



TheWheatField

THE NEWSLETTER OF THE SASKATCHEWAN WHEAT DEVELOPMENT COMMISSION

APRIL 2021 EDITION

Sask Wheat announces largest annual research commitment at 2021 AGM

The Saskatchewan Wheat Development Commission (Sask Wheat) continued its commitment to producer-funded research in the 2019-2020 crop year, committing over \$23 million to 27 projects. The funding was announced at the 2021 Annual General Meeting on January 12.

This record investment in research included a commitment of \$11.9 million to the new \$22.6 million core breeding agreement with Agriculture and Agri-Food Canada and over \$5 million for the \$9.6 million core breeding agreement with the University of Saskatchewan's Crop Development Centre. The core breeding agreements are administered through the Canadian Wheat Research Coalition (CWRC), a collaboration of Sask Wheat, the Alberta Wheat Commission, and the Manitoba Crop Alliance.

The CWRC also administers the Canadian National Wheat Cluster, a five-year \$25 million program which consists of a group of industry-led research projects aimed at ensuring profitability for producers and the long-term stability of wheat in crop rotations. Sask Wheat has committed \$3.1 million to 14 Wheat Cluster activities.

Sask Wheat's 2019-2020 research funding included a \$3.6 million commitment to 23 research projects funded under the Saskatchewan Agriculture Development Fund (ADF). The annual ADF intake process allows Sask Wheat to identify and fund wheat



research projects solely or in partnership with other Prairie crop commissions and/or the ADF.

The approved projects for 2019-2020 include fusarium head blight and ergot resistance studies, research into next generation fungicides, fungi and deoxynivalenol (DON) diagnostic tools, integrated pest management strategies for kochia, identification of genome structural variants for trait improvement, and grain protein and yield studies in durum and Canada Western Red Spring wheat varieties.

Sask Wheat has committed over \$12.9 million to projects through the ADF process since 2014. This research falls into the areas of variety development, production, and post-production.

So far for the 2020-2021 crop year, significant new research commitments in excess of \$8 million are currently being negotiated and finalized.



Chair's Report: Make your voice heard during the CGA/CGC review	2
General Manager's Report: Canadian grain sector remains resilient during the pandemic	3
Sask Wheat's SR&ED tax credits now available ..	3
Foliar applied phosphorus: a "top-up" for hungry crops	4
Rust resistant wheat: it's a package deal	5
Interpreting seed test results	6
Sask Wheat policy update	7

CHAIR'S REPORT:

Make your voice heard during the CGA/CGC review



It has been a long winter, which felt even longer due to the continued COVID-19 situation. If you are like me, you are eager to get back into the field and get seeding underway.

Most producers have purchased their seed by now, but it's worth remembering a couple things if you have yet to buy. For those who are buying certified seed, make sure to compare varieties with similar traits and consider the cost/benefit of various varieties by consulting information from sources such as the Saskatchewan Seed Guide.

For those who are planting saved seed, consider testing for germination and vigour, especially for seed that is several seasons past certified. Even if the seed test indicates good germination, you may still want to consider the use of seed treatment to minimize possible disease issues. Keep in mind that a seed treatment will not rescue seed that has decreased germination and vigour due to ageing or damage from poor storage.

While you are preparing for seeding, Sask Wheat is working on several issues on your behalf, including two which came from resolutions at the Annual General Meeting (AGM) in January.

The first resolution called on Sask Wheat and other crop commissions to advocate for establishing an export sales reporting program. The resolution notes that Canada does not have an export sales data program, leading to gaps in information for grain producers.

Sask Wheat has taken initial steps on this issue, contracting Mercantile Consulting Venture Inc. to analyze and report on data gaps most important to farmers, identify who should collect and report the information, and develop recommendations for an implementation strategy. Following this report's delivery, we will work with other Saskatchewan crop commissions towards establishing the reporting program.

The second resolution we received asks that crop commissions lobby to have Saskatchewan farmers recognized and rewarded for sequestering carbon dioxide in agricultural soils. Sask Wheat will continue to support the Saskatchewan Soil Conservation Association's efforts to recognize the contribution of practices such as zero-till.

More information on these and other activities are available in the policy report on page seven.

We were very happy with the attendance and participation of the AGM. Holding the AGMs online was a new experience for all of the crop commissions, but thanks to Prairieland Park, SPARK Creations, and our staff, the AGMs went very well. While we hope to have an in-person AGM again in the future, we will continue to hold the meeting online, as well, as it allows us to reach more producers who cannot make the trip to Saskatoon.

A consultation that is currently underway is the review of the *Canada Grain Act* (CGA) and the Canadian Grain Commission (CGC). This consultation is seeking the opinions of grain producers on how the CGA and CGC can be improved to meet the evolving needs of the grain sector.

I encourage all producers to participate in the review and give their perspectives to Agriculture and Agri-Food Canada. Before this, please read the report Sask Wheat commissioned that outlines the possible changes to CGA and CGC and their potential impact on wheat producers. Links to the report and the review are available on our website: saskwheat.ca.

I hope there is good weather for everyone as you head into seeding. If you have any questions or concerns for Sask Wheat to address, please don't hesitate to contact us at info@saskwheat.ca or 306-653-7932. You may also contact one of our directors. Their contact information is on our website: saskwheat.ca.

Brett Halstead, Chair



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GENERAL MANAGER'S REPORT:

Canadian grain sector remains resilient during the pandemic



With spring just around the corner, there is not only optimism for the new growing season but also hope that COVID-19 vaccinations will continue to ramp up and restrictions will be able to ease. While COVID-19 has certainly impacted many sectors in our economy, the grains sector has shown great resiliency throughout the pandemic.

This resiliency positions agriculture as an important driver of our economic recovery following the pandemic. Data from the Saskatchewan Trade and Export Partnership (STEP) shows that Saskatchewan agri-food exports reached a record \$16.97 billion in 2020, growing 31.4 percent from 2019. Saskatchewan's agri-food exports represented more than 55% of the province's total exports in 2020.

The value of Saskatchewan wheat (excluding durum) exports were up 14.7 percent from 2019, valued at over \$2.7 billion. The value of durum wheat exports were up 31.5 percent over 2019, worth over \$1.7 billion. The combined value of wheat and durum exports of over \$4.4 billion makes wheat the province's third most valuable export overall in 2020, only behind potash and oil.

Canadian exports of wheat and durum continue to show strength through this crop year, with wheat (excluding durum) exports up 29 percent over last year reaching 11 million metric tonnes (MMT) as of week 29 (February 21, 2021). For durum, 3.3 MMT have been exported as of week 29, which is 23 percent ahead of last year's pace. While there may still be some adjustments to the final 2020 production levels, it appears that another record has been set. Statistics Canada is estimating Western Canadian field crop production in 2020 to be 77.7 MMT, which is 3.5 percent higher than 2019 and surpassing the previous record of 77 MMT set in 2013.

The steady growth we have seen in production has required the railways to continue to move record volumes of grain. However, even with record movement, erratic grain car order fulfillment numbers at prairie delivery points, as provided by the Ag Transport Coalition, and vessel line ups at the west coast show there is still work to be done to improve the efficiency and resiliency of our grain handling and transportation system. The extreme cold weather that plagued most of Western Canada through February severely hampered rail shipments leading to a shortage of stocks in West Coast terminals and a growing backlog of waiting vessels. In order to move record volumes, everything in the system has to work to maximum efficiency.

Sask Wheat continues to invest in important research to ensure farmers have the tools to continue to increase their production, profitability and sustainability. Sask Wheat has recently announced commitments of \$3.6 million to 23 projects funded under the Saskatchewan Agriculture Development Fund (ADF) and \$1.8 million to 16 projects funded under the Alberta

Agriculture Funding Consortium (AFC). These commitments set a record for Sask Wheat for the largest annual commitments to both ADF and AFC. I would also like to remind producers that you are eligible for tax credits through the Scientific Research and Experimental Development (SR&ED) program for your levy contributions towards research funding. More information is available on our website: saskwheat.ca.

Sask Wheat also continues to participate in important consultations to ensure the interests of Saskatchewan wheat producers are represented. 2021 has been a busy year so far, with consultations on the *Canada Grain Act*, Responsible Grain (Code of Practice), Transport Canada's Rail Data Metrics, and modernization of the *Seeds Act* and *Seeds Regulations*. Sask Wheat also continues to work with Cereals Canada and the Canada Grains Council on important trade consultations and upcoming consultations on the regulation of Plant Breeding Innovations. Continue to watch our website, e-news, and Twitter for updates on consultations and how you can get involved.

Harvey Brooks, General Manager

Sask Wheat's SR&ED tax credits now available

The Scientific Research and Experimental Development (SR&ED) Program is a federal government program that encourages research and development by providing tax-based incentives.

By using levy contributions to finance research and development work that benefits Saskatchewan wheat producers, Sask Wheat is able to participate in this program and distribute these tax-based incentives to producers.

The program gives registered wheat producers access to investment tax credits (by means of cash refunds and/or reduction to taxes payable) for their levy contributions that are spent on qualifying research.

For the crop year ending July 31, 2020, producers may claim **38.33 percent** of their levy contributions as a qualifying SR&ED expenditure on their federal tax return.

In addition, farm corporations may also claim **23.95 percent** of their levy contributions as a qualifying expenditure towards the Saskatchewan Research and Development Tax Credit program.

Producers that have requested a refund of their levy are not eligible for either tax credit.

For more information and links to taxation forms, please go to the Sask Wheat website: saskwheat.ca.

Foliar applied phosphorous: a “top-up” for hungry crops

By Janna Moats

Using soil-applied phosphorous fertilizers is a balancing act for Saskatchewan growers. Apply too much and there is a risk of causing damage to the seeds. Apply too little and yields could suffer.

But what if phosphorous wasn't applied to the soil at all? Could foliar application methods help growers overcome issues of soil-bound nutrients?

Dr. Jeff Schoenau, a professor of soil fertility at the University of Saskatchewan, and graduate student Stephen Froese evaluated the possibility of using foliar applied phosphorous fertilizers on Saskatchewan grown crops.

Based on their findings, Dr. Schoenau said, “mid-season foliar application of phosphorous would be most suitable for a top-up, rather than as a substitution for seed-row applied fertilizers.”

Phosphorous is an essential nutrient that is required for all stages of plant development. Unfortunately, it is characteristically low in western Canadian soils, making fertilizer application an important aspect of crop management.

The mineral is highly reactive within prairie soils. “There's a lot of opportunity for the phosphorous to get tied-up and become immobile in Saskatchewan soils,” said Froese. “There's a lot of calcium carbonates that bind to it and make it unavailable for the plants to take-up.”

Studies from other areas of the world have seen benefits to using foliar applied phosphorous fertilizers, but the method hasn't been tested under Saskatchewan's unique growing conditions until now.

With support from Sask Wheat and other funding partners, Dr. Schoenau and Froese designed a scientific gauntlet to test foliar application methods. Through a series of trials, the team measured wheat's response to different combinations of soil-applied monoammonium phosphate (MAP) and foliar-applied monopotassium phosphate fertilizers.

“Everything got the same amount of phosphorous,” explained Froese, which amounted to 20 kg of phosphate per hectare. “We just changed the proportions between foliar or seed-row fertilizer,” he added.

For foliar fertilizers to work, the plant needs to be able to absorb the nutrients through its tissues. According to Froese, “plants

aren't as eager to take up nutrients through the leaves as they are through the roots. They have a lot of defence mechanisms that can prevent uptake of nutrients through the foliage.”

But as it turns out, results from their chamber study showed that wheat *could* absorb the foliar applied phosphorous through the leaves, albeit in small amounts.

“We found there was a limit to how much phosphorous you can get through the leaves,” said Dr. Schoenau.

With a better idea of how the plants respond to foliar applied phosphorous under controlled conditions, Dr. Schoenau and Froese took their research out to the fields.

“We wanted to see how it would work in the real world,” said Froese.

The foliar-applied method did show some benefits in cases where the soils were especially deficient in the phosphorous. But the benefits were only seen when some level of soil-applied MAP was also available to the plant.

According to Dr. Schoenau, these results emphasize the importance of early crop nutrition.

“Having that phosphorous available to the plant in the seed row, when the roots can access it at an early stage, is very important for the nutrition of the plant,” explained Dr. Schoenau. “So, as a top-up is really where foliar phosphorous would seem to have a benefit.”

Overall, they found that crops perform best when phosphorous is available in the seed row during the early stages of development. Full details of their research are available in the *Canadian Journal of Plant Science*.

There are still other areas to study to improve industry's understanding of foliar applied phosphorous.

“Timing is always important for any application of a nutrient,” said Dr. Schoenau. “It would be interesting to look at different application times of foliar phosphorous.”

Dr. Schoenau hopes to continue serving Saskatchewan growers through industry supported research initiatives, like this one.

“It's great that we can get support from producer groups,” said Dr. Schoenau. “Research like this is all part of understanding what the best management practices are for getting the best agronomic and environmental benefits.”



Rust resistant wheat: it's a package deal

By Janna Moats

Dr. Wentao Zhang (Research Officer) and Kerry Boyle (Technical Officer) at the National Research Council of Canada are revolutionizing wheat breeding programs through their genetic research.

Using genetic packaging, they have curated the ideal recipe for durable multi-rust resistance in Canadian wheat.

Generating new crop varieties through conventional breeding systems is an expensive and laborious process. Years are spent observing and selecting desired plant traits (*phenotyping*) and then linking those traits to specific genes (*genotyping*). In the end, hundreds of individual genes can be linked back to a single trait, with little understanding of their relative importance.

According to Dr. Zhang, the current process for developing new crop varieties is like baking a cake without a recipe.

"It's kind of a blind approach," said Dr. Zhang. "You try different combinations of different ingredients until you get something resembling a cake. But if you had a recipe that told you what ingredients to use and how much, you would end up with a much *better* cake."

To advance crop breeding programs, Dr. Zhang and Boyle set out to create the best possible recipe for achieving durable multi-rust resistance in wheat.

The first challenge was to narrow down the list of genetic ingredients.

"There are lots of genes associated with leaf rust, stem rust, and stripe rust," explained Dr. Zhang.

In fact, there are over two hundred!

It would be impossible for crop breeders to include all these genes into a plant. So, Dr. Zhang and Boyle needed to identify the best of the best.

Fortunately, they had some help.

"We had some great collaborations with Agriculture and Agri-Food Canada, as well as the University of Saskatchewan," said Boyle. The team also received support through Sask Wheat and the Saskatchewan Ministry of Agriculture's Agriculture Development Fund.

First, Dr. Zhang and Boyle crossed two known varieties of wheat with different susceptibilities to rust (*Thatcher x Parula*). Then they used genetic mapping to identify which genes are most associated with multi-rust resistance and where they are located within the plant genome. Finally, they came up with their "top-picks" for genetic markers for durable resistance to rust.

When it comes to generating durable multi-rust resistance in wheat, these genes work best as a packaged deal. "It's an additive effect that really makes the difference," said Boyle.

This information is extremely valuable to crop breeders. By testing the primary genetic material, they will know whether their plants will have resistance right from the start.



"Breeders can skip some of the steps in their breeding program if they know that this package of resistance genes is present," explained Boyle. This amounts to saved time and saved costs.

Identifying genetic packages also gives breeders information as to which markers to preserve.

"We want to make sure we don't lose good genes in new cultivars," said Dr. Zhang. "If you don't know what genes to look for, you might lose them."

When it comes to rust diseases, many western Canadian wheat varieties are already resistant to some degree. So why did Dr. Zhang and Boyle make it the focus of their research?

"It's a proactive approach," explained Dr. Zhang.

Climate change is bringing new disease threats to Canada, including new races of rust.

"Previously, we didn't have to worry about how rust evolved or how it was growing in other places, like Mexico," said Boyle. "But now, with climate change, these things are blowing up the corridor and are a risk to Canada."

Dr. Zhang hopes their gene packaging approach will inspire a new era of crop development and will support long-term sustainability of the wheat industry.



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Interpreting seed test results

By Haley Tetreault, Agronomy Extension Specialist

With spring around the corner, seed testing is a great way to prepare for the upcoming season. A seed test can provide valuable information for determining seeding rates and seed quality. Government accredited seed labs must follow a strict protocol for germination, purity of crop kind, and true loose smut tests, but other tests like vigour and fungal tests are not standardized.

Germination is an accredited test. Cereals undergo a brief cold period to break dormancy, and are then tested at 20°C for seven to 14 days. Under these optimal conditions for seed growth, the maximum potential of the seed lot can be seen.

After the test, a seed analyst views seedlings for any abnormalities and dead seeds. Ideally, germination will be above 90 percent. However, seed lots with reduced germination can still provide a good seed source, depending on what factors are affecting germination.

If germination is below 90 percent due to dead kernels, but the rest of the seed is good quality, then increased seeding rates may be a useful management tool. However, if the reduced germination is due to disease, increasing seeding rates could potentially increase the spread of disease inoculum throughout the field. It is important to discuss the cause of reduced germination with a seed analyst.

Another useful number on the seed test results is vigour. Vigour tests impose stressful germination conditions, to more accurately reflect spring field conditions. Vigour is considered the floor of the seed lot, and germination would be the ceiling.

Vigour tests are not standardized, so results may vary between labs. In Saskatchewan, most labs run vigour tests under cool conditions to simulate the stresses many of our crops will face in the spring. Ideally, germination and vigour results will be within 10 percent of each other (e.g.: if germination is 90 percent, vigour should be 80 percent or above).

If the range is greater than 10 percent, a seed analyst can help identify why there is a large spread, and if it can be managed. If vigour is low due to disease, it can sometimes be managed.

However, if the cause is sprouting or frost damage, there may be no successful management options, apart from changing seed lots.

Low vigour is often caused by moisture at harvest, green seed, high moisture during storage, and frost damage. Using frost damaged seed can have a significantly negative effect on vigour. Frost damaged seed may have acceptable germination, however, vigour can be significantly reduced depending on the stage of kernel development. If the kernel is still relatively green, grain fill is halted at the time of the frost event, leaving the kernel depleted in reserves and unable to perform under cool spring seeding conditions. Frost events can also cause significant variability in seed size, which can increase variability in plant stand and emergence.

It is important to note that seed cleaning can change the thousand kernel weight (TKW), germination, and vigour. Therefore, there may be a need to re-test seed after cleaning. TKW changes significantly especially after a year like 2020, where the seed size was highly variable due to an early frost and dry conditions. TKW is crucial in determining seeding rate, so it is important to have an accurate weight.

In wheat, disease testing for major pathogens covers *Fusarium* species (including *Fusarium graminearum*), and *Cochliobolus sativus* (root rot), which affect seed quality. There are no hard rules on acceptable levels of each disease due to each producer having a unique situation, and acceptable level of risk. However, the use of registered seed treatments can significantly help manage major pathogens.

A general guideline for major pathogens is if the result is over 20% infected, it may be time to source new seed, and over 10 percent infected, a seed treatment is highly recommended. Secondary pathogens are also tested. These results will report on possible leaf diseases, and gives an idea of what diseases are present in the soil or crop residue.

Seed treatments are a valuable tool in managing disease, and preserving seed quality. Vigour tests can be run with a seed treatment to determine if there will be a benefit from the use of one.



Beneficial and Pest Insects in Wheat

Webinar

Presented by Dr. Tyler Wist
Agriculture and Agri-Food Canada

Tuesday, April 20 at 11 a.m.

Register now at

saskwheat.ca

Sask Wheat policy update

Canada Grain Act Review

In January 2021, Agriculture and Agri-Food Canada launched a consultation regarding the review of the *Canada Grain Act* (CGA) and the Canadian Grain Commission (CGC). The consultation is open until April 30, 2021.

Maintaining the strength of Canada's quality assurance system and the Canadian brand is an important focus for Sask Wheat during this review. As part of protecting the Canadian brand, Sask Wheat is in favour of mandatory outward inspection remaining as a function performed by the CGC. Sask Wheat also believes that additional improvements to the current system should be pursued during the CGA review that strengthen the functions that support Canada's quality assurance system and the Canadian brand.

Sask Wheat considers it vital that the CGC's mandate as set out in the CGA continues to be to work "in the interests of the grain producers." Furthermore, the governance structure of the CGC needs to ensure that farmers' interests are protected from parties that are meant to be regulated by the CGA.

Sask Wheat is continuing to work on our full submission to the CGA review, so continue to watch for updates on Sask Wheat's involvement in the consultation.

Responsible Grain (Code of Practice)

In late 2019, the Canadian Roundtable for Sustainable Crops (CRSC), released a draft code of practice, "Responsible Grain", for consultation with farmers. Responsible Grain is a proposal for a voluntary code of practice for grain farmers that aims to demonstrate the sustainability of Canadian grain production to our customers. Sask Wheat has not endorsed this initiative. Sask Wheat's Directors participated directly in the Responsible Grain consultations and have also been listening to feedback from farmers. Following this first round of consultations, a second draft of the code will be presented for consultations this fall, after harvest. Sask Wheat will continue to participate in the consultations and encourages farmers to get directly involved as well.

Transport Canada Consultation on Rail Data/Metrics

Through the Crop Logistics Working Group (CLWG), Sask Wheat participated in Transport Canada's consultations to amend the *Transportation Information Regulations* to collect service and performance information from Class 1 rail carriers. This consultation is part of the process to formalize the data and performance measurement metrics collected by Transport Canada under the *Transportation Modernization Act*. For producers, increased transparency in rail performance is one of the few ways to draw wider attention to service issues and understand when and where problems are developing that may influence their ability to deliver grain and the prices they receive for their products. Sask Wheat, and the grain sector more broadly, are supportive of Transport Canada's current initiative to deliver improved visibility into railway performance and believe that it will complement existing independent performance measurement initiatives in place through the Ag Transport Coalition (ATC), of which Sask Wheat is a member, and the Grain Monitor program (GMP).

2021 AGM Resolution Update

Two resolutions were brought forward and passed at Sask Wheat's 2021 AGM. The first resolution called for Sask Wheat to work with other commissions and organizations to advocate for the establishment of an Export Sales Reporting Program. Sask Wheat has previously advocated for additional reporting requirements to better enable producers to make informed decisions when marketing their grain. The CGA review is an opportunity to expand the CGC's responsibilities in terms of collection and dissemination of data to improve market transparency. Sask Wheat will work with other commissions to advocate for the CGC to expand its export sales reporting to assist farmers in making marketing decisions and improve overall transparency.

The second resolution passed called for commissions and associations to lobby to have Saskatchewan farmers recognized and rewarded for carbon sequestered through continuous cropping and reduced or zero-till practices. Sask Wheat, along with other commissions and producer associations, is a member of the Carbon Support Group for the Carbon Advisory Committee of the Saskatchewan Soil Conservation Association (SSCA). Through this process, Sask Wheat has supported the Committee's efforts, with both levels of government, to develop an offset protocol for the sequestration of carbon in agricultural soils. Sask Wheat will continue to work closely with the SSCA and other commissions on this file moving forward.

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