

pulsebeat

Issue 90 • Summer 2020

Extremes of Moisture Three Farmers on How They Deal with Diverse Conditions

p. 15

The Bean Report

Successful Desiccation Decisions in Peas and Beans

p. 18

How Natural Enemies Respond to Soybean Aphids During High- and Low-Aphid Years

p. 25

Foliar Diseases in Soybeans, Peas and Dry Beans

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**We have a new
Production
Specialist in
the west.**



Laura Schmidt

MPSG is pleased to announce that Laura Schmidt has assumed the duties of our Production Specialist – West.

Laura has served MPSG for several years in the role of Extension Coordinator and this change marks a well-earned step in her career. The Production Specialist – West position is key to MPSG’s role in western Manitoba to sustain soybean production, support the re-entry of field peas and nurture the growth of dry beans. Laura’s growing base of skills that includes the recent successful defense of her MSc thesis will serve her well in this new role.

Say Hello to MPSG’s 2020 Summer Students



Raylene Doncaster

My name is Raylene Doncaster. I am originally from Winnipeg but now live in Iles des Chenes, MB. By the time you read this, I will have completed my final semester in the Agriculture faculty at the University of Manitoba, with a major in Agroecology. I am excited to begin my summer with MPSG. I look forward to gaining experience in the various crops they work with. I am trying to gain experience towards my CCA license and this summer job is a perfect way to achieve that. My goals are to learn about pulses, soybeans and their potential pests and how to extend that knowledge to farmers. I can’t wait to get out on the fields and learn!



Julie Gullett

My name is Julie Gullett and I’m from Gilbert Plains, MB, which is a small farming community in the Parkland region. In December, I completed my Bachelor of Science in Agriculture at the University of Manitoba, with a major in Agronomy. I am returning to MPSG for a second summer this year and I am excited to learn more about the pulse and soybean industry here in Manitoba. This winter, I took the CCA exams and passed, so I will be working on becoming a CCA this summer. I’m excited to get connected with MPSG’s farmers again and take on the pests and challenges of the 2020 growing season with you.

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"Where our customers send their friends"



Message from Board Chair

Calvin Penner, Chair, MPSG

AT THE TIME that I write this in mid-April, we are facing many unknowns. The ground just turned white again this morning for what I hope is the last time. I thought winter would have ended a few snow – thaw cycles ago.

Currently, we are still in lockdown due to COVID-19. We hope that we are seeing the curve starting to flatten, but by the time you read this, more will be known and we will be exploring the new normal.

Interestingly, some of what we see in agriculture in Manitoba is the same around the world. My wife and I were in Hawaii pre-COVID-19 and saw some impressive things.

We were on a coffee farm and processor and saw two Convey-All conveyors moving coffee beans into dryers and mills. That was certainly unexpected.

It was interesting to see how a made-in-Manitoba product was being used for a product and purpose that Convey-All probably never would have imagined when designing it. It is a made-in-Manitoba piece of machinery that meets a need most farmers here don't associate

that product with, and it's doing it halfway around the world. I had no idea.

We also toured a vanilla bean growing facility. One of the issues that producers face is fusarium. I wasn't able to find out how they deal with fusarium on the Big Island, where we spent all of our time, but it would have been a long and interesting conversation, no doubt about that. Here was a Canadian prairie farmer and a Hawaiian vanilla producer finding common solutions to a common problem from two very different locations. This is fascinating. The world truly is a small place bound together by more things than we often realize.

While we may think our issues are unique to our farms in Manitoba, there is commonality around the world and some of the solutions that we have found here can help farmers and the agricultural sector around the globe. Also, we can learn from what others are doing and how they've met and tackled challenges similar to the ones we face.

One of the ways that we can, and do, find solutions is by conducting research.

At the time of writing this, it looks like a lot of the research being done at the universities will be postponed for this year. As of now, MPSG's On-Farm Network research will operate under protocols compliant with our provincial and federal health officials. But, then again, this could have changed by the time you read this. Things are changing every day.

If you haven't read the spring version of *Pulse Beat* and *Pulse Beat: The Science Edition*, I would encourage you to go online and read them. There are some interesting findings that can make a difference to the bottom line on your farm.

MPSG's Board of Directors and its staff are always working with its vision in mind, which states, "Manitoba farms sustainably producing profitable, quality pulse and soybean crops."

It is my wish that together we will all produce a profitable and quality crop this season. Here's to a great 2020. Stay safe and healthy out there, everyone!

– Calvin ■

Soybean Scout

What's infecting these soybeans?

Answers can be found on page 28



A



B



Message from Executive Director

François Labelle, Executive Director, MPSG

COVID-19 HAS BEEN the number one issue on everyone’s mind for a while now and it could be for a long time to come. Early on in this lockdown period, people would say things like, “when things get back to normal.”

Things won’t be normal like they were before. There will be a new normal. Without a doubt, agriculture will be changed, as well. There will be some positive changes and others may feel negative. Let’s look at some possible changes and also question whether there should be changes in other areas.

DISRUPTION – CHANGE – EVOLUTION

COVID-19 has disrupted our world in many ways. It has forced change in ways that we don’t yet know the magnitude

and it has continued the evolution of the world. Remember Y2K, that scare that our computers would fail us at the stroke of midnight 1999? It was going to cause all kinds of issues. But nothing happened. The world carried on.

COVID-19 is very different. It is a force that will cause a major disruption to the way agriculture will operate going forward.

Is the lack of products on the shelf a possible, long-term change? Some of the groceries we are used to picking up are not available these days. If food gets more difficult to find, would that change the way many people are going to live? If food is not available, even for a short time, how will our society change?

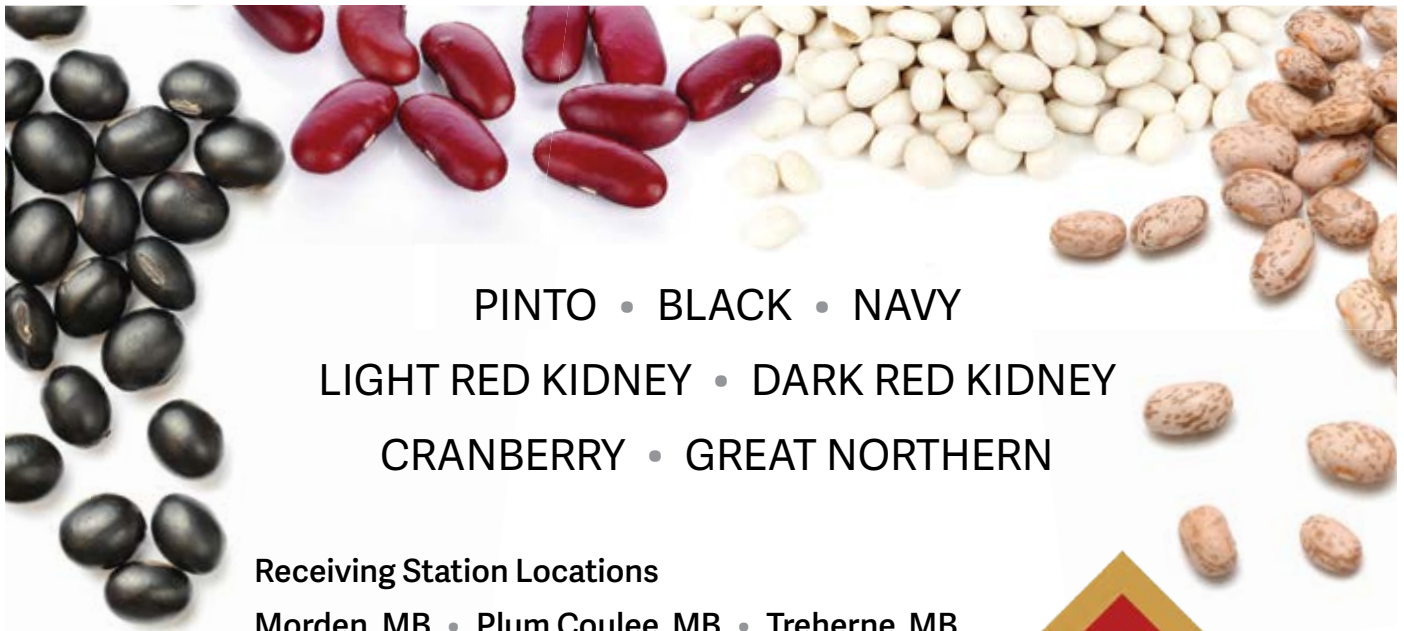
Maybe people will pay more attention to the importance of agriculture and local food production. I have heard several times that beans are a good food source. Many people are buying them now. They just need to remember how to cook them.

Will people cook more? Was the first run on food from people who are not used to cooking at home and didn’t yet have the supplies to do so – yeast, flour, etc.?

ON THE FARM

In the grain sector, will we see major disruptions? Most people are thinking they won’t be dramatic, but let’s think about that. Most farmers naturally self-isolate, but we do interact with lots of

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people. We travel to town often to pick up supplies without thinking about it. Having to think about a grocery run once a week has changed the way we do things.

Should we start storing more goods on our farms? Ahead of seeding, people were saying it would be good to have more storage capacity for fertilizer, and cheap fuel prices had people thinking of ways they could store fuel.

Many farmers have become dependent on getting all their inputs from one, centralized source. This has been done as the world continues to grow on the economic scale. One large plant to supply the world and in locations where the cost of operation is low enough to keep costs down and margins up, this single-source issue is a vulnerability for inputs as well as our markets. Our crops often go to one big market, instead of many smaller ones – China for soybeans and India for peas. When we have an issue, we go scrambling for a new market – or a new supply. Is this something that needs to be reconsidered?

As time drags on through this pandemic, we find that drugs, personal protection equipment and many other things all come from a single supplier or very few suppliers. The active ingredient in many pesticides is not much different. What happens if suddenly we cannot get all the tools we usually have to produce crops?

LABOUR AND AUTOMATION

These can all be brought together. Agriculture is getting hit hard by restrictions placed on the movement of foreign workers and that could force major change. Could we change our reliance on farm labourers if we needed to? My first reaction is to say no, but it's worthwhile to think outside the box on this one.

Is it time to adopt autonomous vehicles? Most grain farmers are used to hands-on control. They see it, feel it and understand it. Moving from manual to automatic requires a significant shift. Could this be part of the new normal? It's scary, but also exciting.

Robots are a great tool. They have changed the way things are done in many manufacturing and grain handling facilities. I have many years of experience hiring strong backs to handle hundred-

pound bags of grain to be loaded into trucks and railcars. Necessity forced a change, as fewer people were willing to do these jobs and fewer were able to, day in and day out. Robots evolved operations. Today, you would not consider investing in a facility that did not have mechanization like this. Many companies were reticent to purchase and implement robot technologies, but that certainly isn't the case anymore. Will farms currently reliant on labour have the same opportunity with robots?

I don't think we have considered all the possibilities for robots and automation on the farm.

PROCESSING

Large centralized plants are potential choke-points in the food supply chain. If you have one plant and it shuts down, this is a huge problem. But with several mega plants, if one goes down, it's just a bump. When several shut down, it's a barricade in the chain. Well – this has been a wake-up call. This needs to be reassessed.

Similar to large plants, trucking is a key part of the food chain. Let's look at the last 10 years. How often have we heard there is a shortage of truck drivers? Like farmers, truck drivers are an aging workforce and not many people are taking on the profession of driving. Will we be able to recruit drivers as needed, or is there more opportunity for automation – autonomous trucks?

MARKETS

At MPSG, we have been taking the opportunity to make changes, as well. There has been a lot of discussion in the last few years of implementing new technologies for meetings and extension. Now, with COVID-19, what was being

talked about conceptually is quickly becoming the norm.

Paperless processes are quickly becoming routine and there is more we can do to become completely paperless.

Many events have been cancelled this summer. Keeping you, our farmers, up to date on the latest research and our most current agronomic recommendations is a priority for us. We're determining the best way to do this. Follow us on our social media feeds, and keep a close eye on our website for updates.

MPSG is trying to maintain a sense of normalcy in our operations. As best we can, we're remaining committed to research, crop scouting, and producing production information, all while being compliant with federal and provincial health directives.

We have developed a set of protocols for all staff to follow, including social distancing and proper sanitation practises. If you notice staff keeping their distance from you, that is why. It is our new normal.

Please make sure to read about the appointment of Laura Schmidt to the Production Specialist – West position at MPSG, as well as the introductions to our summer students, Raylene and Julie, in this issue of *Pulse Beat*.

In closing, COVID-19 and drastic measures to curb it has afforded us the opportunity to reflect on our personal and business aspirations. After COVID-19, life will not return to the way things were. We will evolve to a new normal. It's an opportune time to move ahead, make changes and not be afraid to look at new technology, new life aspirations and new goals.

Remember to take care of yourselves, take care of your family and take care of the future.

– François ■

Notice to Members

In accordance with MPSG bylaws, any active member who wishes to bring forward a resolution to the annual general meeting (AGM) must provide notice to the board of directors by December 1 of the year prior to the AGM.

Resolutions to be presented at the February 10, 2021 AGM must be received by December 1, 2020.

Please forward to Sandy Robinson at sandy@manitobapulse.ca on or before that date.

Agriculture Learning Continues in the Home



AT AGRICULTURE IN the Classroom – Manitoba (AITC-M), we have always believed agriculture performs an essential service for our country and beyond. Now more than ever, that belief has become apparent to everyone. As a result, the public’s trust and confidence in agriculture and our food supply chain are more relevant now than ever.

Along with the rest of the country and the world, we are finding our way and pivoting our strategy in this ever-changing and uncertain time. But if there’s one thing we know about Manitobans, it’s that, with kindness and resiliency, we will get through this together.

Although our in-person programs until the end of June are cancelled, the demand for our resources and activities from educators has never been higher.

Because of this, we are working hard to create new content and adjust existing resources, where needed, so that agriculture learning can continue at home.

Since the mid-March announcement that school in Manitoba was cancelled, AITC-M has seen a record number of resources downloaded from

our website, up 273% compared to the same period in 2019. We have found that our printable worksheets and activities that can be adapted to at-home use have been the most popular among teachers and parents.

We will continue to serve teachers and parents to facilitate at-home agriculture learning for as long as it is needed. We are also focused on staying current and helping

teachers facilitate learning about COVID-19 and how it is impacting our food supply chain. Our newest resource, *COVID-19 and Canada’s Food Supply*, is quickly becoming one of the more popular downloads on our site. Parents with school-aged kids at home have also found our resource page helpful to keep their kids learning about agriculture.

We also launched a food gratitude project to facilitate teachers and parents to help kids show their appreciation to those working hard all along the food supply chain to keep food on the tables of Canadians throughout this crisis. The resource is a printable worksheet that students can use to either draw or write a message to essential agriculture workers. Teachers, parents or students can then post photos of their work on social media using the hashtag #foodgratitude. We hope that with projects like this, we can help Manitobans recognize the hard work and dedication that goes into bringing

safe and healthy food to people at all times, and not just during a crisis.

Members of AITC-M, like Manitoba Pulse & Soybean Growers, put their trust in us to help educate the students of Manitoba on the importance of agriculture to our province and our society. We take this responsibility very seriously, and we look forward to making sure we continue with this work in the times ahead.

For more information on AITC-M, visit www.aitc.mb.ca. ■



Because of the support of our members, in 2019, AITC-M was able to reach a record 37,968 students across the province with our programs and resources. We saw increases in online users, resource downloads and volunteers. We hope to continue to build on that momentum when students and teachers return to classrooms. In the meantime, we are taking the time to improve upon existing resources, create new ones and plan for the school year ahead.



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Grain Growers of Canada's Tireless Advocacy Amid Pandemic

Erin Gowriluk, Executive Director, Grain Growers of Canada



ON BEHALF OF the Grain Growers of Canada (GGC), I bring greetings from our nation's capital and our best wishes for your continued health and safety during seeding season.

As your national organization, we are based in Ottawa to deliver your message to federal policymakers 365 days a year. Well, it is no secret that these past months have been tougher than most. Face-to-face meetings with government officials are no longer possible, and legislators are rightly focused on keeping Canadians safe and healthy while mitigating the economic impact of COVID-19 on Canadian families and businesses.

This means that while business on the Hill continues, it is not business as usual.

So, what have we been doing to keep those lines of communication open?

First and foremost, we have prioritized hearing from you — our valued members — about how COVID-19 has directly impacted your lives and your livelihoods. In order to do so, we have introduced a weekly cross-country member check-in every Thursday afternoon. Through these conference calls with farmer directors and staff members, we have been able to form an advocacy action plan that balances the sensitivities of these circumstances while ensuring the important business of growing our grain is uninterrupted.

We are also having meetings with policymakers and industry partners on your behalf — just in a different form. We meet every day with officials from Agriculture and Agri-Food Canada (AAFC) as part of their COVID-focused roundtables. This forum allows us to share our members' challenges with AAFC officials and to hear how the pandemic is affecting our industry partners.

These discussions have consisted of an open exchange of positions balanced

with an earnest discussion surrounding timelines and action.

I am pleased that we have been given this opportunity to share the specifics that we have advocated for — and to provide you with you an idea of what we will continue to work towards on your behalf.

FIRSTLY, GGC IS CALLING ON THE FEDERAL GOVERNMENT TO KEEP TRADE AND TRANSPORTATION NETWORKS FLOWING.

During this time of uncertainty, we are steadfastly focused on your top priority: keeping grain, pulses and oilseeds moving to customers here in Canada and around the world. If there is one thing that can bring producers piece of mind during these unpredictable times, it's knowing that borders will remain open to the movement of food as well as the products and equipment needed to plant and harvest our crops.

We know that food is essential and that all of the people who contribute to growing, processing and transporting our food provide Canadians with an essential service. This is why it is critical that the provisions outlining what constitutes an essential service should consider every aspect of the agri-food supply chain and be consistent in their application across the country. Alignment and coordination between the provinces in this area are essential to avoid disruptions in our supply chains.

We were pleased to see that on April 2, 2020, the federal government released its long-awaited guidelines on essential services during the COVID-19 pandemic. As we have known all along, under the National Strategy for Critical Infrastructure, which was in place prior to this pandemic, *food* is listed as one of 10 major critical infrastructures — and rightfully so.

It is important to note that the federal list is not a directive and serves only as a set of guidelines for the provinces to help align their own lists under their states of emergencies. We hope that this federal list will encourage the provinces to come together with the federal government and

make sure that all aspects of Canadian agriculture are considered essential.

During this challenging time, coordination between provinces to ensure the smooth flow of goods and services is key to ensuring private sector supply chains can operate efficiently and effectively. There have been concerns raised in our sector how the differing lists of essential services between provinces could result in supply chain bottlenecks, which GGC will continue to monitor closely.

GGC IS ALSO ADVOCATING FOR DIRECT STIMULUS THROUGH BUSINESS RISK MANAGEMENT PROGRAMMING.

Agriculture is the lifeblood of the rural economy. When our farmers thrive, our communities thrive. However, right now, this is not the case. Between 2000 and 2017, the amount of farm debt in this country doubled — reaching a record \$102.3 billion.

In 2018, StatsCan reported that net farm incomes — the difference between farm revenues and operating expenses — fell by nearly 21 percent. This is one of the largest year-over-year decreases ever recorded in Canada.

While the impacts of COVID-19 have yet to be fully realized, our members and their agri-food supply chain partners are becoming increasingly anxious about this new reality. As we look towards solutions, we cannot emphasize enough that we need tools to succeed — not the freedom to drown in debt.

GGC, along with our industry partners: the Canadian Federation of Agriculture, the Canadian Pork Council, the Canadian Horticultural Council, the National Sheep Network and the Grain Farmers of Ontario are calling our nation's leaders, to provide direct relief to farmers at a time when they need it most. This should come in the form of restoring the Agri-Stability program to its prior level of support, while also providing immediate access to stimulus funds through Agri-Invest.

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Soy Canada's Perspective on the Coronavirus Pandemic

Ron Davidson, Executive Director, Soy Canada



AT A TIME when COVID-19 continues to be the overarching preoccupation of governments, businesses, workers and consumers around the world, it would seem odd should this report avoid comment on the pandemic's implications for the soybean sector. In an environment defined by continued uncertainty, the challenge is to envisage remarks that could still be relevant to readers five weeks into the future.

Food constitutes a fundamental "necessity of life." Hence, it would be reasonable to affirm that food production and demand of all types should fare better than sectors that produce "nonessential" products or services. However, reality is that, first, each component of the food sector is being impacted in its own manner and, second, the soybean supply-demand continuum is eminently more complex than that of a two-choice, either an essential or a nonessential dichotomy.

Although the eventual intensity and duration of the pandemic remain far from evident, it can be predicted that both direct and indirect pathways will buffet the soybean sector. In addition to the usual weather-related unknowns that will affect production, a series of exceptional globally-based consumption-related concerns are already weighing on future demand and price prospects.

HUMAN NUTRITION

Some 20–25% of Canadian soybean production is destined directly for use in

the manufacture of soy-based consumer products such as tofu, tempeh, natto, edamame, soy sauce and soy milk.

COVID-19 related implications include:

1. a reduction in the volume of inbound manufactured goods arriving in North America from Asia that results in fewer containers being available at a higher cost for the outbound transportation of identity-preserved/food-grade soybeans to vital export markets in Asia and Europe; and
2. closures or reduced activity at Canadian and foreign workplaces, hotels, restaurants and convention centres that have devastated consumer demand in the foodservice and hospitality sectors. Nevertheless, as soy products are traditional components of Asian diets, one could anticipate increased retail sector sales of these products.

SOYBEAN MEAL

Animal agriculture (pork, chicken, turkey, cattle and fish) relies on large volumes of high-quality protein and digestible energy from nutrient-dense soybean meal. Consequently, strongly performing red meat, poultry, egg and fish production and consumption is of paramount importance to the soybean sector.

COVID-19 related implications include:

1. temporary facility closures and mandatory physical distancing-induced decreases in production and productivity at abattoirs that have

created livestock delivery back-ups on farms and depressed producer prices. If there is a positive aspect to be found in the severe circumstances that exist at the time of writing, it could be that the currently elevated levels of infections in some major meat processing establishments should provide a comparatively high level of workforce immunity and business continuity to coronavirus-related shut-downs during future months;

2. Canada Emergency Response Benefit (CERB) payments of \$2,000 per month that exceed minimum wages in several provinces and decrease worker availability by incentivizing Canadians to remain safe at home rather than to seek work in the meat processing industry; and
3. a very unpredictable extent and the timeline for recovery of the global foodservice and hospitality sector, a leading outlet everywhere for the consumption of animal products. The extent to which increased sales at retail stores will offset decreased demand at foodservice outlets remains to be confirmed.

SOYBEAN OIL

Soybean oil is consumed widely as vegetable oil for cooking or frying and as an ingredient in an extensive array of processed foods. Soybean oil is available

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FINALLY, THIS IS OUR COMMITMENT TO YOU — OUR MEMBERS.

We will not stop in our tireless advocacy on behalf of your interests.

We have and will continue to share insights on GGC's member priorities on the daily COVID-19-focused roundtable calls with AAFC and through written submissions to government officials.

Our team will keep the lines of communication open with our industry

partners. We check in with them weekly to get updates on the availability and accessibility of fertilizer and seed for spring planting, as well as the functionality of the logistics network from inland terminals to ports, including the services critical to the flow of trade like those offered by the Canadian Grain Commission.

For more information on our efforts, please visit our dedicated COVID-19 news

and issues landing page (ggc-pgc.ca/covid-19/) and follow us on Twitter @graingrowers.

If you have any specific questions, please do not hesitate to reach out to me via email at Egowriluk@ggc-pgc.ca.

As we chart these unfamiliar waters together, I want to thank you unreservedly for your support. Stay safe out there! ■



throughout grocery stores in forms such as bottles of pure vegetable oil, salad dressings and margarine.

Also, soybean oil is a major source of lecithin. Soy lecithin attracts both water and fatty substances and is used for smoothing food textures, emulsifying, homogenizing liquid mixtures and repelling sticking materials in food and industrial applications.

COVID-19 related implications for soybean oil include:

1. high reliance of currently shuttered foodservice outlets and restaurants on soybean oil for frying, baking and other food preparation; and
2. potential increase in grocery store sales of pure vegetable oil, salad dressings and spreads that contain soybean oil.

BIODIESEL

Biodiesel is a cleaner-burning, renewable alternative to petroleum diesel. Biodiesel is blended into diesel and used in the transportation fuel supply to reduce greenhouse gas emissions by up to 86 percent.

World biodiesel consumption in 2017 used 2.8 million tonnes of soybean oil from 14.5 million tonnes of soybeans. In that year, domestic demand for biodiesel accounted for more than a quarter of all soybean oil use in the U.S.

COVID-19 related implications for soy-based biodiesel include:

1. the shuttering of a major portion of the global economy that has resulted in a substantial decrease in demand for diesel fuel, including biodiesel, for use in transportation; but
2. a compression in demand for biodiesel that is of substantially less significance than the unprecedented plunge in worldwide demand for gasoline that is severely impacting the ethanol industry.

INDUSTRIAL USES

A renewable resource, soybean uses range well beyond food, feed and fuel. The versatility of soybean components makes possible wide-ranging product applications, including rubber, fibre, coatings, solvents, plastics, lubricants and adhesives. As a drying oil, processed soybean oil is also used as a base for printing inks (soy ink) and oil paints.

Soy allows manufacturers to replace petroleum-based materials and satisfy the demand for sustainable, environmentally friendly products. For example, after discovering that using soybean oil in tires resulted in better traction in wet and winter conditions, Goodyear launched a wide-ranging line of soy-based tires.

The future for soy-based products continues to be bright. The *Soy Products Guide* produced by the United Soybean Board in the U.S. contains more than one thousand soy-based products currently on the market – from flooring and roofing products to candles and personal care items.

Other than the repercussions of a substantive near-term decline in industrial activity, COVID-19 should not have a particular impact on the future expansion of the use of soy products for industrial purposes.

GOVERNMENT SUPPORT

During 2018 and 2019, Soy Canada advocated persistently for financial support for the sector to offset:

- a) Canada's exclusion from the Chinese market for crushing beans; and b) the

massive U.S. subsidies that were targeted particularly for U.S. soybean producers.

Among the reasons for the consistent lack of government response during that period was the absence of support from other organizations for commodity-specific assistance. As this report is being written, the entire agriculture and agri-food value-chain has, for weeks, been seeking financial support in the dual context of:

1. significant sector-wide financial losses resulting from the repercussions of the COVID-19 pandemic; and
2. a third successive year of massive competitor country subsidies as confirmed by the April 17, 2020 announcement of a U.S. \$19 billion *Coronavirus Food Assistance Program* that offers an "immediate relief program to provide critical support" to U.S. producers.

The Canadian government has continued to state only that support for the grain and oilseed sector is being considered actively. Hence, notwithstanding the fact that food security is designated as essential on both sides of the border, there continues to be a substantive divergence between the north and south when it comes to investment in the link between food production and food security.

CONCLUSION

For the foreseeable future, total food consumption will probably approximate that of the pre-COVID-19 era. Nevertheless, there is likely to be a substantive period during which regulatory environments and personal trepidations will combine to limit prospects for a return to the old normal. This change will require commodity-specific production and distribution adaptations within the agriculture and agri-food sector.

Within the oilseeds sector, soybeans are in a relatively fortunate position in that the primary component and price determinant is protein. In at least the near term, there should be less demand destruction and price suppression for the food sector dependent protein component than for the more energy sector dependent oil component. ■

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Impacts of COVID-19 on Canada's Pulse Industry

Pulse Canada 

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

PRIOR TO DECEMBER 2019, there was little to no awareness of the impact SARS-CoV-2 would have globally. Now, the virus and consequential disease (COVID-19) has spread to almost every country, infecting millions of people. In Canada and around the world, the COVID-19 pandemic and efforts to manage the spread of the disease have impacted all aspects of society and ground economies to a halt. Like all sectors, the Canadian pulse and special-crop sector has been impacted, both through short and medium-term changes in domestic demand and through supply chain challenges exporting pulses to international markets.

MARKET DEVELOPMENT FOR THE CANADIAN PULSE INDUSTRY

In an effort to move significant volumes of Canadian pulses into new processing and value-added applications, Pulse Canada has been working on a strategy to achieve *25 by 2025*: creating demand in new market and use categories for 25 percent of the Canadian pulse production by 2025.

For the Canadian bean industry, the strategy is focused on increasing domestic consumption and utilization of 75,000 tonnes of beans in Canada compared to 2015 benchmarks. According to data from Euromonitor, the volume of shelf-stable beans sold in Canadian retail was just over 40,000 tonnes in 2015, while almost 20,000 tonnes of beans were sold to

Canadian foodservice. This year, COVID-19 caused an initial dramatic rise in the sales of retail canned and dry shelf-stable pulses, particularly beans.

Some reports have cited 100%–200% increases in volume sales of shelf-stable pulses. However, the shutdown of most foodservice operations in response to the pandemic is expected to largely offset this retail demand spike.

In the medium-term, Euromonitor expects shifts to cooking and consuming at home will continue to be a priority for many families in an environment of financial uncertainty as well as running through stockpiles. As Canadian consumers rely more on their pantries

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than ever before, an opportunity exists to continue engaging with them through social media to build positive cooking experiences with beans and other shelf-stable pulses, and learn more about their unique health benefits.

Pulse Canada's target for Canadian peas is 1.1 million tonnes of incremental use by 2025. Achieving the volume target for peas will require more use of pea protein ingredients in applications like meat analogues, dairy/dairy alternatives and bakery products, as well as expanding the use of pea starch, fibre and flour ingredients. The majority of pea protein is currently used in the dairy products and alternatives category, however, the actual volume used in the global food supply is still low (estimated at 35,000 tonnes in 2019) compared to other plant-based protein sources.

In the U.S., milk alternatives, such as oat milk and fresh meat alternatives have seen a three-to five-time increase in volume sales in light of COVID-19. This growth may have produced a small bump for pulses, but there is still a need for significant increases in processing and building demand for pea ingredients to drive the use of a volume that is meaningful, given Canadian pea production levels. In the medium term it is expected that COVID-19 will drive growth in the snack category, a category that has so far been promising for pulse ingredients including pea protein and other pulse flours.

Crop-specific market diversification targets and strategies for beans, peas and other Canadian pulses including lentils, faba beans and chickpeas, will all require adaptations as the situation

continues to evolve. An expected post-COVID-19 focus on the local supply will mean that now, more than ever, Canadian pulse ingredient processors will need to be supported and the quality advantages of Canadian pulses will need to be highlighted. There will always be demand for food and an opportunity for pulses in both affordable, shelf-stable formats, as well as value-added products to meet consumer dietary preferences and demands for nutrition, health and sustainability.

INTERNATIONAL EXPORTS AND SUPPLY CHAINS

Food and food security have taken on increased importance globally and demand for Canadian pulses has remained strong. Many governments acted quickly to ensure food production and food supply chains were recognized as an 'essential service' in an attempt to limit damage to the availability of food. But a disruption of the magnitude of COVID-19 has highlighted several areas of vulnerability in both the Canadian and global food supply chains.

The "just-in-time" model adopted by the global supply chain relies on timely delivery of product and accurate forecasting of supply and demand. The logistical constraints caused and exacerbated by the COVID-19 pandemic have severely disrupted the viability of this model. Thirty percent of Canadian pulse exports are containerized and rely heavily on the inbound traffic of containers full of consumer goods from markets like Asia.

These containers are then re-filled with Canadian pulses and shipped back

to our export markets on the backhaul. The COVID-19 pandemic has resulted in a wave of blank container vessel sailings (cancellation of regularly scheduled vessel stops at port) from January 2020 and continued into June, causing a cascading effect through containerized supply chains that is causing a tightening of empty container supply at port. Until the Canadian economy recovers and consumer buying increases, it is anticipated that these blank sailings will continue. The lack of available vessel space is also impeding the ability to return loaded containers, congesting transload facilities in western Canada.

In addition to limitations on the availability of shipping equipment, the COVID-19 pandemic has also limited the normal flow of people and documentation vital to the logistics system which has caused a further slowdown to normal shipping patterns and increased the risk of detention and demurrage charges borne by shippers. This slowdown has been exacerbated by quarantine policies implemented in key markets for Canadian pulses creating delays in loading and unloading of product.

Despite these challenges creating logistical uncertainty for the Canadian pulse sector, what remains certain is that there is continued demand for affordable and shelf-stable food like Canadian pulses. Canadian agriculture has often faced transportation challenges and while COVID-19 is creating unprecedented global disruption, the sector is focused on ensuring the Canadian supply chain remains resilient and capable of meeting global food security requirements. ■

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Clancey's Stats

Pulse market analysis

Brian Clancey, Senior Market Analyst and Publisher,
STAT Communication

PULSES HAVE BEEN unexpected beneficiaries of the COVID-19 coronavirus pandemic. Initial worries about the impact the virus could have on trade flows have been replaced by optimism that base demand for pulses could grow faster than expected.

As countries imposed restrictions on the movement of people to try to control the spread of the virus, consumers rushed to stock up on non-perishable foods and other items. The resulting panic buying and hoarding saw some processors reporting up to a 40% jump in sales volumes over last year as canners and packagers restocked grocery shelves.

Meeting improved demand has not been trouble-free. Exporters report

occasional issues with the availability of ocean freight because world trade in non-food products is down sharply. Some regions also do not have enough containers to meet demand because some vessel sailings have been cancelled because they are not full. Simply put, when imports of non-food items are down, there is less space for exports.

Ships are also facing restrictions at some ports because of a requirement that the ships be at sea for at least 14 days between port visits. This does not have much impact on ships with medium or long transit times, but would affect those with short transit times.

On a positive note, ocean freight rates are expected to be under pressure for an

extended period of time because fleets have been expanding and world trade is not expected to quickly return to normal.

The net result of increased sales of packaged and canned pulses is that demand for most classes of pulses improved in March and April. Companies which process pulses into protein, starch and fibre fractions are also seeing better demand. Some companies which manufacture meat substitutes are seeing improved demand and expanding the number of retail outlets they serve. This is being helped by the temporary closure of some meat packing facilities in March and April after some staff were diagnosed with COVID-19.

One area where demand has collapsed is the hotel, restaurant and institutional market. With those businesses forced to close in most countries, consumers are now eating in their homes.

This creates an interesting opportunity for the pulse industry. To the extent people can cook meals using pulses that taste good, base demand for pulses moving

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forward could increase faster than expected. It is important for the industry to help consumers learn to cook pulses correctly and provide them with simple, yet tasty recipes.

Rising short-term demand will result in lower than expected ending stocks of many classes of pulses in most parts of the world. However, because prices received by farmers did not generally move upward until after March, it might not have the kind of impact on the amount of pulses planted this year as it would have had if markets were strong in January and February.

DRY EDIBLE BEANS

Overall, land in pulses is expected to decline this year mainly because of a steep decline in chickpea area. Dry edible bean area could be little changed in Canada, while increases in the United States could see an overall increase in North American plantings of both coloured and white beans. Total lentil plantings should be up, while peas are expected to be down.

If these ideas prove correct, a return to average yields would see Canada harvest less peas and chickpeas than last year, but more lentils and dry edible beans. The story is somewhat different in the United States, where output of peas, lentils and chickpeas could drop, while dry edible bean production rises.

Many processors are hopeful demand will remain stronger than normal through the fall shipping period because of the need to restock marketing pipelines. This should result in a relaxation of demand

to more normal levels after December. Even so, residual supplies of pulses are expected to get tighter during the coming marketing year, possibly stimulating a solid increase in plantings in 2021.

Demand pressure in the coming marketing year could also be affected by a potential humanitarian crisis.

The World Food Programme thinks the number of people facing “acute food insecurity” could nearly double this year to 265 million. The increase reflects job losses caused by lock downs around the world and fears it will take much longer for the global economy to recover than it took to sink. Assuming funding is available, food aid could add important demand through at least the middle of 2021.

FIELD PEA DEMAND

There is modest optimism field pea demand from China could improve in the coming year. The country’s hog herd is starting to rebuild. The USDA agricultural attaché for the country predicts inventories will rise 9% by the end of the year to around 337 million. Though still down 90 million from 2018, it points to increased demand for livestock feed ingredients.

Field pea exporters are hopeful this will prove correct now that India has modified import restrictions on field peas.

Quantitative import restrictions for peas during the country’s 2020–21 fiscal year were changed to 75,000 MT of green peas under HS-Code 07131020 and 75,000 MT of other peas under HS-Code 07131090. The import quota for yellow

peas under HS-Code 07131010 was changed to zero.

More significantly, traders in India report that the 50% import duty on peas will be based on a notional minimum import price of Rs. 200 per kilogram or U.S. \$2400 per metric ton (MT) instead of the contract value. That results in an import duty of around U.S. \$1200 MT.

Duties at that level are expected to freeze field pea imports. Instead of being a competitive alternative to locally grown Desi chickpeas, the landed cost of peas would be more than double India’s minimum support price of roughly \$686 MT.

Lentils are one of the few pulses without quantitative restrictions. If duties for lentils continue to be calculated on the contract value, they will be a more attractive alternative for millers trying to cover logistical shortfalls or seeking a cheaper alternative to domestic pulses.

North American dry edible bean markets are getting a lot of support from the recent jump in domestic demand. Even if exports are at normal levels, processors believe many classes will finish the current season without almost no carry over. Given current seeding intentions, the supply situation for beans should remain relatively tight through the coming marketing campaign.

One question asked by importers is whether the recent price advances seen for some pulses will result in massive acreage increases. That seems unlikely because by the time markets started moving most farmers would have secured this year’s planting seed and other inputs.

Seeding of most pulses wraps up by the end of May, with the result there was little chance to change seeding plans at a time when most people were preoccupied with the COVID-19 pandemic. However, there is a good chance next year could see major gains in pulse plantings, especially if the income potential versus grains and oilseeds continues to improve.

That could have an impact on prices during the closing quarter of the 2020–21 marketing year to the extent importers can wait for next year’s harvest to finish. The implication for growers is chances to take profits ought not to be ignored, though there may be no reason to rush to sell what is grown. ■

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Extremes of Moisture

Three farmers on how they deal with Manitoba's diverse conditions.

Toban Dyck, Director of Communications, MPSG

Manitoba is a diverse province. We have historically dry regions and, similarly, we have areas that often receive too much moisture.

Eastern Manitoba has experienced moisture or drought differently than the western parts of the province, and the same disparity can be said of our northern and southern areas. These wet and dry areas change and shift over time.

What a consortium of commodity groups have realized is that the needs and challenges surrounding the extremes of moisture are vast enough to warrant special attention and they are consequential enough to constitute an entire body of research aimed at helping farmers and lawmakers with the complexities of dealing with the basic element of water.

In wet cycles, cropping plans change and farmers look to certain technologies for help. Dry spells force change and innovation, as well.

Manitoba Pulse & Soybean Growers (MPSG), in collaboration with Manitoba Canola Growers and Manitoba Wheat and Barley Growers, is funding a cluster of research projects surrounding this very issue – the extremes of moisture.

This project is aimed at gathering researched and anecdotal data from farmers, so that its findings can better arm growers with the tools needed to face the extremes of moisture while remaining profitable and productive.

I asked three farmers from three different areas of Manitoba to discuss with MPSG how their farms have dealt with the extremes of moisture. These are their stories:

ERIC LOEWEN South of Riverton, MB

His farm has been there since 1960. Eric farms with his parents, Len and Linda Loewen. They grow wheat, oats, rye, soybeans, canola, flax, grass seeds and pollinate alfalfa for seed production. They believe in a diverse rotation to maximize returns on particular soil types. This has allowed them to withstand major weather events and spread risk.

In Eric's words...

Forages make up about a third of our rotation, as grass seeds tend to do well in our climate, with humid, cool nights due to our proximity to Lake Winnipeg. Excess moisture is often our yield-limiting factor, due to poor internal percolation of our heavy clay soils. Alfalfa helps fracture our subsoils, and we see better moisture tolerance for years following an alfalfa stand, which benefits our annual crops. Soybeans have proven to perform well on the heavy clays, while flax and canola are better suited to our higher ground.

Moisture and Cropping Changes?

We experienced higher than normal moisture conditions from 2005–2011. Canola production had fallen off a cliff after experiencing reasonable success to that point. It couldn't handle the saturated soils. We initially tried soybeans in 2002 and again in 2006. Both times we noticed that it could handle moisture even at a small growth stage, but the varieties weren't performing well enough in our shorter season. With the advent of shorter season varieties that could perform, between 2010–2013 our soybean acres increased from 2% to 22% of the rotation, largely taking the place of canola acres.

That wet cycle also increased our grass seed acres on the farm. Prior to 2005, grass seeds made up about 12% of the rotation. By 2010, this rose to 23%.

Even with a soggy October 2019, we're currently in the midst of our driest two-year period in decades. As a result, we will be reintroducing peas to the rotation.

Moisture and New Technologies?

The years of excessive moisture I referenced led us to purchase our first grain cart in 2010, as a necessity for getting the crop home. Field travel with anything other than 4WD wasn't an option. We ferried many 150-bushel loads on packed, mudded trails to the municipal roads that fall. While not the most efficient, it was certainly effective.

We've also invested in a RTK base station on the farm, which we use to make precise surface drains with a pull-type scraper. Surface water management is always a top priority for us, and being able to survey fields while seeding, pulling that elevation data out and drawing up drainage plans has helped us dry out acres.

We've installed a soil moisture probe in summer of last year, which has been interesting data to watch and learn from.

Tile Drainage?

We don't have any tile, but it's certainly on the radar.

Mitigating Adverse Effects?

In our experience, we've found there is little benefit to "mucking" the seed in, in the spring, even if the calendar is telling you that you should be rolling. We find that a later-seeded crop in good conditions outperforms the earlier crop in difficult conditions, and there's far less headache involved.

We also make sure that our fields are seedbed ready in the fall, which means

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that tillage operations begin promptly after harvest takes place. It's a race to get the fieldwork done before winter sets in, but we have better results avoiding the spring fieldwork.

In dry years, though we would consider our practices conventional-tillage, we'll switch to zero-tillage.

Moisture and Soil Quality Issues?

We have had issues related to soil compaction. To help with reducing these problems, we purchased our first tracked 4WD in 2014 to pull the drill in the spring and grain cart in the fall. It's a step in the right direction and I'm planning on more tracks for the farm. We've rotated alfalfa to problem areas to fracture soils, experimented growing tillage radishes, and used a subsoiler on headlands that are particularly susceptible to compaction.

What Should be Done?

Our municipality has a number of provincial third-order drains. Making sure those drains remain well maintained is essential to dealing with excess water flows. Provincial support for tile drainage practices would be welcome.

It would also be of interest to see more research in the area of moisture-tolerant varieties. Adding more soil moisture probes to the network of provincial weather stations could be really neat data, as well.

JAKE AYRE, J&C FARMS North of Minto, MB

Jake farms alongside his parents, Heather and Andrew Ayre, and his sister, Caitlin. They moved their operation from the southwest of England to Manitoba in 2002.

They grow wheat, barley, oats and soybeans for seed production. Jake also reserves a few acres for cash crops, such as canola, corn and soybeans.

In Jake's words...

We have grown flax, alfalfa, faba beans, spelt and winter wheat and we are hoping to incorporate forage crops and dry beans into our rotation in future growing seasons.

Moisture and Cropping Changes?

We used to grow peas almost every year, but due to a trend of wet weather and harvest difficulties, they have been shelved for the foreseeable future. In severely wet years, we have planted canola on canola in desperation to try to grow something that generates revenue. On more than one occasion, we broadcasted canola with a spin spreader and then went in after with a rotary harrow to try and get something to grow.

Moisture and New Technologies?

Historically, our farm was minimum-till and in some cases zero-till as low moisture was a concern up until 2010. Post-2010, wet weather and excess moisture became more prevalent, and as a result, we had to increase tillage.

Tile Drainage?

Our home section had tile placed in '96 to help with excess moisture and ensure adequate water movement. Over the past few years, we have done some partial replacement as sections were blocked with silt and roots.

Mitigating Adverse Effects?

We have a diverse rotation because of seed production, which helps spread the risk. We've found that regardless of conditions, one crop type will always perform better than another (for example, soybeans were better than wheat in a wet year) and therefore, we try to avoid changing plans too much. We also adjust seed depth depending on growing season and conditions.

Moisture and Soil Quality?

We definitely see and struggle with salinity in wet years and we have seen compaction on some headlands in dry years. In drier years, we experimented with subsoiling and may try it again. As far as salinity, we haven't found a "silver bullet" to combat the issue, but continuously experiment to try and fix the problem.

Lately, my dad has been talking about "mole draining" and wants to try it. From what I understand, this is a European idea and uses technology that isn't readily utilized in North America.

What Should be Done?

Our business risk management programs definitely need some work. One idea would be to increase the coverage rate to 85% or higher in AgriStability. I'd also like to see other types of crop insurance, provincially, such as field-by-field coverage or a gross revenue-based program offered by Manitoba Agricultural Services Corporation (MASC).

I also feel that a tile drainage program/subsidy would benefit farmers and the government. I'm willing to bet that there's research showing that land with tile drainage has a decreased history of crop failures and insurance payouts versus similar land without. Tile drainage also helps decrease the amount of silt/sediment in our water from fields, increases water retention capacity, and shows a reduction in pesticide and fertilizer runoff, which greatly benefits the environment.

GREGG FOTHERINGHAM Fotheringham Farms Ltd. • Reston, MB

Gregg runs a fourth-generation farm with his son, Jamie. They grow wheat, winter wheat, peas, rye, sunflowers, oats, canola and, occasionally, flax. And, in the last few years, they have added corn and soybeans to their rotation.

In Gregg's words...

Also, sunflowers seem to respond well in our area, as we tend to be hot through the July-August months.

We have had some success with early-season corn, but we're still in training. We have spent years trying to drought-proof our operation, particularly during the '80s to mid-'90s.

Moisture and Cropping Changes?

We had implemented zero-till methods. But then in the fall of '98 and the spring of '99, we dealt with excess moisture. In the fall of '98, we had quite a bit of fall rye seeded and it looked rather promising. The day we started, we received seven-plus inches of rain and it turned into a terrible fall. The spring of '99 was worse. We had excess rainfall in April and May,

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and we just did not have the equipment to handle the wet. We had 300 acres planted in '99 and let the volunteer rye grow to see what we could get. Not much, as I recall.

This was the beginning of AgriStability and, believe it or not, it saved us.

The generation before me had never seen anything that wet, but 2011, 2013 and 2014 made 1999 look like a kid in short pants. Throughout that period, we saw a shift in weeds that have become larger pests than usual – foxtail barley and kochia, and cattails.

Moisture and New Technologies?

Over time, we have sized up equipment with bigger rubber, flotation spraying and seeding, flotation tires on grain carts and duals on combines.

Mitigating Adverse Effects?

Our farm has entered into agreements with Ducks Unlimited under a program called *No Fill No Drain* aimed at enhancing duck habitat without completely impeding our ability to farm the ground. If the area they call a wetland dries up, we can break it up and hopefully plant in the future. We just can't drain that area or fill it.

Ducks Unlimited has been very good to work with.

Our area is poorly drained pothole country. Some drainage is possible, but it's limited at best. It just cannot tolerate three times the annual rainfall in a month.

We have gone back to some tillage and drainage, which is hit or miss.

Moisture and Soil Quality?

We have seen the development of some saline areas around our potholes that are now unproductive.

What Should be Done?

After 1999, MASC created the excess moisture program, which has been beneficial, but has some issues.

I guess we would just like a nice warm spring with the right amount of rain and sunshine through the growing season and a dry harvest. But, at the end of the day, Mother Nature still controls the weather. ■

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Successful Desiccation Decisions in Peas and Beans

Cassandra Tkachuk, Production Specialist – East, MPSG

The Bean Report

Your source for soybean and pulse crop agronomy and research.

CROP DESICCATION HAS become an increasingly hot topic. In part due to consumer demand for pesticide-free products, variable maximum residue limits (MRLs) across export markets and the negative spotlight on glyphosate. It doesn't mean desiccation is off-limits. But we need to understand the limitations of late-season herbicide. Especially when it comes to crops destined for human consumption, including field peas and dry edible beans.

DESICCATION VS. PREHARVEST WEED CONTROL

“Preharvest” and “harvest aid” are broad terms used in the ag industry. Today, we need to be more specific about distinguishing desiccation from preharvest weed control. The difference between the two is your goal for applying the late-season herbicide and the type of product you intend to use.

Desiccation is the application of a contact herbicide or true desiccant that will dry down plant material and advance harvest (Table 1). Preharvest weed control most often involves the application of a systemic herbicide like glyphosate (e.g., Roundup) that will control excessive

weed pressure (especially perennials) before harvest.

This contact vs. systemic herbicide distinction is important. Glyphosate offers some dry-down, but don't expect to see it until a week or two after application (depending on weather conditions). True desiccants provide rapid dry-down of plant material in one to three days and do a much better job of advancing harvest. They also help dry down weeds to ease harvest and maintain quality. Yes, glyphosate is cheaper than a true desiccant. But if your main goal is to advance maturity, glyphosate is not your guy. After all, we don't want you to spend money and risk the marketability of your crop for nothing.

WHAT ARE MRLS AND WHY DO THEY MATTER?

An MRL is the maximum level of residue of a specific active ingredient allowed in harvested grain. Health Canada sets science-based MRLs that are well below any amount that could pose a health concern. But motivations behind



MRLs vary among importing countries and do not follow one internationally recognized standard. Since Canada is highly export-dependent, we need to keep an eye on the changing MRL landscape.

The new, pared down list of chemicals on this year's MRL advisory showcases only the herbicides that pose potential market risks to pulses – glyphosate, diquat and glufosinate. Check out the advisory on page 22 for details.

Keeping track of these moving targets is complex. But what farmers need to do is simple: 1. only use registered products, 2. apply the product at the labelled rate and timing, 3. regularly consult with your buyer to keep tabs on product limitations and 4. consider avoiding late-season herbicide altogether (more on that later). Note that if a buyer does not accept preharvest glyphosate, that applies to tank-mixing as well.

GETTING YOUR APPLICATION 'JUST RIGHT'

The real risk is applying late-season herbicide too early. Applying too early leaves high residue concentrations in the seed and can cause yield and quality loss. At the late end of application, we also need to stay within each product's preharvest interval (PHI). Consider yourself Goldilocks and aim for 'just right'.

The rule of thumb for crop desiccation and especially preharvest glyphosate timing, is that seeds must be dried down to less than 30% moisture in the least mature part of the field. Walk the field to inspect plants from different areas. Inspect pods for colour change, shake the plant for rattling seeds, shell pods and squeeze seeds from the upper portion of the plant to assess seed colour. And do that drive-by assessment or stand on your vehicle to get

Table 1. True desiccants registered for dry beans and field peas.

Product	Group/Active Ingredient	Preharvest Interval
Reglone/Reglone Ion/Desica/Armory 240/Diquat 240/Drifast/Stage/Guardsman Diquat/Craven/MPower Clone/Bolster	22/diquat	4–10 days
Aim EC	14/carfentrazone	3 days
Heat LQ/ WG	14/saflufenacil	Dry beans – 2 days Peas – 3 days
Valtera	14/flumioxazin	5 days 7 days if tank-mixed with glyphosate

Notes: Group 14 herbicides offer dry-down of broadleaf weeds only. Group 22 herbicides are non-selective. Consult with your local rep to determine if your field is a good candidate for Valtera, as this product has not been widely used in dry beans in Manitoba to date. Valtera is most effective when tank-mixed with glyphosate.

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Peas at 25–30% seed moisture with yellow to brown pods and firm seeds within the pod.

a picture of percent maturity across the field. Here's your road map, now let's get to the specifics of 30% seed moisture in peas and beans.

FIELD PEAS

Desiccation timing for peas is in late July to early August when conditions are still hot and dry. Swathing is an option for peas and acts much like a desiccant. However, low residue, billowy pea swaths are highly susceptible to blowing and at high risk of harvest loss. If possible, straight combining is best for peas.

Peas are 'just right' for desiccation when...

- 80% of the plant has turned yellow to brown in colour in 75–80% of the field.
- Seeds rattle in the lowest pods. Bottom pods are ripe and dry with seeds detached from the pod.
- Top of the plant may still be slightly green in colour.
- Top pods appear wrinkled and seeds inside are firm. A firm seed will split rather than squash under pressure.

DRY BEANS

The time to desiccate dry beans ranges from late August to early September when conditions are cool and moisture is high. Dry beans can be harvested by undercutting and windrowing, swathing or straight combining. Cutting and windrowing is more common for row-cropped beans and vine-type varieties

that pod low to the ground. Direct harvest or swathing with lifters prior to combining has been more common for solid-seeded beans and bush-type varieties with higher pods. Both undercutting and swathing of dry beans have a similar effect as desiccation.

Dry beans are 'just right' for desiccation when...

- 80–90% of leaves have dropped and 80% of pods have changed to their mature colour.
- Seeds rattle in the lowest pods. Bottom pods are ripe and dry with seeds detached from the pod.
- Upper pods may still be yellow in colour.
- Seeds in the upper pods have lost their green colour when split.

It is interesting to note that the correct desiccation timing describes the "full maturity" development stage for both crops. This reinforces the fact that desiccants do not bring about seed maturity, but instead help dry down plant material for ease of harvest.

DO I REALLY NEED THAT LATE-SEASON HERBICIDE?

The decision to pull the trigger on desiccation or preharvest weed control depends on a combination of factors. Here are a few questions to run through as you consider whether late-season herbicide is truly needed:

Do I have a stacey crop with areas maturing at different rates?

Estimate how much these areas differ in maturity. If some areas are way behind, consider harvesting in stages. Some of

these green spots could stay green for a long time. This means an increased risk of residue concentration in the seed sample if product is applied. If there isn't a huge difference in maturity across the field and product application can be timed appropriately, desiccation could be your friend.

How far away from harvest is the majority of the crop?

If most of your crop is close to harvest, late-season herbicide may not even be an option for you depending on the product and its PHI. Also consider your crop's potential to mature naturally without a desiccant. This is especially true for peas that mature in the heat of summer. You may not need a desiccant if the crop is already progressing nicely.

Are there weeds that need to be controlled?

Consider the types of weeds present, their populations, distribution within the field and development stage. Your main targets are perennials (e.g., Canada thistle) that are best controlled by herbicide application ahead of winter. Although green weeds of any kind can pose a threat to quality, especially for dry beans. You also need a high enough weed population to justify the cost of application. Maybe the weeds can be managed in patches. Or maybe post-harvest management is a better strategy if weeds have already set seed and you can live with some going through the combine. Luckily, pea harvest is early enough to leave time for weed control after.

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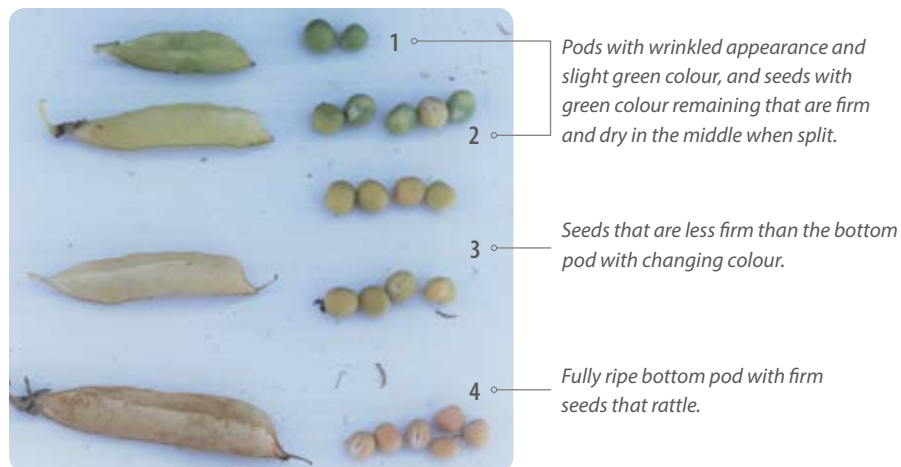


Photo: Saskatchewan Pulse Growers



Navy and pinto beans at the correct timing for desiccation.



navy bean



pinto bean

Split navy bean seeds showing varying levels of green colour remaining.



too early

just right

Left = too green to desiccate

Middle and right = safe to desiccate

Pinto bean seed samples aggregated from entire plants at 50% moisture (left) vs. 30% moisture (right), on average.



too early



just right

What are the weather conditions like during crop maturity?

If you wait for natural dry-down of beans and peas, particularly in years with lots of vegetative growth and high moisture during maturity, there is a risk of pod shatter, sprouting, seed coat slough and post-maturity disease. There is also the risk of bleaching in green peas. Under these conditions, desiccation may be a good choice.

Product performance is also impacted by weather conditions. Diquat works best under cloudy conditions or in the evening. Saflufenacil is the opposite – it needs sunlight for activity and should be applied during daylight hours under clear skies. And glyphosate prefers warm, sunny conditions when weeds are actively growing.

What grade are you targeting?

Whether you're aiming for No. 1 or No. 2 peas may influence your late-season herbicide decisions. Specifications for No. 2 peas are more lenient on seed colour and staining. For dry beans, where you're normally aiming for a No. 1 grade, we recommend being especially cautious

about lush, green weeds mixed with soil going through the combine that can cause downgrading.

What crop are you planning to grow after?

Watch for any re-cropping restrictions associated with a given product and crop combination. Two examples: 1. dry beans can only be planted the second season after preharvest application of Heat on the previous crop, and 2. potatoes can be

grown the season after spring application of Valtera but not after fall application. ■

➤ This year, our goal is to collect more photos of pea and bean desiccation timing, ground truth some of the current recommendations and develop more resources for you. Reach out if you would like us to visit your field. And remember to seek a second opinion if you are on the fence about late-season herbicide.

Stay in touch this summer!

MPSG will not be hosting its annual SMART Day field tour this year, but we will continue to deliver timely, meaningful results throughout the season.

The Bean Report

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KNOW THE MARKET IMPACTS OF YOUR CROP PROTECTION PRODUCT CHOICES

The success of the Canadian pulse industry relies on the ability to export the pulses produced in Canada. **More than 85% of Canada's pulse production is exported to feed the world, and the demands of the end user are becoming increasingly complex.** Market access is important to the Canadian pulse industry, and growers play a key role in keeping the doors to export markets open. Growers are encouraged to review the information on the next page of this document before proceeding with their pulse crop management plans. The use of certain crop protection products may restrict marketing options due to missing or misaligned MRLs in the export market.

The chart on the next page of this document outlines the regulatory impediments and challenges to market access that can arise from using certain crop protection products. In addition to meeting the science-based regulatory requirements of our domestic and export markets, Canadian pulses must also meet the requirements of consumer acceptance. Buyers of Canadian pulses will reflect consumer acceptance of various production practices in addition to meeting government regulations on food safety, which govern trade.

Keep it Clean is a joint initiative of the Canola Council of Canada, Pulse Canada, Cereals Canada, Barley Council of Canada and Prairie Oat Growers Association, providing growers with resources for growing crops that meet the requirements of our domestic and export customers.



IMPORTANT INFORMATION FOR PULSE GROWERS

CROP PROTECTION PRODUCTS: WHAT ARE THE RISKS?

Late-season applications of herbicides, fungicides, insecticides or desiccants may result in residue levels found in the seed. Growers must take appropriate risk mitigation steps to ensure product residues remain below maximum residue limits (MRLs) set by regulatory agencies.

IMPORTANT INFORMATION REGARDING THE PRE-HARVEST APPLICATION OF GLYPHOSATE

Glyphosate (e.g. Roundup) is registered for pre-harvest weed control and is not to be used as a desiccant. Pre-harvest glyphosate must only be applied when seed moisture content is less than 30% in the least mature part of the field to prevent unacceptable residues in the harvested grain.

When using glyphosate for pre-harvest weed control in a tank mix with other products, such as Saflufenacil (Heat™), glyphosate and the tank mix partner must still be applied when seed moisture content is less than 30% in the least mature part of the field and must also follow the pre-harvest interval (PHI) of the most restrictive product label.

In order to keep our export markets open, it is imperative to follow the application rate, timing and PHI on the label of glyphosate products. For more information, including proper application timing and resources, visit keepingitclean.ca/glyphosate.

WHAT CAN YOU DO TO MITIGATE RISK?

Ensure product residues remain acceptable for both domestic and export customers by following these tips:



1. USE ACCEPTABLE PESTICIDES ONLY

Only apply pesticides that are both registered for use on your crop in Canada and won't create trade concerns.

► **Consult with your grain buyer** to ensure the products you are using are acceptable to both domestic and export customers. Grain buyers have a good sense of which international markets may be sensitive to specific crop protection products and may restrict the use of certain crop protection products.

► **Refer to the Pulse MRL Advisory** (below) for information on market considerations and classifications of specific crop protection products. Visit keepingitclean.ca for the most up-to-date information.



2. ALWAYS READ AND FOLLOW THE LABEL

Always follow the label for application rate, timing and pre-harvest interval (PHI).

► **Rate:** Follow the proper application rate to ensure the product is safe to use and won't exceed the MRL.

► **Timing:** Specific crop staging information is provided for the proper application timing. Follow label instructions and apply crop protection products only at the recommended crop stage.

► **Pre-harvest interval:** The PHI is the number of days that must pass between spraying pesticides or desiccants and swathing or straight-cutting the crop. If the crop is harvested too soon, too much residue may remain on the grain and exceed the MRL.

PULSE MRL ADVISORY – UPDATED APRIL 2020

CROP PROTECTION PRODUCTS	PEAS	LENTILS	CHICKPEAS	DRY BEANS	FABA BEANS	COMMENTS
A. Pre-harvest weed control						
Glyphosate (e.g. Roundup)	!	!	!	!	!	Glyphosate is registered for pre-harvest weed control and is not to be used as a desiccant. Pre-harvest glyphosate must only be applied when seed moisture content is less than 30% in the least mature part of the field to prevent unacceptable residues in the harvested grain. Growers are advised to consult with their grain buyer before using this product on pulse crops. Some grain buyers may not accept pulse crops treated with pre-harvest glyphosate due to scrutiny in the global marketplace and low MRLs for some pulse crops in certain major markets.
B. Desiccant						
Diquat (e.g. Reglone)	!	!	!	!	!	Growers are advised to consult with their grain buyer before using this product on pulse crops. MRLs are established in most major markets but are set at low levels in the U.S.
Glufosinate - Western Canada (e.g. MPower Good Harvest)	NR	✗	NR	NR	NR	Growers are advised to not use glufosinate on lentils as a crop desiccant. There is an elevated risk of MRL-related trade disruption due to missing or very low MRLs in most major markets. Treated lentils will not be accepted by grain buyers.
Glufosinate - Eastern Canada (e.g. Ignite)	NR	NR	NR	!	NR	Growers are advised to consult with their grain buyer before using this product on dry beans in Eastern Canada. MRLs are missing or set at low levels in most major markets.



Be informed. Treated pulse crops may not be accepted by some grain buyers. Consult with your grain buyer before using this product.



Do not use. There is an elevated risk of MRL related trade disruptions. Treated grain will not be accepted by grain buyers.



Not registered. Only use registered product.

For more tips and tools to help you grow a market-ready crop, visit keepingitclean.ca.





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**IT'S
GROW
TIME**



Better Tools in Sight for Dry Bean Disease Management

This researcher wants to make it easier to predict when white mould will occur and know which cultivars and seed sources are the best match against bacterial blight.

Courtesy of Alberta Pulse Growers

IF DISEASE WAS less of an issue, dry beans could be an even bigger crop than the 125,000 acres it's averaged in recent years in Manitoba. If this happened, more growers could enjoy the soil-building and economic benefits of the different market classes of dry bean.



work showed spores are continuously being released into the environment.”

Correlating spore counts to prevailing weather conditions to white mould incidence, Chatterton would ultimately like to develop a way to give growers advance warning of an outbreak. A

PhD student at the University of British Columbia is examining how machine learning, a field related to artificial intelligence, could make this prediction faster and more precise.

“A prediction model would take into account some of those different weather variables,” Chatterton said. “We need three years of data to create a really robust data set for modelling and 2020 will be our third growing season doing the spore sampling.”

SEED SOURCE IS ONE KEY TO BACTERIAL BLIGHT

With bacterial blight being a seed-borne disease, Chatterton started her inquiry with the seed itself, screening both

certified seed grown in Idaho and farm-saved seed from Alberta for bacterial pathogens.

“There was definitely a big difference,” she said. “The seed lots coming from farm-saved seed had very high levels of most bacterial pathogens. The certified seed was pretty much clean.”

One piece of a bacterial blight defense could be planting dry bean varieties known to be less susceptible to the disease. It hasn't been clear, however, which varieties qualify.

“In 2019, we set up field trials with five different market classes, with two different cultivars each from two different seed sources,” Chatterton said.

To track disease development through the growing season, a technician visits these extensive trials to assign a disease rating on as many as 240 plots per site. This is complex research that, combined with the white mould work, will help growers stay ahead of disease and keep dry beans productive and profitable.

“The white mould spore sampling and the bacterial blight trials have both showed good progress,” Chatterton said. “We'll be continuing this work in the 2020 growing season.” ■



PARTICIPANTS ARE NEEDED for our Pulse and Soybean Disease Survey

Each year, a representative sample of soybean, dry bean and pea fields across Manitoba are surveyed for foliar, root and stem diseases. These surveys are a collaborative effort between Agriculture and Agri-Food Canada, Manitoba Agriculture and Manitoba Pulse & Soybean Growers. Survey results feed into a province-wide summary that is available to all farmers. Participants also receive an individual disease report from their fields.

Sign up your pulse or soybean field today at www.manitobapulse.ca





How Natural Enemies Respond to Soybean Aphids During High- and Low-Aphid Years

Crystal Almdal and Alejandro C. Costamagna, Department of Entomology, University of Manitoba

SOYBEAN APHIDS ARE an invasive species and major pest with the potential to reduce soybean yields up to 40%. The soybean aphid was first detected in North America in 2000 and has since spread throughout the United States and Canadian prairies. Since its introduction, it has occurred infrequently in Manitoba, but reached widespread outbreak levels in 2006, 2008, 2011, and more recently in 2017. Our previous work during 2012–2014 (low soybean aphid years) showed that natural enemies, including ladybeetles, green lacewings, brown lacewings, minute pirate bugs, damsel bugs, hoverflies and parasitoids provide strong control of soybean aphids. With the outbreak of soybean aphids in 2017, we were able to compare aphid suppression and natural enemy response between outbreak and non-outbreak years in Manitoba. Specifically, we asked:

1. Does an aphid outbreak impact aphid suppression by natural enemies?
2. Do natural enemies respond to aphid outbreaks? and
3. Where are natural enemies migrating from?

Answering these questions will allow us to gain a better understanding of how we can maximize pest suppression by natural enemies to reduce the need to apply broad-spectrum insecticides.

We conducted field experiments in 12 fields in 2017 and 11 fields in 2018 throughout southern Manitoba (Emerson, Morris, Gimli, Winkler, Oakville, Beausejour, Arnaud, Carman, Elm Creek, Steinbach, New Bothwell, St. Adolphe, Warren, Kleefeld, La Broquerie, Scanterbury). To determine the level of aphid suppression, we set up five aphid colonies on plants open to natural enemies and five aphid colonies on plants closed off to natural enemies in each field studied for a period of two weeks (Figure 1).

To monitor the movement of natural enemies, we set up bi-directional Malaise traps between soybean and the neighbouring field (either canola, alfalfa, wheat or woody vegetation, Figure 2). In addition to Malaise traps, we conducted sweep-net samples within soybeans to determine the abundance of natural enemies within our study soybean fields.

In 2017, we saw seven out of our 12 soybean study fields above the economic threshold of 250 aphids per plant. We

witnessed high levels of winged aphids immigrating in soybeans, counting hundreds of winged and wingless aphids on plants, that at times were covered entirely in aphids (Figure 3). In contrast, 2018 was the complete opposite, where we saw very few aphids in our study fields, with counts nowhere near the economic threshold.

The high level of soybean aphid migration in 2017 resulted in aphids

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Figure 1. Experimental design to test suppression of soybean aphid by natural enemies. Potted plants are either open to natural enemies (left) or closed off to natural enemies (right). A bottle was used to irrigate each pot.



Figure 2. Bi-directional Malaise trap between soybeans and alfalfa to measure the movement of natural enemies between each crop. Insects are collected in jars on either side of the trap.



Figure 3. A look at one of the many soybean plants covered in aphids, observed in summer 2017.

escaping natural enemy control on our experimental plants. Since our aphid colonies open to natural enemies were also open to winged aphids, we could not tease apart the impact of natural enemies from the impact of aphid immigration. Therefore, we only observed significant aphid suppression in one of the twelve study fields, where aphid immigration was comparatively low. In contrast, in 2018, we observed significant aphid suppression on all experimental aphid colonies, as soybean aphid immigration was very low. Therefore, when aphid populations within fields are low, which is the usual situation in Manitoba, natural enemies can suppress them, but during massive immigration of winged aphids, natural enemies seem to be overwhelmed and aphids develop outbreak populations that escape control.

Although suppression was not observed in 2017, we did see a four-fold increase in the abundance of ladybeetles, a six-fold increase in hoverflies, and a two-fold increase in damsel bugs



Figure 4. Seven-spotted ladybeetle, *Coccinella septempunctata*, larva (left) and adult (right) feeding on soybean aphids.

compared to 2018. Natural enemies were responding numerically to soybean aphids in 2017. Each week we observed more aphids, but we also saw more natural enemies than in the previous sampling week, including hoverflies, ladybeetle larvae and adults (Figure 4), minute pirate bugs, damsel bugs, and green and brown lacewings. Additionally, during our last sampling week, we saw many black aphid mummies on soybean plants. *Aphelinus certus* parasitoids likely parasitized these aphids, but we are awaiting confirmation on its identification. We also saw brown aphid mummies on soybean, indicating the presence of another parasitoid species, but they were not as abundant as the black ones.

Our results suggest that ladybeetles are moving into and staying in soybeans to feed on aphids. We observed more ladybeetles migrating to soybeans during the high-aphid year than the low-aphid year. More ladybeetles were seen immigrating into soybeans than emigrating out. Green lacewings and hoverflies were found to move more between soybeans and canola than between soybeans and wheat, alfalfa or woody vegetation in 2017, and in 2018 hoverflies followed this same trend. That suggests canola is an important crop for hoverflies regardless of soybean aphid density. Canola is most likely an important habitat for both hoverflies and green lacewings because it provides them with pollen as an additional food source. Overall, we saw natural enemies moving between soybeans and wheat, canola, alfalfa and woody vegetation, suggesting

they are all crucial contributors of natural enemies.

SUMMARY

Natural enemies can control soybean aphids when aphid populations are low. An aphid outbreak does impact aphid suppression by natural enemies even though natural enemies are responding numerically to aphid outbreaks. Ladybeetles are moving into soybeans at a higher rate during an outbreak year than a low-aphid year and are found to be staying in soybeans. Green lacewings and hoverflies mostly move between soybeans and canola; therefore, canola serves as an essential crop for soybean aphid suppression by contributing natural enemies in soybeans. Planting a variety of crops in the landscape may promote pest control services in soybeans by providing different types of natural enemies that have different habitat requirements that would move into soybeans when aphid immigration occurs.

We conclude that natural enemy populations suppress soybean aphids during most years and have the potential to reduce soybean aphid outbreaks in years of high-aphid immigration. Our research is focusing on finding the best combination of natural habitats and crops that increase natural enemy populations in agricultural landscapes to achieve sustainable aphid control. ■

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Controlling Pea Aphids in Lentils and Faba Beans

Ningxing Zhou and Sean Prager, University of Saskatchewan and Tyler Wist, Agriculture and Agri-Food Canada – Saskatoon



Figure 1. Pea aphid feeding on faba bean stem and young leaf tissues.

PEA APHIDS

Pea aphids are a pest of leguminous crops found anywhere pulses are grown in the world. The little green insect is tiny in size, ranging in length from one to 10 millimetres, depending on how old they are. The stylet (mouthparts of aphids) pierce into plants and extend to the phloem where they suck on the plant's sugar-conducting fluids. Plants that are eaten by aphids suffer reduced vigour, with symptoms such as reduced productivity, leaf yellowing, plant stunting, reduced yield, wilt and death. Pea aphids prefer temperate regions with moderate climate fluctuations and constant temperature and humidity. This climatic preference suggests that aphids have a hard time overwintering in Canada. In Saskatoon, for example, aphids usually appear in early July. Due to their small size and tendency to develop wings when they want to leave plants, they travel from one area to another by flying and by using wind currents.

The common natural enemies of pea aphids include lady beetles, lacewings, parasitic wasps and syrphid flies. At low aphid densities, these predators may prevent economic damage from pea aphids to plants. However, these aphids can reach incredibly high densities very quickly, as they did in our Saskatoon field sites this past season (2019). If the population of pea aphids is huge, losing a



Figure 2. Untreated control (left) vs. treated (right) at a Saskatoon farm site.

few percentages of the population is not worth mentioning and will not reduce plant damage. Aphids have unusual reproduction where at different times of the year, reproduction can be either asexual (parthenogenesis) or sexual. Parthenogenesis means that mature female aphids can give birth to the next generation through cloning and without needing to mate. For one single adult aphid, this cloning results in around 20 to 30 nymphs in seven days, depending on plant nutrients. It takes about 15 days for pea aphids to become reproductive from nymphs. Thus, within 22 days, one single aphid can have 625 offspring. So, imagine if ten aphids migrate into one field, how many aphids there could be in 22 days or two months? If all of the offspring continue to reproduce, pea aphids can quickly cover an entire plant. Once the aphid populations start to crowd each other on plants, some aphids produce wings and migrate to other sites and plants.

Pea aphids can cause significant economic damage by reducing both seed quality and quantity. For example, we found last year that infestations of pea aphids in faba bean can lead to drastic yield losses (up to 100%). Besides the direct damage from feeding, aphids can also vector diseases and cause indirect damage through the transmission of viruses such as the Pea Seed-borne Mosaic Virus (PSbMV). PSbMV symptoms on pulses include mosaicked leaves, delayed or uneven crop maturation, and various forms of seed and pod

deformation. The presence of PSbMV in fields adds great insult to injury.

The first step to successful aphid management is controlling their population density. While this can be accomplished through multiple means, knowledge of the economic thresholds is a crucial element in any management strategy. We don't have good thresholds for lentils, and we have none for faba beans.

ECONOMIC THRESHOLD/ECONOMIC INJURY LEVEL RESEARCH IN PROGRESS

The point when pest injury results in economic loss is called the economic injury level (EIL). The action threshold is defined as the point where the action (insecticide treatment) needs to be taken to prevent the aphid population from reaching the economic injury level with the economic threshold working in costs such as insecticide and labour. As we know, when we get a mosquito bite, we may feel itchy from a few seconds to a few hours, and we could easily recover from it, depending on your body's immune system. Similar to the relationship between mosquitoes and humans, the plant immune system also has a defensive response to the aphid feeding. Low numbers of aphids sucking on plant phloem will not cause huge issues to the plant, while large numbers will overwhelm the plant's ability to defend itself or compensate for damage. Insecticide resistance is becoming an increasingly important topic, especially concerning pea aphids in lentils and faba

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beans, which have limited registered insecticides available in the market. As a result, there is a need to use existing materials carefully. Instead of applying insecticides early in the season, and doing several treatments in a season, it is better to spray when aphids approach the economic threshold. Treating with insecticide too late, though, might result in irreversible yield loss like we demonstrated last season. Finding a balance point between economic loss and spray timing is essential for pea aphid control.

In the 2019 field season, we conducted experiments on both lentils and faba beans to determine economic injury levels and evaluate the efficacy of three insecticides. For lentils, we used plots of CDC Impulse, a small red variety, while for faba bean, we planted CDC Snowdrop (a non-tannin variety). Lentil fields were sampled using a sweep net before, two days and ten days after the application of insecticides. In lentils in Saskatoon, aphids appeared around the bud to the early flowering stage (most buds with a few fully opened flowers). Based on the 2019 season's data, we found that controlling aphids at low density gives the highest yield return. However, lentil plants were sprayed twice in the lowest density to keep aphids at our predetermined aphid density. We also found that if aphid populations reached 1,000 aphids per sweep, it resulted in

a very low yield (~2 tonnes/ha). After reaching 1,600 aphids per sweep, the pea aphid population started decreasing. The decreasing trend may result from the maximum capacity of the lentil plants to host the pea aphid as well as the senescence of the crop. Without any insecticidal management of pea aphids, our average yield return was 0.9 tonnes/ha (control plots).

In our faba bean experiment, pea aphids were counted using an individual plant cutting and shaking method since aphids usually hide under the leaves and cluster on areas of new growth. Under high aphid density, new growth started wilting and aphids covered the plants (Figure 1). Pea aphids arrived in faba beans around the early flowering stage (one calendar week later than lentil). The results of the first year of this study demonstrated that earlier spray timing with insecticides provides the highest yield. Preliminary data shows no significant difference between spraying at 50 aphids/plant and 120 aphids/plant. Aphid populations that reached 800 aphids/plant before insecticidal treatment resulted in a loss of at least half compared to the plots kept at the lowest aphid density while waiting to apply insecticides until populations reached 1,500 aphids/plant resulted in complete yield loss. It took less than one week for aphid populations to go from

280 aphids/plant to 800 aphids/plant. In our plots, however, pea aphid populations may have been influenced by migration from neighbouring lentil and pea fields. Due to the aging of lentil and pea plants, the aphids may have migrated to the still-green faba bean fields. Therefore, monitoring pea aphids frequently from the end of July to mid-August is essential for preventing crop losses due to pea aphids.

In both pulse crops, given the high densities of pea aphids that are possible, it is important to monitor and control aphids, as unmanaged pea aphid populations can spread into untreated fields in bad aphid years. Our experiments using contact and systemic insecticides indicated that contact insecticides gave better control of pea aphids than the systemic insecticide that we tested. To limit the development of insecticide resistance, producers should rotate between different classes of contact insecticides when controlling pea aphids. Now that we have uncovered the devastating effects of high pea aphid populations, our work continues to pinpoint the optimal aphid density to use in control decisions.

Funding for this research was supplied by Western Grains Research Foundation, Government of Saskatchewan Ministry of Agriculture and the Agriculture Development Fund. ■

Soybean Scout ANSWERS

Photo: Dr. Craig Grau, Crop Protection Network



A – Soybean cyst nematode (SCN)
The presence of SCN (*Heterodera glycines*) was confirmed for the first time in MB in 2019. Low level detections (with no above-ground symptoms) were made in 4/106 fields within 4/18 municipalities surveyed since 2012. When visible, symptoms usually occur in patches. This includes stunted plants, slow or no canopy closure, and chlorosis. Scout for SCN starting 30–45 days after emergence

until 21–28 days before harvest. Carefully dig up roots to distinguish SCN from other conditions. Infected plants have poorly developed root systems, a reduced number of N-fixing nodules and tiny, lemon-shaped cysts (much smaller than nodules). To manage SCN, diversify crop rotations, grow resistant varieties, control host weed species, reduce tillage and utilize cover crops.



B – Sudden death syndrome (SDS)
SDS is a fungal disease caused by *Fusarium virguliforme* that survives in soil and on crop residue. Foliar symptoms first appear after flowering as yellow spots between leaf veins that progress into large chlorotic and necrotic patches. Symptoms resemble those of brown stem rot (BSR), which is not yet present in MB. If the inside of the stem is brown and discoloured, it is more likely BSR. The

presence of SDS often coincides with the arrival of SCN, which can actually increase SDS severity. Therefore, fields with suspected SDS should also be tested for SCN. Manage SDS by managing SCN, improving field drainage, reducing compaction and using appropriate seed treatment. If SCN, SDS or BSR are suspected, contact MPSG and confirm via laboratory testing.

GROWTH STAGES					
MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
Emergence		Flowering R1-R2		Seed Fill R5-R6	
Vegetative			Pod Growth R3-R4		Maturity R7-R8

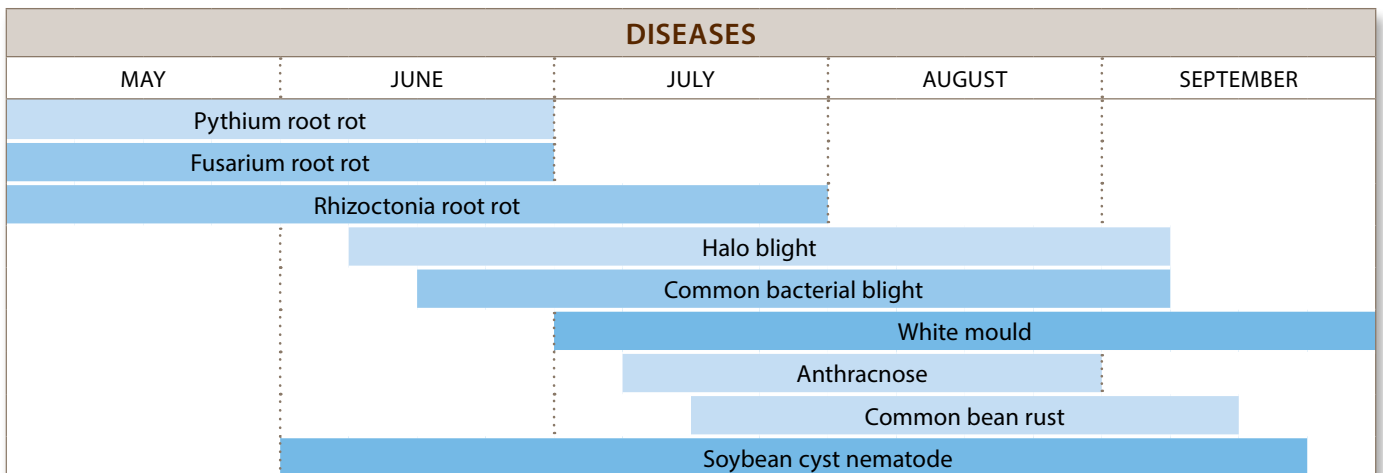
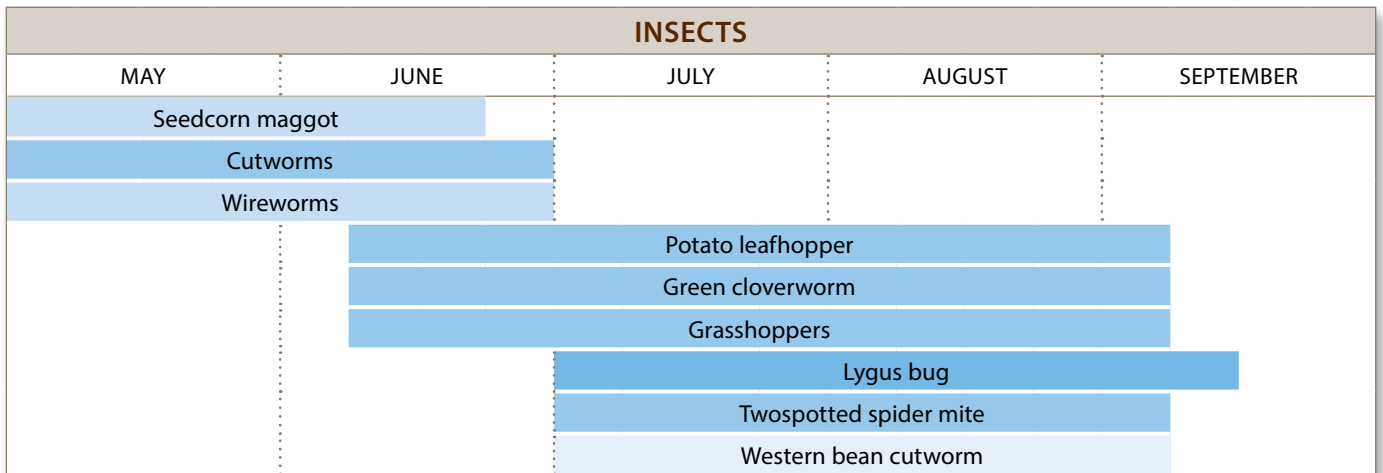
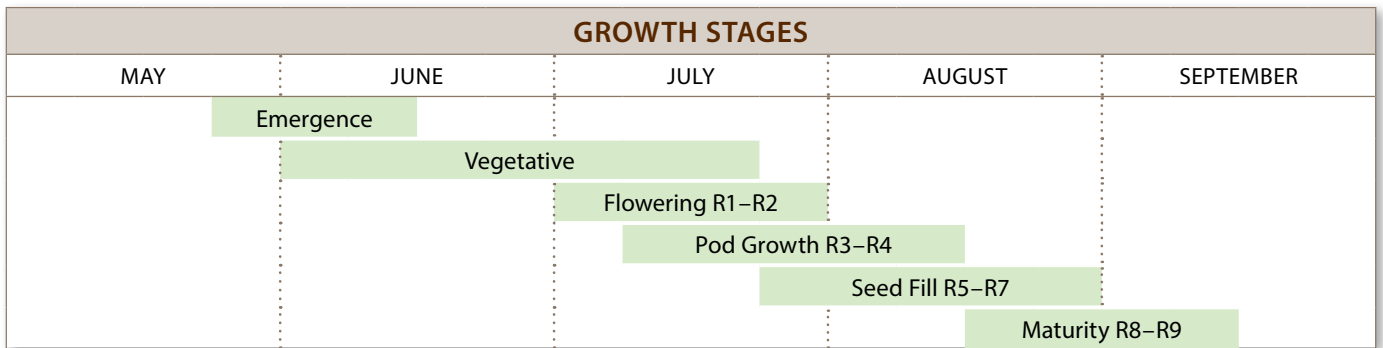
INSECTS					
MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
Seedcorn maggot					
Cutworms					
Wireworms					
	Grasshoppers				
	Soybean aphid				
	Twospotted spider mite				
	Green cloverworm and other caterpillars				

DISEASES					
MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
Pythium root rot					
Fusarium root rot					
Rhizoctonia root rot					
Phytophthora root rot					
	Fusarium wilt				
	Frogeye leaf spot				
	Septoria brown spot				
	Bacterial blight				
	Viral diseases				
	Downy mildew				
	Sudden death syndrome				
		White mould			
		Stem canker/Pod and stem blight			
	Soybean cyst nematode				

The following diseases have NOT been reported in Manitoba: soybean rust, charcoal rot and brown stem rot.

Potential Impact on Soybean Production and Quality in Manitoba

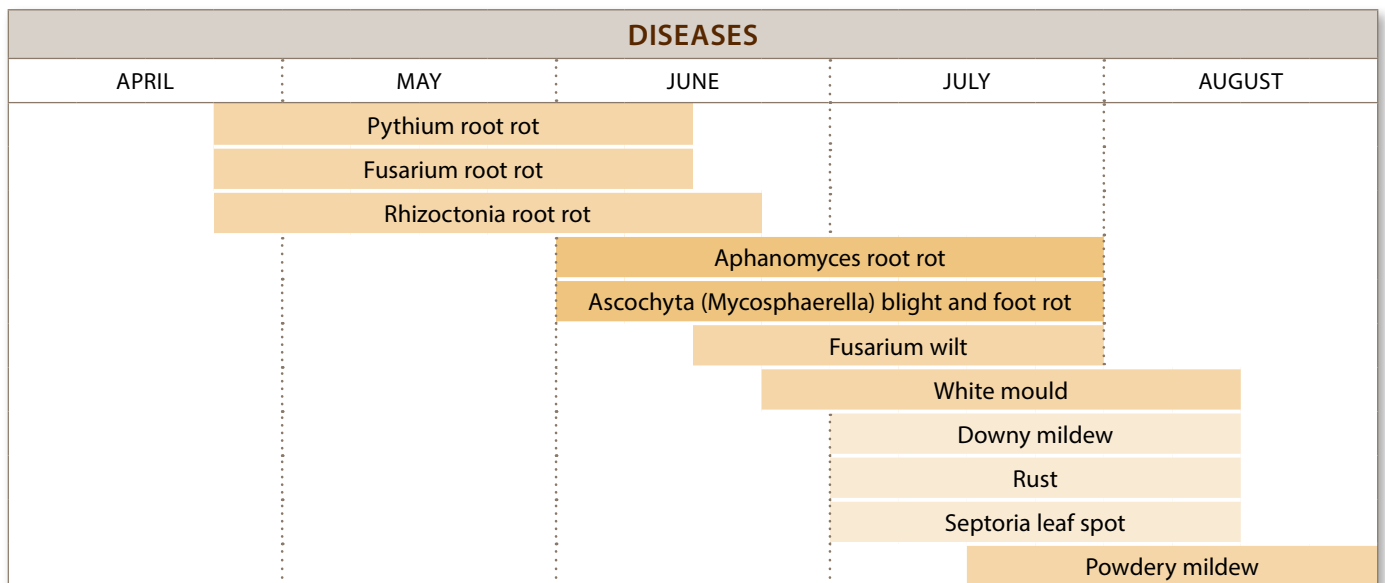
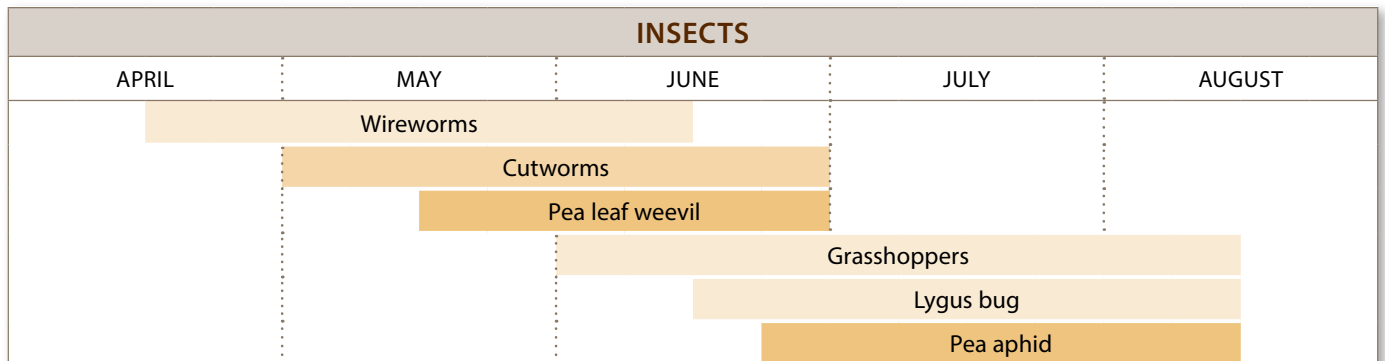
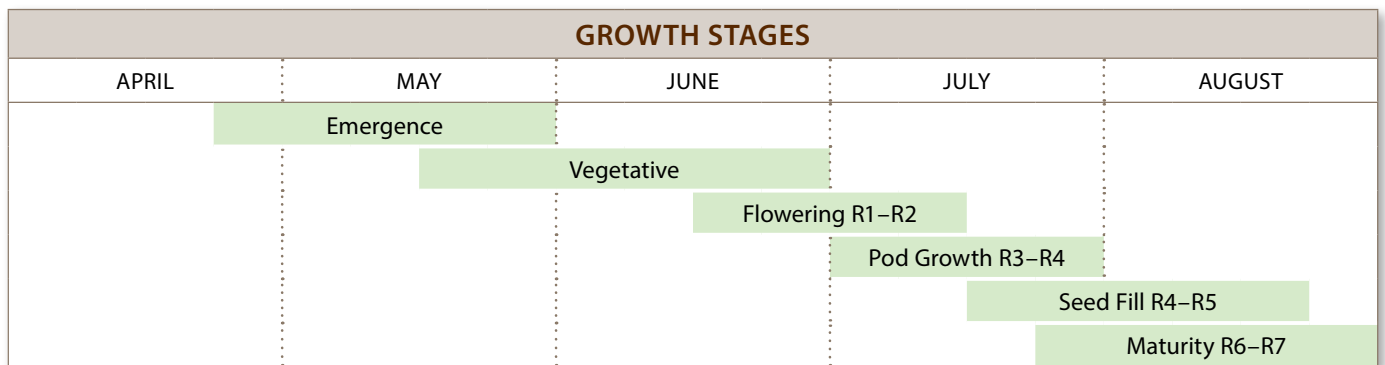




The presence of western bean cutworm has not been confirmed in Manitoba.

Potential Impact on Dry Bean Production and Quality in Manitoba





Potential Impact on Field Pea Production and Quality in Manitoba





Harvesting Tips to Improve Dry Bean Quality

Dennis Lange, Provincial Pulse Specialist, Manitoba Agriculture and Resource Development



EVERY YEAR I get calls from dry bean growers on harvesting challenges. These questions range from how do I reduce splits to how to reduce earth tag, just to name a few. Looking back through an old *Pulse Beat*, I discovered it had been 20 years since I wrote a similar article on combine modifications for dry beans. In this discussion, I will be referring to some of the same equipment, but focusing more on improving the overall dry bean quality.



NOT ALL DRY BEANS ARE CREATED EQUAL

Some bean types require extra special handling due to their brittle nature, especially when seed moisture is 10–12%. Harvesting navies, blacks and pintos can be done with conventional or rotary combines. Kidney, cranberry, pink and Great Northern beans have a much better fit for a specialty bean combine. This type of combine can handle those bean classes when harvest conditions are more challenging. Keep in mind, when harvesting beans, a lot depends upon operator experience as well. I have seen growers harvest kidney beans with a rotary combine and deliver beans that look just as good as if they were harvested with a bean combine. I have also seen the opposite where the grower should have hired a bean combine due to the

high amount of damage created under the more challenging harvest conditions. For this discussion, I will focus on tips for conventional and rotary combines.

BASIC EQUIPMENT MODIFICATIONS

What types of equipment modifications should you consider for harvesting beans if using a conventional or rotary combine? Screen kits placed in strategic locations are vital to helping eliminate soil. It is best to start at the header and under the feeder house. Eliminating soil before it goes into the hopper is very important. Some growers have also installed screen kits on the unloading auger. That does help to remove some soil, but smearing can still occur if moisture from soft puffy (not fully mature) beans or green plant material combines with soil and smears the beans. The use of a conveyor mounted on the combine to unload the beans will also help reduce the smearing of those beans.

SOFT, PUFFY, SMEARED BEANS

Continuing on this topic of soft, puffy, smeared beans, how do you eliminate those beans from the sample? You could wait until the beans dry down to continue to harvest, but they are probably already at 16% moisture. Waiting for the soft bean to dry down will cause the overall sample to get too dry and make it challenging to keep your splits and cracked seeds low. If you keep these beans from earth tagging, then they will dry down normally in the

bin. The first thing to do is to check the back of the truck after the first combine dump to see if there are any smeared beans. If the beans are clean but soft, then you are good to go. They will dry down normally in the bin. If the beans are smeared, it will count as pick or damaged and will be discounted when you deliver them. What I would suggest, is to find out how the soil is coming into the combine. If these beans are undercut, have they been windrowed? That helps to remove any soil clinging to the roots. The best way to remove soil is by using screen kits under the feeder house early in the process. Increasing fan speed can help a bit, but if the soil is moist, then higher fan speed will not help. If you are direct-harvesting beans, this allows for a cleaner sample as long as you are not picking up soil by improper header adjustments.

WHAT IF YOUR BEANS ARE TOO DRY?

If your beans are under 12% moisture, the first thing you should do is check to see if you are getting more than 10% cracked seeds. A quick way to check is to grab a sample from the hopper and soak 100 seeds in a small pan of water. If you pick out 10%, then a few adjustments will be necessary. Keep in mind that for navy, pinto and black beans, the 10% rule would apply to most bean company

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HARVEST LOSS ASSESSOR TOOL – MPSG'S BEAN APP

Soybean yield loss at harvest can add up, stemming mainly from losses at the header. Periodically assess harvest losses and make gradual combine adjustments to keep yield loss below 5%. ➔ Rule of thumb: 4 seeds/ft² = 1 bu/ac lost

Use MPSG's Bean App Harvest Loss Assessor to calculate soybean yield loss based on the number of seeds on the ground and seed size. This tool can be used for header losses, or for losses behind the combine.

GET IT NOW ➔





Harvest Header Losses in Soybeans

PAMI Research Update

Charley Sprenger, Prairie Agricultural Machinery Institute



TODAY'S COMBINES ARE well designed to minimize threshing losses when harvesting soybeans; however, there can still be significant losses at the header (accounting for 80% of the losses), particularly in Manitoba where the pods grow closer to the ground. Large combines currently being used in Manitoba will not be loaded to their threshing capacity in soybeans with headers used in canola and cereals. The header loss becomes the limiting factor to combine efficiency. Prairie Agricultural Machinery Institute (PAMI) has conducted several field-scale research projects to determine which factors affect header losses most in order to provide producers with management strategies for reducing risk by minimizing losses. Significant

savings can occur if harvest losses are minimized.

Four variables, which may significantly affect header losses, are the type of header (draper or auger), the angle setting of the header (as per recommendations for a specific crop type), the use of an air system, and ground speed during harvest.

Header type may make a difference in reducing losses. When properly adjusted (e.g. bean setting), a draper header has been shown to have less losses than an auger header (0.5 to 1 bu/ac difference). This is likely due to the conveying method; the draper allows a smoother flow of material to the feeder house and pods are less likely to shatter.

Header settings are important for minimizing losses because of the

proximity of the end of the bottom pod to the ground. An improperly adjusted draper header (e.g. when the same settings used for cereal crops are also used for soybeans) can have the highest losses (up to 1.5 bu/ac greater losses than when properly set to manufacturer's recommendations). It is important to spend the time adjusting the header angle settings between crops to minimize losses regardless of the header type. One

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requirements. However, for the larger bean types like kidney and cranberry beans, which are more sensitive to cracks, the lower you can keep your cracks the better. To reduce cracks, you should start by first reducing your cylinder speed. Starting speeds are around 300–600 rpm depending on bean type and harvest conditions. If you're starting at 500 rpm, then reduce your rate in 100 rpm intervals until you see a noticeable difference in cracks. If you do this and not much changes, then try to close up your concave to thresh the beans out quicker. Having your concave too far open will allow the beans to flow further into the threshing system, causing the rotor to hit the beans and create more cracks.

ADDITIONAL CONSIDERATIONS

If you are a first-time bean grower, make sure you have a bean concave, also known as a wide-wire concave, installed on your combine. That will allow the beans to fall through the concave faster. The amount of material entering the combine also

plays a role in keeping cracked seed low. If you can, keep more material in the combine by windrowing beans into larger windrows. Or if you are straight-cutting, a wider cutting width will help keep the combine running at full capacity. That helps to cushion the beans, thus reducing splits and cracks.

The time of day you are harvesting also makes a difference. I recommend harvesting when the plants are dry and avoid harvesting before noon. If you try to harvest when the plant material is moist, the beans may be dry but the pods do not open up as quickly when going through the cylinder and concave. They actually crack and split more than if the plants are dry. The same applies to harvesting in the evening. At sunset, you should be monitoring your cracks closely. I have seen instances where growers have harvested kidneys during the day at 13% moisture with 2% cracks, then cracked seed jumped to 30% by evening. This caused marketing challenges for those beans.

PODS AND SOYBEANS IN THE SAMPLE

Pods are relatively easy to address. If there are unthreshed pods in the sample and those pods are green, then the beans are not ready to harvest. If the pods are mature and open, then closing up your sieves and increasing your fan speed should help.

The final comment is on soybean admixture. **There is nothing you can do to remove soybeans from a dry bean sample with the combine.** If you notice the odd soybean in your field before harvest, try to harvest that dry bean field earlier than other fields. I have seen growers harvest dry beans with a few green immature soybeans in the sample and the buyers have still been able to work it because the green soybeans typically shrink up. That is tricky to do because both soybeans and dry beans are long-season crops and both mature in September. A safer option would be to contact your bean buyer and let them know before delivery so that they can address the situation before the beans arrive at the processing facility. ■



of the keys is getting the knife positioned between the ground at the lower tip of the bottom pod.

An air system has been found to have a significant effect on decreasing header losses for both header types. Losses can be reduced an average of 0.5 to 1 bu/ac when using an air system on either a draper or auger header. At a price of \$10/bu, this can provide a savings of \$5 to 10/ac. When trying to determine if an air system is worth the investment, consider that the payback area for an air system with an average capital cost of \$16,500 would be 1,650 to 3,300 acres. This indicates that using an air system can provide substantial benefit in reducing losses.

The effect of ground speed needs to be weighed against the urgency of harvest. Ground speeds of 3 and 4 mph typically have lower losses than the higher tested speeds of 5, 6 and 7 mph with an average difference was 0.5 bu/ac. One of the studies, however, was inconsistent and found that there was no significant difference between losses

at different speeds. It appears that crop and other environmental conditions are the likely causes of this varied result. This reinforces the recommendation that checking losses in each crop during harvest is the surest way to minimize them.

Because of the many factors that can influence losses, it is important to understand header setup and operating effects. Producers can measure their header losses by counting the number of seeds on the ground in a 1 ft² area. Stop randomly in the field and count between the header and the rear wheels of the combine; repeat a minimum of five samples randomly behind either side of the header to get a good picture of the losses. Four beans per ft² = 1 bu/ac loss. Be sure to include loose seeds, seeds in pods, and seeds in pods on cut stubble or lodged stalked in your counts. Seed on cut stubble can indicate that the header is not cutting low enough. Lodging may indicate that the ground speed is too high and just pushing over plants.

The remaining factor that has been observed as having a potential impact on losses is the time of day that harvest occurs, which represents a combination of temperature and humidity. PAMI hopes to conduct another research project to address this remaining question that producers have. Hopefully, that will indicate if there is value in starting an hour later in order to reduce losses? Or, similarly, should the combine slow down more as harvest runs late into the night to reduce losses?

From all of these insights gained over several projects, producers can evaluate the value of a draper header, an air system and optimal travel speed for their operations, based on the return per acre of soybeans grown. ■

Do you have a question about pulse or soybean crops? Email us!



Cassandra Tkachuk
cassandra@manitobapulse.ca or
Laura Schmidt • laura@manitobapulse.ca

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On-Farm Network Strives to Answer the Why Behind Yield Results

A more in-depth look into the factors contributing to yield response.

Megan Bourns, Agronomist – On-Farm Network and Daryl Domitruk, Director of Research and Production, MPSG



MPSG'S ON-FARM NETWORK (OFN) aims to test new products and evaluate management practices in a way that empowers farmers to conduct straight-forward and reliable research on their farms. The OFN structures its investigations as randomized and replicated strip trials, at field scale. Due to their size and the simplicity of comparison in an on-farm trial relative to the intensity of something like small plot research, on-farm trials are typically focused heavily on yield response. Since the OFN's beginning in 2014, the testing of products and evaluation of practices have been primarily focused on just that – after all, yield is a key driver of the bottom line.

However, as the OFN program has grown and the capacity has expanded, MPSG senses an opportunity to extract even more knowledge from these trials. There's so much going on in and under the crop – chemical and biological processes that can enhance or detract from the effect a product or practice has on yield. We think farmers are curious to discover hidden interactions that impact their bottom line. Especially interactions that may prove to be unique to their district or overall circumstances. And so, beginning in 2020, MPSG will selectively intensify data collection through collaboration with hand-picked soil and crop experts. You could say we're moving to address both the *what* outcome of a product or management practice plus the *why* answer to how that product or method resulted in the observed yield response.

This year, soybean seed treatment and row spacing trials are a focus for intensification of data collection. A farmer favourite, soybean seed treatment trials have been part of the OFN since 2015, with 41 trials conducted to date.

Among those 41 sites, there were only eight locations where seed treatment significantly increased yield compared to untreated soybeans. This result is especially curious since farmers have taken to regarding seed treatment as “insurance” by adding the products and their cost to the crop budget without much thought. The low frequency of yield response begs the question why? Was there too little pest pressure for the treatment to make a difference at most sites? An insurance approach usually means the level of the actual threat is not estimated. Are seed treatments less effective at preserving yield than we may think? Actually, most products do the job they're developed to do – control or suppress pests. However, that just further stirs curiosity about why we saw so little response. An instrument as blunt as an insecticide-fungicide mix should show some improvement in yield. We need to look deeper.

Through collaboration with researchers, we will be able to determine how effective seed treatments are at reducing seedling root rot pressure, collect data on the range of root rot pathogens that exist in the trials, and gain an understanding of wireworm pressure in the fields where these trials are conducted. Having this in-depth information early in the season will help interpret yield response at harvest.

Soybean row spacing trials are another focus for intensifying data collection. Unlike seed treatment trials that have been conducted for several growing seasons, row spacing trials were a new addition to the OFN suite of research in 2019. In the first year, yield was compared between two row spacings in each trial, with 7.5" vs. 15", 10" vs. 20" and 15" vs. 30" treatments. Out of the seven row-

spacing trials conducted in 2019, two sites had significant yield differences, where the narrower row spacing in each trial out-yielded the wider row spacing. A substantial consideration for the effect of row spacing on production is the rate and extent of canopy closure, which influences soil moisture conservation, total sunlight capture, weed and disease pressure. This year, in addition to yield, the OFN will start measuring canopy closure in collaboration with researchers, to assess differences between row spacings. Differences in late-season weed pressure will also be determined.

Another area receiving more scrutiny in the OFN program will be estimates of profitability. While it's true every farm has different conditions affecting its bottom line, MPSG intends to provide a quick and easy number that farmers can incorporate into their own more extensive calculations of profit. For example, consider row spacing, opens cost money and narrow row spacing results in more iron being pulled through the ground and more fuel consumed. Yet, it may be worth it on many soil types.

Thanks to the farmers who have invested time and effort in on-farm trials, MPSG has amassed a significant bank of practical results. However, like all good research, more questions have arisen. The field-scale and real farm conditions under which these trials are conducted means the questions will keep coming. ■

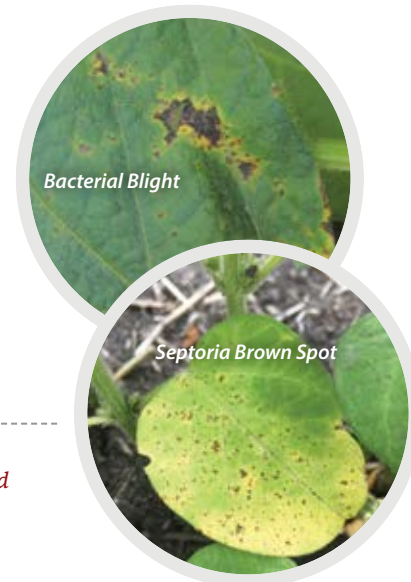
Over 288 independent, on-farm trial project details and results available at manitobapulse.ca



Foliar Diseases in Soybeans, Peas and Dry Beans

Results from the 2019 late-season disease survey and On-Farm Network foliar fungicide trials

Laura Schmidt, Production Specialist – West and Megan Bourns, Agronomist – On-Farm Network, MPSG



Each year a representative sample of soybean, pea and dry bean fields are surveyed for root, foliar and stem diseases throughout Manitoba. These surveys are a collaborative effort between Agriculture and Agri-Food Canada, Manitoba Agriculture and Resource Development and Manitoba Pulse & Soybean Growers. Root rot results from the 2019 survey can be found in the spring 2020 issue of Pulse Beat.

SOYBEAN FOLIAR DISEASES

Sixty-eight soybean fields were surveyed in 2019 at R3 (beginning pod) and R6 (full seed). Soybeans were visually assessed for infection by common diseases like bacterial blight, septoria brown spot and downy mildew, as well as less common diseases like white mould, pod/stem blight, anthracnose and frogeye leaf spot.

Similar to previous years, bacterial blight and septoria brown spot were found in the majority of fields surveyed. Average severity levels of these two

diseases were low in 2019, scoring 1.4 and 1.5 respectively, on a scale of 0 to 5 (Table 1). At these levels, bacterial blight and septoria brown spot are not expected to cause yield loss. While bacterial blight and septoria brown spot are common in Manitoba, they are rarely present at levels which cause economic concern. However, some fields will experience greater severity and incidence of these diseases. In these cases, it's important to verify which diseases are present and causing symptoms. Fungicides will only

be effective against fungal diseases like septoria brown spot, but management practices like crop rotation and tillage could be used to manage both fungal and bacterial diseases.

Downy mildew was present in roughly a third of fields surveyed, also at low severity levels (Table 1). Pod/stem blight, anthracnose and frogeye leaf spot were present but less common. In 2019, white mould was not detected in any of the soybean fields surveyed.

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Table 1. Prevalence, incidence and severity of foliar and stem diseases in 68 soybean fields in Manitoba in 2019 during R3 (beginning pod) and R6 (full seed).

Disease	Rating	Region (number of fields)									
		Central (31)		Eastern/Interlake (17)		Northwest (7)		Southwest (13)		Manitoba (68)	
		R3	R6	R3	R6	R3	R6	R3	R6	R3	R6
Bacterial blight	Prevalence ¹	94%	100%	65%	88%	100%	100%	100%	100%	88%	97%
	Incidence ²	43%	56%	44%	44%	56%	75%	45%	35%	45%	51%
	Severity ³	1.3	1.4	1.4	1.3	1.1	1.5	1.2	1.6	1.3	1.4
Septoria brown spot	Prevalence	97%	87%	76%	94%	71%	67%	92%	100%	88%	90%
	Incidence	57%	53%	96%	78%	55%	91%	62%	43%	65%	59%
	Severity	1.4	1.3	1.4	1.5	1.7	1.8	1.3	1.6	1.4	1.5
Downy mildew	Prevalence	19%	39%	29%	35%	29%	29%	31%	15%	25%	32%
	Incidence	25%	44%	16%	36%	3%	3%	10%	31%	16%	37%
	Severity	1.3	1.2	1.0	1.4	1.5	1.0	1.2	1.3	1.2	1.2
White mould	Prevalence	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Incidence	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pod/stem blight	Prevalence	6%	16%	0%	0%	0%	14%	0%	8%	3%	10%
	Incidence	3%	7%	0%	0%	0%	4%	0%	2%	3%	5%
Anthracnose	Prevalence	13%	0%	0%	0%	0%	0%	0%	0%	6%	0%
	Incidence	15%	0%	0%	0%	0%	0%	0%	0%	15%	0%
Frogeye leaf spot	Prevalence	3%	0%	0%	12%	0%	43%	8%	38%	3%	13%
	Incidence	2%	0%	0%	29%	0%	5%	2%	6%	2%	11%

¹ Average percent prevalence across all fields surveyed.

² Average percent incidence in infested fields.

³ Average disease severity in infested fields on a scale of 0 (no disease) to 5 (severe symptoms with defoliation).

ON-FARM EVALUATION OF FUNGICIDE IN SOYBEANS

MPSG's On-Farm Network (OFN) has conducted 59 foliar fungicide response trials in soybeans since 2014. These randomized and replicated strip trials compared soybeans with and without a single foliar fungicide application, where fungicide was intended to control fungal disease including septoria brown spot, white mould and frogeye leaf spot. Applications were made at recommended label rates and timings of either R1 (beginning bloom) or R2 (full flower).

Among the 59 trials, there were nine statistically significant yield responses,

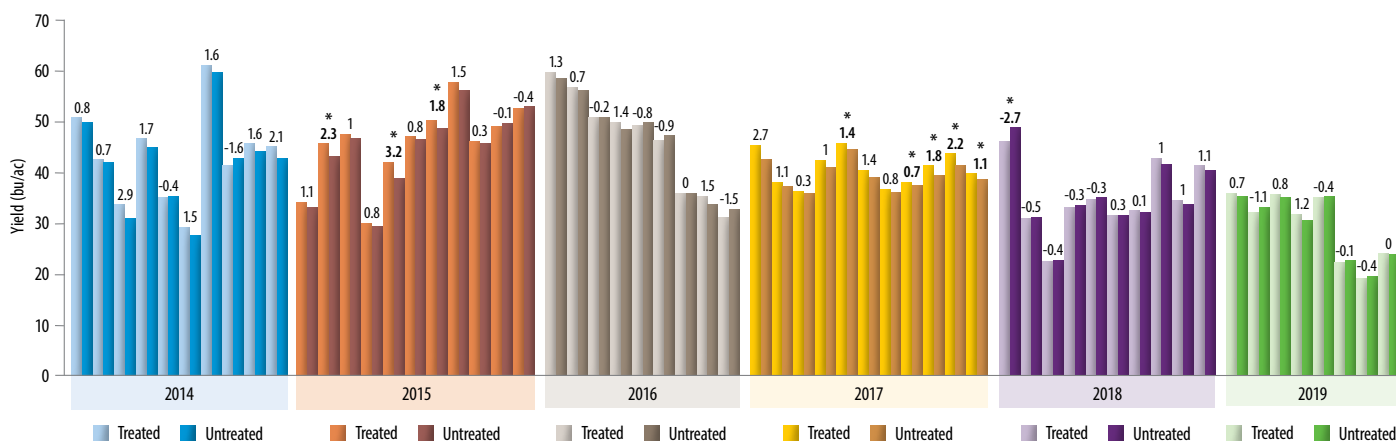
eight of which were positive (14%). Significant yield responses occurred within three growing seasons – 2015, 2017 and 2018. At most responsive sites within this study, septoria brown spot and white mould disease pressure were reduced by fungicide application.

This type of variability in soybean yield response to fungicide application is to be expected, as the extent and severity of disease pressure is inconsistent across years and dependent on growing season conditions. Fungicide application is also expected to protect yield only when fungal disease pressure is severe enough to be limiting.

In Manitoba, soybean yield is not often limited by septoria brown spot and white mould. This is one reason for even greater variability in the yield response to fungicide application. It also calls into question the economic benefit of regular fungicide applications in soybeans if yield benefits are small or insignificant.

The OFN will continue to conduct soybean fungicide trials in 2020. For more information on each of the OFN soybean fungicide trial results, visit manitobapulse.ca/on-farm-network. ■

Figure 1. Yield difference (indicated by the value above the paired bars) between soybeans with foliar fungicide applied (treated) and soybeans without foliar fungicide (untreated) for individual On-Farm Network trials from 2014–2019.



Numbers above bars indicate yield differences between soybeans with a single foliar fungicide application and untreated soybeans. * Statistically significant yield difference at $p < 0.05$.



FIELD PEA FOLIAR DISEASES

Forty-four pea fields were surveyed in 2019 during mid- to late-July when peas were at the podding stages of R3 to R4 (Table 2). Foliar diseases were identified based on their symptoms. The severity of mycosphaerella blight, white mould and anthracnose were estimated using a scale of 0 (no disease) to 9 (whole plant severely diseased). Powdery mildew, downy mildew, rust and bacterial blight were rated as the percentage of foliar area infected.

Similar to previous years, mycosphaerella (ascochyta) blight was the most

Table 2. Prevalence and severity of foliar diseases in 44 pea fields in Manitoba in 2019.

Disease	# Crops affected (%)	Disease severity	
		Mean ¹	Range
		— 0 to 9 Scale ² —	
Mycosphaerella blight	44 (100%)	3.8	2.3 – 6.3
White mould	0	0	0
Anthracnose	0	0	0
		— % leaf area infected —	
Powdery mildew	0	0%	0%
Downy mildew	29 (64%)	0.4%	<0.1 – 1.4%
Rust	0	0%	0%
Bacterial blight	17 (39%)	<0.1%	<0.1 – <1.0%

¹ Mean values are only based on fields where the disease was present.

² Mycosphaerella blight, white mould and anthracnose were rated on a scale of 0 (no disease) to 9 (whole plant severely diseased).

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prevalent foliar disease and was present in all pea fields surveyed. Disease severity ranged from 2.3 to 6.3, averaging 3.8. The impact of disease severity on yield will depend on how early the disease sets in and how quickly it develops. For scouting and management information on mycosphaerella blight, read *The Pea Report – Managing Ascochyta (Mycosphaerella) Blight in Field Peas* in the summer 2019 issue of *Pulse Beat* available at manitobapulse.ca.

Downy mildew was detected in 64% of fields (29/44) and the percentage of leaf area infected averaged 0.4%. Bacterial blight was observed in 39% of the crops surveyed (17/44) with the percentage of foliar area infected averaging less than 0.1%. White mould, powdery mildew, rust and anthracnose symptoms were not

observed in any of the fields surveyed in 2019.

ON-FARM EVALUATION OF FUNGICIDE IN FIELD PEAS

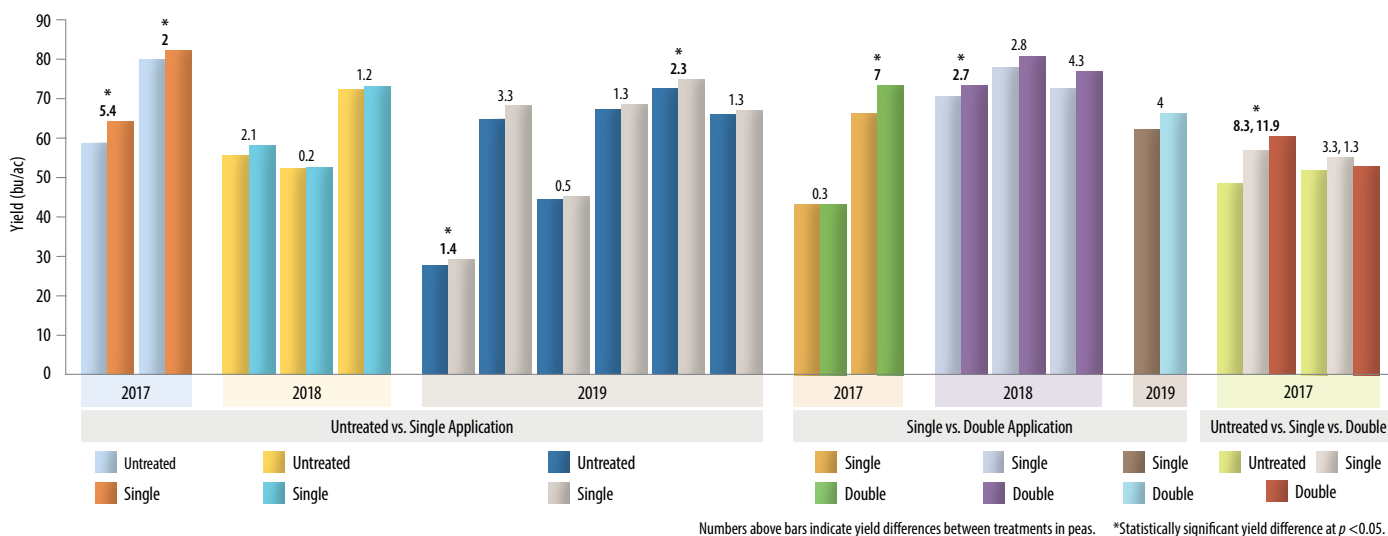
MPSG's OFN has conducted 19 trials evaluating the effectiveness of foliar fungicide application in peas since 2017 (Figure 2). Typically, foliar fungicide application in peas targets control of mycosphaerella blight. However, fungicide application can also offer control or suppression of other diseases including white mould, powdery mildew and rust, depending on the product.

This pea fungicide study includes 11 trials of single vs. no application, where foliar fungicide was applied at R2 (beginning bloom). There have been six single vs. double application trials, where the single application is applied

at R2 and a second application is applied one to two weeks later. This study has also included two trials comparing all three treatments – single vs. double vs. no fungicide application.

To date, four out of 11 trials have resulted in significant yield increases from single application of foliar fungicide compared to peas with no application. Two out of six trials have had a significant yield increase from a double application of fungicide compared to a single application. Of the two trials that compared all three treatments, one had significant yield differences between treatments. At this trial, both the single and double fungicide applications significantly increased pea yield compared to untreated peas. However, double and single fungicide treatments yielded similarly to one another. ■

Figure 2. Yield difference (indicated by the values above the paired bars) between three types of foliar fungicide On-Farm Network trials from 2017–2019.



Numbers above bars indicate yield differences between treatments in peas. *Statistically significant yield difference at $p < 0.05$.



DRY BEAN FOLIAR DISEASES

Common Bacterial Blight

Forty dry bean fields were surveyed in 2019 (Table 3). Most fields surveyed were located in southern

Manitoba, with 10% of fields located outside

of the traditional bean growing regions. Foliar and stem diseases were assessed

when dry beans started to mature during mid-August, except for halo blight, which was assessed during flowering in mid- to late July.

Foliar diseases were identified visually by their symptoms. Common bacterial blight (CBB) severity was assessed on a scale of 0 (no disease) to 5 (50 to 100% of leaf area covered in lesions), while anthracnose, rust, white mould and halo blight severity were assessed as percentages of infected plant tissue.

CBB was the most widespread foliar disease throughout the province. CBB symptoms were observed in every field surveyed. The incidence of CBB leaf infection, or the average percentage of plants showing infection within infected fields, ranged from 5 to 37% with an average of 16%. Severity ranged from 0.3 to 3.3, with an average of 1.8.

Halo blight was observed in five of the 40 dry bean fields surveyed (13%)

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Table 3. Prevalence and severity of foliar diseases in 40 dry bean fields in Manitoba in 2019. Halo blight was rated during mid to late July and all other diseases were rated in August.

Disease	# Crops affected (%)	Disease severity		Incidence of leaf infection	
		Mean ¹	Range	Mean	Range
		— 0 to 5 Scale ² —			
Common bacterial blight	40 (100%)	1.8	0.3 - 3.3	16.1%	5.0 - 36.7%
		— % infected plant tissue —			
Halo blight	5 (13%)	5.2%	1 - 10%		
Anthraxnose	0	0%	0%		
Rust	0	0%	0%		
White mould	1 (3%)	0.7%	0.7%		

¹ Means are based on an average of fields where the diseases were observed.

² CBB severity was rated on a scale of 0 (no disease) to 5 (50–100% of leaf area diseased) and on the incidence of leaves with symptoms.

with an average of 5% leaf area infected. White mould symptoms were detected in only one field in 2019, with less than 1% of tissue infected. Rust and anthracnose were not detected in any of the fields surveyed.

Bacterial blights (CBB and halo blight) first appear as small water-soaked spots on the underside of leaves. Lesions eventually coalesce and become necrotic, surrounded by a yellow halo. Infection occurs through leaf damage caused by hail, high winds or mechanical cultivation through the field. These diseases can spread rapidly from plant to plant favouring humid conditions. Halo blight is favoured by cool temperatures and CBB by warm temperatures.

The best way to manage CBB and halo blight is to plant disease-free seed, avoid working in fields when foliage is wet, keep equipment clean and incorporate residue. As these diseases are bacterial, foliar fungicide will not be effective for control.

ON-FARM EVALUATION OF FUNGICIDE IN DRY BEANS

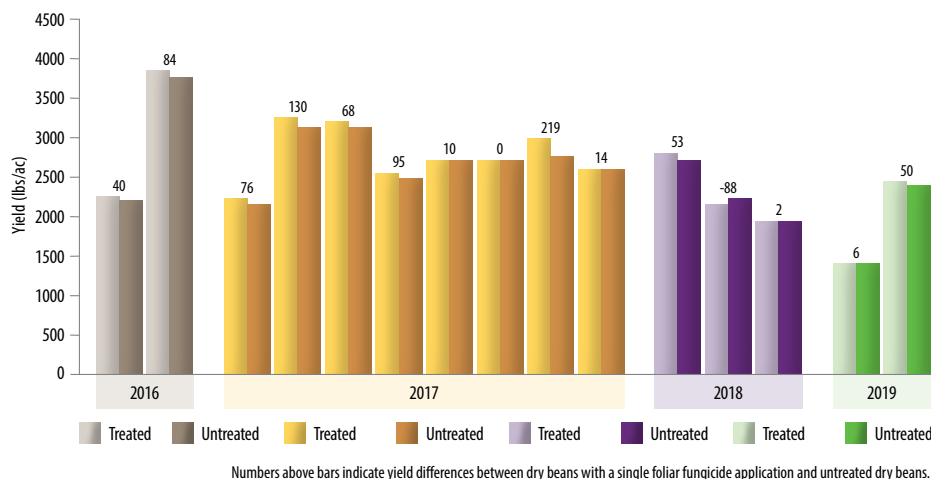
Since 2016, 15 trials have been conducted by MPSG’s OFN investigating foliar fungicide application in navy and pinto

beans to control white mould. A single application of foliar fungicide was applied at R2 (early pin bean) and compared to an untreated control.

To date, there have not been any significant dry bean yield responses to a single foliar fungicide application. The impact of fungicide on yield depends on the extent of fungal disease pressure in the field. Across all 15 trials, disease pressure was generally low. Under different environmental conditions that facilitate higher disease pressure, fungicide could have a significant impact on yield. The OFN will continue these trials to measure the effects of fungicide in dry beans across different environmental conditions and levels of disease pressure.

For more information on each of the OFN dry bean fungicide trial results, visit manitobapulse.ca/on-farm-network. ■

Figure 3. Yield difference (indicated by the value above the paired bars) between dry beans with a single foliar fungicide application and untreated dry beans for each trial from 2016–2019.




Numbers above bars indicate yield differences between dry beans with a single foliar fungicide application and untreated dry beans.

Do you know about the Scouting Network?

The Scouting Network is a representative sample of pulse and soybean fields across Manitoba observed by MPSG agronomists. Fields included in the Scouting Network may also be selected for annual pulse and soybean disease surveys. Information acquired through the Scouting Network enables MPSG to provide farmers with independent, up-to-date information for communications, such as *The Bean Report* and *The Pea Report*.

Sign up your pulse or soybean field today at www.manitobapulse.ca



Recipe Corner

Three Easy Steps to Cooking Beans

1 Soak your beans

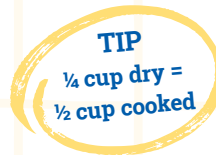
Traditional soak Pour enough cool water over beans to cover completely. Soak for 8 hours or overnight. Drain soaking water and rinse beans with cool water.

Quick soak Place 1 cup of beans in a large pot with 3 cups of water. Bring to a boil for 3 minutes then remove from heat and let stand for 1 hour. Drain soaking water and rinse beans in cool water.

2 Combine 1 cup beans with 2 cups water and bring to a boil.

For every cup of beans, use 2 cups of water.

3 Simmer on low for 45 minutes to 2 hours.



For more tips, visit Pulses.org



White Bean, Sausage and Kale Pizza

Serves: 4 Time: 25 minutes

Ingredients

- 2 cups (about 1.5 cans) cooked white (cannellini) beans, rinsed and drained
- 1/2 pound pork or chicken sausage
- 1 package store-bought, raw pizza dough
- 1/2 cup ricotta cheese
- 1/2 cup mozzarella cheese, shredded
- 1 cup lacinato kale, chopped

Instructions

1. Pre-heat the oven to 450 degrees and line a large sheet pan with parchment paper. Set aside. Place the sausage in a skillet over high heat and cook until brown, about 7 minutes. Remove from heat and set onto a paper towel-lined plate.
2. Divide the dough into 4 pieces and roll each piece into a roughly 6-inch circle. Place on the prepared sheet pan.
3. Top each with mozzarella, dollops of ricotta, white beans, sausage and kale. Bake until edges are golden brown and crispy, about 15 minutes.



Citrus and White Bean Salad

Serves: 4 Time: 15 minutes

Ingredients

- 2 cups (about 1.5 cans) cooked white (cannellini) beans, rinsed and drained
- 2 oranges
- 1/4 cup olive oil
- 2 tablespoons white wine vinegar
- 2 cups baby arugula
- 2 avocados, peeled and thinly sliced
- 1 red onion, thinly sliced

Instructions

1. Make a simple dressing by combining the juice and zest from one orange with the olive oil, white wine vinegar and a pinch of salt in a jar with a tightly fitted lid. Close and shake until combined.
2. Peel and slice the remaining orange. Divide the arugula between four bowls, then top each with beans, orange slices, avocado and onion. Drizzle with dressing before serving.



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