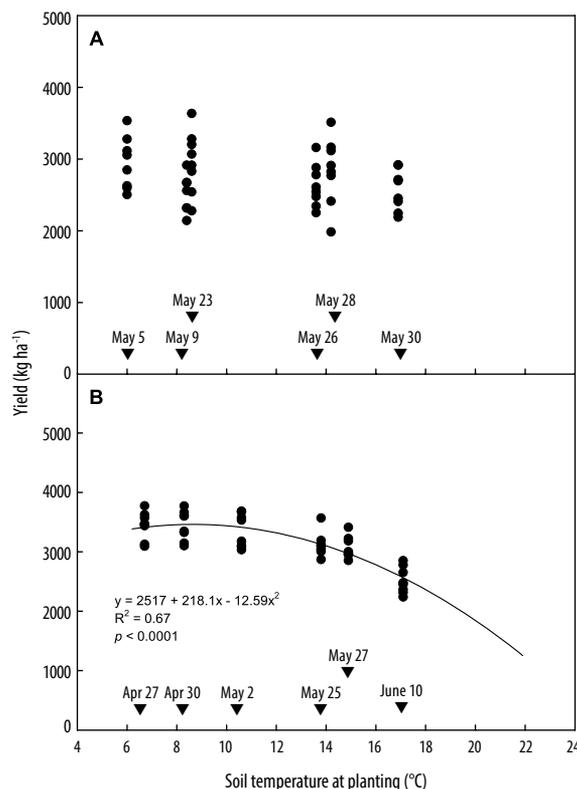
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Figure 2. Soybean yield response to soil temperature at planting at (A) Carman, MB in 2014 and (B) Carman, MB in 2015. Note: calendar dates for corresponding soil temperatures at planting are labelled for each planting date treatment.



fell on calendar dates ranging from May 5 to May 30th at Carman in 2014, and April 27 to June 10th at Carman in 2015 (Figure 2). Although planting began very early for both site years, no yield penalty from early planting was found (Figure 2). Yields were overall greater when soybeans were planted into cooler soil temperatures, or on earlier calendar dates for both site years, regardless of a significant relationship.

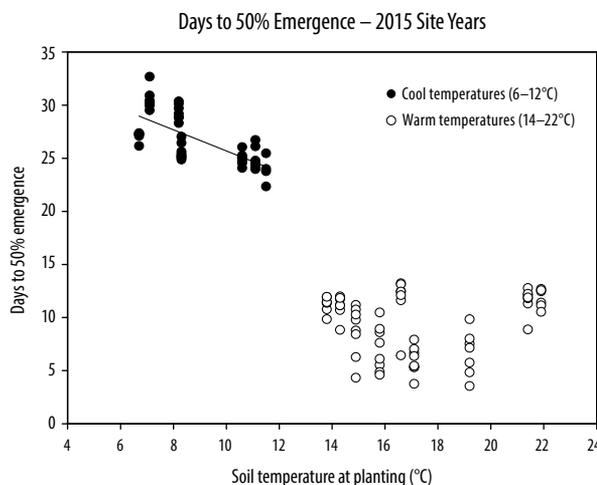
DID COLD SOIL AT PLANTING SLOW DOWN SOYBEAN EMERGENCE?

As crop establishment is such a critical first step for a successful soybean crop, it is important to understand how cold soil temperatures at planting could affect soybean emergence in Manitoba. Crop establishment was assessed in greater detail in the second year of this study at three sites. Soybean emergence was monitored every Monday, Wednesday and Friday until the V-4 stage. Again, no differences between early and late cultivars were found for soybean emergence.

Soybeans planted into cold soil had slower emergence than soybeans planted into warm soil. Days to 50% emergence from combined 2015 site years, clustered into “cool” (6 to 12°C) soil temperatures, which caused delayed emergence, and “warm” (14 to 22°C) soil temperatures, which resulted in rapid emergence (Figure 3). Such grouping suggests that there is a threshold temperature for time to soybean emergence. The significant linear relationship found for only the cool temperature grouping indicated that days to 50% emergence decreased with increasing soil temperature at planting, as expected. However, days to 50% emergence were unresponsive to warm soil temperatures. This finding suggests that soil temperatures of at least 14°C at 10:00 a.m. are ideal for soybean emergence.

It was expected that soybeans planted into cooler soil temperatures would result in reduced plant stands and higher seedling mortality. A significant linear relationship between soybean plant stand at 100% emergence and soil temperature at planting was found at

Figure 3. The relationship between days to 50% soybean emergence and soil temperature at planting for combined 2015 site years.



only one site at Morden in 2015. Plant population increased with increasing soil temperature, suggesting that warming soil temperature positively influenced established plant stands. A significant negative relationship between soybean seedling mortality and soil temperature at planting was also only found at Morden in 2015. High soybean seedling mortality coincided with low plant stands at Morden in 2015, suggesting that low soil temperatures were responsible for greater seedling mortality causing reduced plant stands, as expected.

LATE SPRING FROST EFFECT

Two site years experienced late spring frost events: Carman and Morden on May 30, 2015. Air temperatures ranged from -0.4 and -0.7°C over two hours at Carman, whereas temperatures ranged from -0.5 to -1.6°C for three hours at Morden. Frost damage at Morden was more extensive and affected only the first four treatments which were emerged at the time of the frost. As

a result, it was late spring frost rather than low soil temperature at planting that increased soybean seedling mortality and reduced plant stands.

SHOULD SOIL TEMPERATURE DETERMINE WHEN TO PLANT SOYBEANS?

It was surprising to find that low soil temperatures at planting, or early planting dates, did not penalize yield in this two-year field study. However, more information is required before new planting date recommendations can be adopted in Manitoba. Results from this study indicate that calendar date and spring frost had a greater influence on soybean yield and emergence, respectively, than soil temperature at planting. Therefore, factors other than soil temperature may be as or more important to consider in this short growing season area, such as calendar date, seedbed conditions, the weather forecast following seeding, tolerance to loss from spring or fall frost, and timeline to complete seeding and harvest. ■



Figure 4. Range of frost damage to soybean seedlings at Morden, MB on May 30, 2015 caused by air temperatures ranging from -0.5 to -1.6°C for a total of three hours.

MANITOBA PULSE & SOYBEAN BUYER LIST – NOVEMBER 2016

COMPANY	EDIBLE BEANS	FABA BEANS	LENTILS	PEAS	SOYBEANS	PHONE	LOCATION	CGC REGULATED
Agassiz Global Trading	✓				✓	204-745-6655	Homewood, MB	
Agri-Tel Grain Ltd.				✓	✓	204-268-1415	Beausejour, MB	✓
AGT Foods	✓		✓	✓	✓	306-525-4490	Regina, SK	✓
• SaskCan Pulse Trading – Parent Division	✓		✓	✓	✓	204-737-2625	St. Joseph, MB	✓
All Commodities			✓	✓		204-339-8001	Winnipeg, MB	✓
B.P. & Sons Grain and Storage Inc.					✓	204-822-4815	Morden, MB	✓
Belle Pulses Ltd.				✓		306-423-5202	Bellevue, SK	✓
Besco Grain Ltd.	✓	✓	✓	✓	✓	204-745-3662	Carman, MB	✓
Best Cooking Pulses Inc.			✓	✓		204-857-4451	Portage la Prairie, MB	✓
Brett-Young Seeds				✓	✓	204-261-7932	Winnipeg, MB	
BroadGrain Commodities Inc.	✓	✓	✓	✓	✓	416-504-0070	Toronto, ON	✓
C.B. Constantini				✓		604-669-1212	Vancouver, BC	✓
Canadian Grain Inc.	✓	✓	✓	✓	✓	905-257-6200	Oakville, ON	✓
Cargill Ltd.				✓	✓	204-947-6219	Winnipeg, MB	✓
Delmar Commodities				✓	✓	204-331-3696	Winkler, MB	✓
Farmer Direct Co-operative Ltd.	✓	✓	✓	✓		306-352-2444	Regina, SK	
Fill-More Seeds Inc.			✓	✓		306-722-3353	Filmore, SK	✓
G3 Canada Limited				✓		204-983-0239	Winnipeg, MB	✓
Gavilon Grain LLC					✓	816-584-2210	Omaha, NB	✓
Global Grain Canada	✓					204-829-3641	Plum Coulee, MB	✓
Hensall District Co-op	✓					204-295-3938	Winnipeg, MB	✓
Horizon Agro					✓	204-746-2026	Morris, MB	
ILTA Grain Inc.	✓	✓	✓	✓	✓	604-597-5060	Surrey, BC	✓
J.K. Milling Canada Ltd.				✓		306-586-6111	Regina, SK	✓
Knight Seeds			✓	✓		204-764-2450	Hamiota, MB	
Kalshea Commodities Inc.				✓		204-272-3773	Winnipeg, MB	✓
Lansing Olam Canada Commodities ULC					✓	877-747-7599	Chatum, ON	✓
Linear Grain	✓			✓	✓	204-745-6747	Carman, MB	✓
Louis Dreyfus Company Canada ULC					✓	403-205-3322	Calgary, AB	✓
Masterfeeds				✓		403-327-2555	Lethbridge, AB	
Maviga NA., Inc.		✓	✓	✓		306-721-8900	Regina, SK	✓
Monsanto					✓	-	Winnipeg, MB	
Natural Proteins					✓	204-355-5040	Blumenort, MB	✓
North American Food Ingredients					✓	204-272-5510	Winnipeg, MB	✓
Nutri-Pea Ltd.				✓		204-239-5995	Portage la Prairie, MB	

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COMPANY	EDIBLE BEANS	FABA BEANS	LENTILS	PEAS	SOYBEANS	PHONE	LOCATION	CGC REGULATED
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	✓
Providence Grain Group	✓	✓	✓	✓	✓	780-997-0211	Fort Saskatchewan, AB	✓
Quarry Seed					✓	204-467-8877	Stonewall, MB	
Remillard Seed Farm					✓	204-737-2376	St. Joseph, MB	
Richardson International				✓		204-934-5627	Winnipeg, MB	✓
• Richardson Pioneer Ltd.				✓	✓	204-934-5627	Winnipeg, MB	✓
• Tri Lake Agri				✓		204-523-5380	Killarney, MB	✓
S.S. Johnson Seeds	✓			✓		204-376-5228	Arborg, MB	✓
Seed-Ex Inc.					✓	204-737-2000	Letellier, MB	✓
Scouler Canada Ltd.	✓	✓	✓	✓	✓	403-720-9050	Calgary, AB	✓
Shafer Commodities					✓	204-822-6275	Morden, MB	✓
Simpson Seeds			✓			306-693-2132	Moose Jaw, SK	✓
Southland Pulse				✓		306-634-8008	Estevan, SK	✓
Sunrich LLC					✓	507-446-5642	Hope, MN	
Thompsons Limited	✓		✓	✓		519-676-5411	Blenheim, ON	✓
Vanderveen Commodity Services					✓	204-745-6444	Carman, MB	✓
Viterra Inc.	✓	✓	✓	✓	✓	Contact your local Viterra sales representative		✓
Walhalla Bean Co. (Canada Ltd.)	✓					701-549-3721	Walhalla, ND	✓
• Winkler Receiving	✓					204-325-0767	Winkler, MB	✓
Wilbur Ellis	✓		✓	✓		204-867-8163	Minnedosa, MB	✓
Zeghers Seeds Inc.			✓	✓		204-526-2145	Holland, MB	✓

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Soybean Scout ANSWERS



A – This relatively rare but distinct mottling pattern in soybean can be quite alarming. Typically we associate these symptoms with Sudden Death Syndrome (SDS) or Brown Stem Rot (BSR), both important diseases of soybean. However, Sclerotinia stem rot, Phomopsis pod/stem blight and environmental stresses can also be associated with these

leaf symptoms – this was the case in several Manitoba fields this past summer. If you see these symptoms, chances are it is one of these more common pathogens and not SDS or BSR, but it is important to investigate: take samples to the Crop Diagnostics Lab or call Manitoba Pulse & Soybean Growers. It should be noted that SDS has not been detected in Manitoba.



B – Tan-coloured stem lesions occurring at the node (point of leaf attachment on the main stem) can be common in the late reproductive stages of soybean (R-6 to R-8). The main pathogens causing stem lesions are Phomopsis pod/stem blight, Sclerotinia stem rot and Stem Canker. As Phomopsis progresses, very

tiny black specks are visible on the stem and infection may spread to the pods and seed. Stem canker will cause discoloration within the stem and Sclerotinia will produce the typical black sclerotia. Phomopsis pod/stem blight was found in about 10% of Manitoba soybean fields in 2016. It is generally not a yield limiting disease, but can reduce seed quality if harvest is delayed.

Recipe Corner



Split Pea Hummus

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| 2 cups – yellow split peas | 1 tsp – cumin |
| 8 to 10 – garlic cloves | 1/2 tsp – cayenne pepper |
| 1 – red onion, diced | 5 cups – water |
| 1/4 cup – olive oil or cold pressed canola oil | Zest and juice of 2 lemons |
| 1 tsp – paprika | To taste – salt and pepper |

Sweat the onion in half of the oil then add the split peas and water. Simmer until tender, about 35 minutes. Transfer to a blender or food processor; add the zest and juice from the lemons along with the spices, seasonings and garlic. Blend until smooth. Adjust the consistency with the remaining oil as well as some extra water. Adjust the seasoning as needed with salt and pepper.

It's simple, delicious and healthy. Give it a go or tweak it to suit your style.

Braised Chicken and Chickpeas

Serves 6-10

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| 10 – chicken thighs | 6 cups – chicken stock (or water) |
| As needed – canola oil | 3 sprigs – fresh thyme |
| 1 – onion (diced) | 1/4 cup – cider vinegar |
| 6 cloves – garlic | To taste – salt and pepper |
| 1 bottle – light beer (optional) | 3 – tomatoes (sliced) |
| 2 cups – chickpeas (soaked overnight, drained and rinsed) | 1 cup – edamame beans (shelled) |
| | To taste – fresh herbs |



Heat pan to medium hot and lightly coat with canola oil. Add chicken thighs, skin side down and sear until golden brown and crispy. Flip chicken thighs and add onion and garlic until slightly browned. Deglaze with beer and vinegar, reduce until almost dry. Add stock, chickpeas and thyme to pan. Season with salt and pepper. Cover and place in oven at 375°F for 1 and 1/2 hours. Remove and uncover. Add sliced tomatoes and immature soybeans (shelled edamame). Place back in oven on broil for 10 minutes. To serve, add chopped herbs of choice. Best enjoyed with others! If time sensitive, use only 4 cups of stock (or water) and 2 cans of drained chickpeas.

Recipes courtesy of The Sentruhl Project

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