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Hey Agriculture, What They Did to the Canadian Energy Sector... ♦

Brad Wall Warns, “Don’t Let it Happen to You, Brother”

Brad Wall, Senior Advisor at Osler, Hoskin and Harcourt LL and former Saskatchewan Premier, presented at the 2018 POGA conference in Saskatoon. Using Tombstone and Bugs Bunny film clips to illustrate a worrying plot in his cautionary tale, Wall engaged the listener and provided a bit of comic relief to the gravity of the subject.

Wall has been delivering his message in Saskatchewan and across the western provinces since July, 2018: “Fifteen years ago, the energy sector would never believe that what has happened to them in the last few years could ever happen. We already see signs of the same serious threats happening in modern agriculture.”



Brad Wall speaking at the 2018 POGA Conference

Wall points out that the oil and energy sectors are seeing the lowest ever product price per barrel, cannot get pipelines built to open up their customer base, and Canadian oil has been allowed to be effectively branded ‘dirty’. He offers possible explanations for how this happened.

1. Canada is a ‘freedom-loving nation’ that allows Non-Governmental Organizations (NGOs) the autonomy to come to Canada and speak against their chosen targets. Says Wall, “Canadians are culturally ‘nice’ and do not like to offend, but all sides need to feel free to engage to get our points across via counter-arguments and freedom of speech.”

2. NGOs have the financial resources to fund protests, advertising and court costs. Wall shares, “Their tactics include things like convincing the public that all First Nations don’t want projects like the Trans Mountain pipeline, when in reality 43 First Nations groups have signed on to the project.”
3. Wall states, “The industry, and provincial and federal governments were late and flat-footed in defending the industry. They made an ‘error in omission’ in that regard.” He provides examples, such as policies that contributed to the state of the Northern Gateway and Eagle Spirit pipeline projects; methane regulations and the emission reduction agreement with the U.S. (which the current U.S. government walked away from, leaving Canada in an unbalanced position to do business); the carbon tax; and climate change policy. Wall reveals, “We need to focus on technology that we already lead in, such as carbon capture and sequestration, and renewables. If this was the auto or cement industries, these things would not happen. Bill C-48 is before Parliament, which, if passed, will ban oil tankers from the northern B.C. coast and leave Western Canada with no way to move oil to other countries; however, there is no ban for tankers in the Atlantic or St. Lawrence. The West’s feelings of alienation are understandable. And, just when we figured out the environmental approval process, the feds throw that out and introduce Bill C-69 (to enact the Impact Assessment Act) which will make it impossible for Canada to build pipelines.”
4. Wall continues, “Industry is unable to respond to these serious issues, and some governments have actually helped to make things worse. In 2015, the Premier of Alberta, supported by five large oil companies (three of which have now left Canada to do business in other countries), implemented a carbon tax. This sent a message to Canada and industry detractors that, ‘they were right all along and maybe we should pay an indulgence for our “dirty” oil.’ The notion of social license seems to be just that.”

Groups that don’t like oil or agriculture have an impact on national and global opinion. Current trends and the messages that are accepted by the public (almost subliminally), which turn into mindsets, are a big concern to

Wall. One example Wall noted was the Leap Manifesto which, he states, “calls for an end to modern agriculture.” Another trend Wall feels is worth not only mentioning, but encourages agriculture to stay on top of, is GMOs. He states, “Crop scientists named the product of the technology ‘genetically modified organism’ and the public responded negatively. What if it had been called ‘crop science?’”

Agriculture has backed off a bit lately in its defense of GMOs. It’s interesting that when people talk about climate change, they will mention that 90% of scientists agree that climate change is real – and rightly ask, ‘how can anyone deny it?’ However, when the same number of crop scientists say GMOs are needed to produce safe and plentiful food for the world... this is somehow not as credible.” Wall calls for agriculture to challenge representatives of companies who market food products using false claims or encouraging people to believe certain food products are unsafe: “I have seen salt and water labels in U.S. products claiming that they are ‘GMO free’ - of course, since they naturally don’t contain GMOs! Now glyphosate is being challenged as well, even with no major regulatory body in the world considering it a health risk. Where is that leading?”

Wall has some recommendations for the agricultural industry. He believes that the three prairie provincial governments need to support agriculture and be proactive about these issues. He encourages producers to take a campaign-style approach, which requires funding and resources:

- Identify the right people to represent you and your message - people who are dynamic and know how to use social media. Professional ag women seem to dominate social media and convention communications. They are savvy and very effective at working with all levels of business and government; regardless of gender, those who are leading communicators in these issues should be chosen.
- Seek out allies - for instance, agricultural counterparts in the U.S. Don’t disregard the non-traditional groups and people you might not initially think of. Those who follow alternative diets (like vegetarians and vegans) are concerned about food, know about nutrition, and are specifically seeking high protein, plant-based diets. The popularity of oats in vegan and vegetarian diets and the many different ways they are used (including for milk) indicate this group is interested in your product. Work with them, be positive and make points whenever you can.



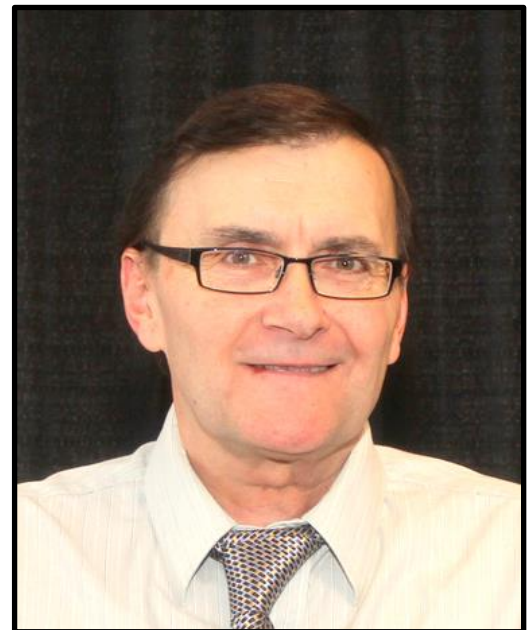
Brad Wall and the POGA Chairmen, from left to right: Brad Boettger, Alan Butuk, Brad Wall, Ray Mazinke, Art Enns

Wall’s final message is optimistic: “When you channel your efforts in this way, it is worth it - for the country, your communities, and your individual lives. Your customers deserve, and should have, all the facts. Your way of life is worth your voice, your protection and your pride.”

In Memory of Elroy Trithardt

Elroy Trithardt, SaskOats and POGA Board member from January 2012 until he passed away on August 14, 2018, was always willing to step forward and sit on various committees, such as Ag in the Classroom and Western Grain Research Foundation (WGRF). He attended one of POGA’s Ottawa missions and also served as the SaskOats audit chair.

POGA sends sincere condolences to the Trithardt family and friends. His dry and witty sense of humor as well as his vast knowledge of the industry will continue to be missed by the board.



Oat Market Outlook[®]

Where Are We and Where Are We Heading?

Chuck Penner has worked in the Canadian Grain Industry for over 30 years and his company, LeftField Commodity Research, offers global market analysis for Canadian grains, oilseeds and special crops. POGA invited him to present at the 2018 POGA conference in Saskatoon.

Penner provided a picture of where global markets are at currently: "We're dealing with trade disputes, which leads to guessing games. The disputes are not just between U.S. and China (these are the big players), but because many disputes are situated in the U.S., it's hard to look beyond U.S. borders right now. The U.S. is calling for changes in the way that China does business, but the disputes are about more than tariffs, and China will not make fundamental changes simply due to threats of increased tariffs. Resolutions may be a long time coming. The Canadian government has not taken a strong stance for, or against, any country's position. Lately, China has



taken retaliatory action against Australia and is launching an anti-dumping investigation for Australian barley. For you here today, the question is, 'what about oats?'"

Chuck Penner at the 2018 POGA AGM in Saskatoon

In the past, the Canadian dollar was linked to and followed the price of crude oil. Penner states, "However, since January, 2017, that correlation is not as strong and the dollar is not following oil prices. The Canadian dollar is more affected by trade negotiations and Tweets from the U.S. President these days."

Penner continues, "There has been a 'hangover' of bearish sentiment for cereal grains, and bear markets take a long time to come around. Up until 2018/19, world wheat production outpaced usage for six years in a row. Global wheat production and ending stocks have now dropped. Wheat futures are taking a long time to carve out of a low from 2016."

Where are things going from here? Penner proposes, "Trade barriers will eventually be resolved, demand will catch up to the large supplies, and there will be less cushion for inevitable crop problems. And this means that

there will be a need for continued large production responses."

Oat futures are experiencing the same trend as wheat; since the beginning of 2015, prices have not risen much above \$3.00/bushel for many in Western Canada, especially in Saskatchewan and Alberta. Says Penner, "Oats suffered the same long price decline, slumped in 2016/17, but is now coming up slowly." World oat production was affected by severe drought in 2018 - especially in Germany, Poland, Finland, Sweden, Denmark and eastern Australia.

In regard to oat acreage numbers, Penner shares, "The good news is that oat acreage numbers have remained steady over the years, holding up against increases in canola and soybean acres. The bad news is that there has been no growth in seeded acres, with only minor fluctuations. There have been no big changes in production and yields have been moving higher, which is a good trend."

This production year's grade spread for oat production is at 85% for No. 2 CW or better - which indicates a good quality for this year. The oat supplies were only slightly lower than 2017/18. Penner states, "In the 1980's, 70% of oats went to feed; that number has decreased to <20%, which indicates a value-added trend for food, milling and exports. This is the biggest success story for Canadian oats, and that is due to the quality of the oats."

Penner questions the potential for oat seed in cover crop use, both in Canada and the U.S., "Statistics Canada numbers don't show anything on this yet, but - could this be an opportunity for oats? I think it's possible." U.S. oat acreage numbers show that the percentage taken to harvest is shrinking (it is currently one third).

As for oat exports, Penner states, "Canada used to export >98% of its oats to the U.S. but that has dropped to 90% in the last three years. For 2018/19, that number will decrease to ~89% and the balance will be moving to other destinations, such as Asia and South and Central America. This is a deliberate strategy to find new markets, in which POGA has played a major role."

The EU typically imports little oats at all, but this year might be different because of the EU crop losses. Penner asks, "Can Canada look for ways to move oats to the EU?"

Oat production in the U.S. rebounded a bit from last year, but it is still lower overall. U.S. oat supplies and import needs indicate a slight increase in imports to offset smaller supplies, but Penner advises: "I would be conservative when forecasting the import outlook to the U.S. for this next year. The U.S. ending stocks, however, continue to shrink annually; they will either need to grow more oats or import more in the future."

China continues to import more oats year over year. Penner says, "Canada has been largely shut out of China

for now and China buys almost exclusively Australian oats. Canada might have opportunities in the future if it can get access to China because of the recent drought in Australia - their stocks will dwindle." [Ed. Note: POGA has been working with the Market Access Secretariat through the Government of Canada on this market access issue since 2015.]

Mexico tends to import oats in big chunks, and imports are increasing. Imports for 2018/19 are already well ahead of last year and in 2017 they bought most of their oats from Australia; in 2016 and 2018 they bought mostly from Canada. Penner shares, "Often oat bids in the western prairies are affected by big orders from Mexico."

Penner's forecast for 2018/19 ending oat stocks is 650-675 thousand tonnes, which is getting into the multi-year lows/declines. Global oat production for 2018/19 is down one million tonnes from last year. The drops throughout the major oat-producing countries were mostly due to drought.

On the Canadian oat bid front, Penner highlights, "Since the last part of 2018, Manitoba prices are taking off and leading the Prairie Provinces. Alberta is back in line with Saskatchewan numbers but that can change again as oats are needed off the west coast."

Overall, Penner advises the following list of points to keep in mind for the 2018/19 oat market:

- There will be strong U.S. demand for oats due to tight supplies.
- We will see growing demand from Mexico and other Australian customers.
- There will be no competition from the EU.
- China's reactions will remain a question; we should know more in 2019/20.
- There will be a gradual tightening of Canadian supplies and firmer bids.
- The question remains: what to do for 2019 oat acres in Canada?
- Watch closely for signs of up-coming drought; there is no immediate need to worry, but do keep monitoring for drought.

Penner makes the following predictions:

- There will be a minor (7.5% average) increase to Canadian oat acres from 2018/19 to 2019/20.
- Cereal crop prices will look favourable overall (oat prices will not stand out).
- There will be a small increase from last year's oat production, but not huge overall, and consumption of supplies will be manageable.
- Overall 2019/20 ending stocks should be okay for the price. If China bumps its oat imports, it will be better.
- There will be a rebound in seeded area among other exporters (this is an important point to keep in mind).

**Note: For detailed data and information, visit poga.ca 'AGM & Conference' for a link to a pdf of the Powerpoint presentation, 'Oat Market Outlook. What's Ahead for 2018/2019 and Beyond?'*

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Producer Consent Form

POGA has received requests from international oat buyers to source oats directly from producers. If you are an oat producer in Alberta, Manitoba or Saskatchewan and are interested in being contacted by these companies for potential direct oat sales, head over to the main page at poga.ca, click on and fill out the Producer Consent Form. Your contact info will be included in a list provided to companies inquiring about direct-from-producer sales.

Trade Wars, Plant Protein and the New “NAFTAs” ♦

There’s a Lot Happening in Canadian Trade Relationships. How Will They Affect You?

Carlo Dade, Canada West Foundation

Carlo Dade, Director of the Trade and Investment Centre, Canada West Foundation (CWF), presented at the 2018 POGA conference in Saskatoon. Dade provides a brief history of CWF: “Forty years ago, leading individuals of vision realized the need to defend and advance the unique interests of the Canadian West in confederation. The West needed representation to provide informed analysis, data and research to speak beyond the issues of any single province or industry, and to cooperate with interests of eastern Canada. Forty years later, CWF still gets ahead of issues of concern and anticipates, analyzes, and takes action on issues affecting the western provinces.”

Dade is well equipped to deliver insight on current trade developments and he begins with a positive message: “We need to recalibrate our thinking about trade. There have always been and will always be difficulties and risk (and I don’t need to tell farmers about those), but now is a time of unprecedented opportunity and optimism.” Dade’s presentation focused on trade architecture (i.e., agreements) and plant protein, specifically as they relate to the North American Free Trade Agreement (NAFTA)/United States-Canada-Mexico Agreement (USMCA) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

Global Trade and Free Trade Agreements (FTAs) are continually morphing and fluctuating. Many factors affect the nature of trade. The speed of ever-changing technology and world events are current major influences. However, change in itself is not bad; for instance, the Canadian government’s Supercluster Initiative is new and may prove beneficial to Canada’s trade position in the world.

Trade negotiations (and re-negotiations) also cause uncertainty. However, Dade advises that to focus on the importance of any single trade agreement, such as NAFTA/USMCA, is not in the best interests of all Canadian businesses. Dade states, “We’ve actually had two renegotiations of the NAFTA. The first was the original Trans Pacific Partnership Agreement. With Mexico, Canada and the U.S. as part of the TPP, it would have replaced the NAFTA as the agreement that governs trade in North America. It was an improvement of NAFTA done by a U.S. administration who wanted more open trade. The Trump administration rejected that and what we have now is a step back. The Trump revision was not about expanding or growing trade; for Canada, it was about making concessions to hold on to most of what we already had in the old NAFTA.”

So, what if NAFTA had failed? Dade continues, “The U.S. disclosed that it considered pulling out of NAFTA. If this were to occur, there would be losses to Canadian-U.S. trade and we would have no choice but to revert to the World Trade Organization (WTO) agreement. However, there would also be potential gains as Canada-Mexico stay in NAFTA and Canada would keep low NAFTA tariffs in Mexico while the U.S. suddenly would face higher WTO tariffs in Mexico. The bottom line to the renegotiated NAFTA/USMCA agreement is that a) trade negotiations with the U.S. will be on-going and new challenges will be faced (and this is a long-term forecast); and, b) regardless of any problems with NAFTA/USMCA, Canada does benefit from its current existence.”

Beyond Canada’s trade relationship with the U.S. and Mexico, Canada has FTAs that are, in essence, new NAFTAs, or NAFTA-type agreements: in force (e.g., with 23 countries in the EU and with the Pacific Rim); in negotiations; and in exploratory discussions with other countries. Under the CPTPP, Canada enjoys some grain-sales tariff advantages over the U.S. and, especially because the U.S. withdrew from the CPTPP, Canada is also gaining on-going and accumulating advantages in trade with Japan.

Insofar as how the new NAFTA/USMCA will specifically affect agricultural interests, Dade does not see any major impacts. The grain-grading issue has, however, not been resolved. U.S. grain interests are unhappy with Canada’s continued use of varietal registrations (specifically in wheat) and this issue will resurface at some point in the future. For right now, U.S. agriculture has bigger issues it is focusing on, but that will not always be the case. Dairy, of course, was affected but U.S. dairy interests estimate only US\$280 million in new sales to Canada because of the agreement (this represents an approximate 5% increase in U.S. dairy imports into Canada). However, a main point of concern to all farmers is that intellectual property rights will affect equipment used by many industries, including farm equipment with computerized components. Digital locks on software will bring about problems for farmers when equipment breaks down. Farmers will have to have repairs done by official technicians or dealerships who hold the rights to unlock the software and will lose the option to do repairs locally or by themselves. U.S. farmers have been granted a 3-year digital-lock exemption for farm equipment repairs, but this exemption was not granted to Canadian farmers. Dade cautions, “We are not keeping up to protect the Canadian farming industry. I urge farmers to contact their elected representatives with their concerns regarding this

issue.” For more information, go to cwf.ca for Dade’s op-ed, ‘USMCA IP provisions make for uneven playing field for Canadian-U.S. Farmers.’



Carlo Dade and Shawna Mathieson, POGA Executive Director, at the 2018 POGA AGM in Saskatoon.

A new agricultural opportunity is the increasing global, middle-class demand for plant-based proteins and ingredients. Dade says, “There is global demand for quantity and quality of all protein. Canada is currently signing agreements for all of these demands but also must take strategic advantage of the CPTPP and be ready to shift as market demand shifts. The opportunity here is that Canada can provide whatever protein type the market demands: meat, animal and fish feed, and plant-based protein like oats and other ingredients. It also makes sense to process all products close to the source.”

Visit poga.ca, ‘AGM & Conference’ for a pdf of Dade’s presentation, ‘Disruptive Change & Trade Agreements’ for additional data and information.

Leaf Blotch on Oats[®]

Research Project Wrap-Up

Researchers at the University of Saskatchewan’s Crop Development Centre (CDC) have completed the project entitled, *Breeding for Resistance to Leaf Blotch Pathogens in Saskatchewan Oat*. POGA last reported on this project in the November, 2017 Oat Scoop, and that article is recommended reading to refresh your understanding of some of the terms and techniques involved (available at www.poga.ca).

The CDC’s research team for this project (Aaron Beattie, Randy Kutcher and Tajinder Grewal) developed tests and gathered data that will advance the industry’s understanding of this pathogen, assist oat breeders to develop leaf-blotch-resistant strains and help producers grow healthy crops.

Over the four-year project, producer field surveys revealed that the most common pathogen associated with oat leaf blotch was *P. avenae*, with *C. sativus* being

the next commonly associated pathogen and *S. avenae* being rarely found. These findings differed somewhat from prior surveys in which *P. avenae* was also most prevalent, but *S. avenae* was the next most relevant pathogen. In the Summary Report, the researchers state, “While it is hard to draw firm conclusions as to why this difference was observed, the higher average summer temperatures (May-August) from 2015-2017 may suggest temperature, as opposed to precipitation amount (which varied across all years from below to above average), may favour the growth of *C. sativus* over *S. avenae*. The observation that *P. avenae* is consistently the most prevalent oat leaf spot pathogen regardless of growing conditions indicates it may be less impacted by these environmental factors.” Importantly, the confirmation that *P. avenae* is critical to the development of leaf blotch provides a clear target for breeders to focus on.

In addition to this finding, several other critical results were obtained from the project. In a nutshell, conclusions included:

- disease-causing variants of the two predominant pathogens exist,
- resistant oat germplasm that can serve as parents in leaf-blotch-resistance breeding programs were identified,
- a major gene associated with resistance to several *P. avenae* variants was identified and is the focus of new marker development; this marker will aid in the incorporation of leaf blotch resistance in future oat varieties, and
- four additional resistant genes were identified; future work will be required to map the genes to determine their utility for resistance breeding.

“We are very pleased with the outcomes of this study. Not only do we understand which pathogen is most important in the development of oat leaf blotch, but we have a very effective resistance gene, and soon will have associated molecular markers that will help us develop varieties resistant to this pathogen,” says Beattie. For readers interested in delving into the oat lines studied, scientific and technical aspects of the project, and the detailed conclusions and recommendations, go to poga.ca / Research Results / 2018 Research. There you will find the comprehensive Final Report and supplemental tables, as well as a Summary report.

The project is supported by Prairie Oat Growers Association and the Agriculture Development Fund (ADF) of Saskatchewan and is made possible through the federal/provincial cost-shared Growing Forward 2 initiative.

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Promoting POGA®

Meet POGA's Marketing Coordinator

Cyndee Holdnick is POGA's part-time Marketing Coordinator/Administrative Assistant. Cyndee brings to her position a Bachelor of Science in AgBusiness and work experience that includes seed/chemical sales at Agricore, Research Coordinator for the Canadian Association of Agri-Retailers (CAAR), and Agronomist for a local independent seed/chemical dealer. She started working for POGA in January, 2017 on a part-time basis (about 10-15 hours per week).

Holdnick explains her position with POGA: "I am the MOGA representative on the CropConnect Committee and SaskOat's representative on the CropSphere Committee; I bring the oat perspective to the planning table for these conferences. I am also on the Chops and Crops Committee for AOGC; this event is an evening reception in Edmonton, which brings MLAs, government representatives, and the industry together to meet and discuss important issues. This year was the first Crops-A-Palooza event, and I sat on the committee on MOGA's behalf, as well to help in the planning. When time allows, some of my administrative duties include assisting Shawna Mathieson, POGA Executive Director, with tasks such as completing funding applications, letter drafting, and levy forms."

Holdnick was raised on a farm and has always been interested in agriculture. She explains how she started working for POGA: "I took some time 'off work' while my children were young. Now that they are all in school, I wanted to get back into the off-farm ag world in some capacity. The position at POGA fits perfectly with my farm/family life and my interest in primary agricultural production." In fact, the position suits her so well that she has no plans to change anything in her work life - on or off the farm. She states, "I chose to move away from full-time off-farm work to be at home, raise our children and work on the farm. I hope to continue in this position; I enjoy the work, contacts, and the opportunity to help work towards bringing positive changes in an ever-evolving ag landscape."

Cyndee and her husband live on a multi-generation farm. She shares, "My husband, children and I have a few cropped acres, as well as 100 head of cattle. We purchased our homestead from my grandparents and have lived here for 20 years. We have slowly been expanding our cattle operation and plan to continue to do so."

When asked what she likes about agriculture, she reveals herself to be a person who is passionately tied to her family and the land. Holdnick explains, "Since I grew up on a farm, agriculture has always been our way of life. I enjoy the chance to work outside, grow crops, care for nature, and teach our children an important work ethic

and value system. I enjoy the seasons' different qualities as they change. The satisfaction after a hard day's work – from a new healthy calf being born, the last hay bale hauled home, or when the crop is in the bin – surpasses all other feelings of achievement. The ag business world is ever evolving, and it is impossible to keep up with everything. It becomes a balancing act to decide what is best for your own operation and find ways to implement the necessary adaptations. Agriculture has changed in many ways, even over my short career; the move to all things electronic has been a huge change. Information is stored in so many formats now (GPS technology, mapping systems for precision application, etc.) and farming itself is more precise and accurate for every job, from seeding to spraying and harvest."




Husband Shawn and Cyndee, with sons (from left to right): Ceanan, Chase, Cole and Connor

Her family, the farm and her job take up most of her time, but we had to ask: what is your favourite non-work-related pastime? Cyndee replies, "Day-to-day farm life/work doesn't typically end, and because my family is always part of that as well, my work life is also my happy time. But, I do love watching my kids play hockey in the winter, as well as being involved in various committees including our local minor hockey board. In summer I enjoy gardening, camping with my family, and canning with my kids."

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Oats and Dairy Research Project ♦

Oats + Dairy Cows = More Milk and More Profits?

In the November, 2017 Oat Scoop, POGA introduced readers to Dr. Peiqiang Yu's research trial entitled, *Develop New Strategies to Efficiently Utilize Oat Grains in High Production Dairy Cows to Maximum Economic Return and Benefit to Prairie Oat Growers*. The project began in 2017, concludes in 2022, and consists of four sub-projects (phases):

1. Systematically compare the feed milk value (FMV) of different prairie oat grain varieties/types and common barley for dairy cattle in western Canada in order to determine the oat variety or type with highest FMV value for dairy cows.
2. Improve/increase FMV of the feed and/or milling type of oat grain through feed processing applications in comparison with barley for lactating dairy cows. The processing conditions will be determined for prairie oat grain grown in western Canada's cool climate conditions. Different feed processing methods/technologies will be tested and applied at the Canadian Feed Research Centre (CFRC).
3. Develop new feeding strategies of the milling or feed type of oat grain to find maximum or optimal replacement levels of barley grain in high production lactation dairy cows (to maximize benefit and economic return to prairie oat growers and dairy milk producers).
4. Develop new feeding strategies for raw and heated feed and/or milling type of oat grain based on the performance in high production lactation dairy cows to benefit prairie oat growers and dairy milk producers.

Phase One will be completed in 2019. During this phase, Dr. Yu's team is using the following comparison sets:

- a) various varieties of oat grains,
- b) feed vs. milling types of oats, and
- c) oat and barley nutritional profiles.

By comparing the sets above, feed milk value FMV can be determined based on test results such as: chemical characterization and nutrient profiles; protein and carbohydrate sub-fraction assessments; energy values; ruminal fermentation characteristics and rumen primary nutrient degradation kinetics; protein digestion; total nutrient absorption; and intrinsic molecular structural features of both milk and oats.

The five-year project is a bit like a Lego build, in that each subsequent project phase is added on to the findings of the last phase. POGA will provide newsletter updates from each of Dr. Yu's reports along the way so readers can build a step-by-step understanding of this exciting project.

Benefits to oat and dairy producers include:

- opportunities for oat growers and dairy producers to further develop their businesses and market nationally and internationally;
- more efficient feeding systems by providing nutritionists with information to assist in designing efficient, high potential feeding programs;
- and, last but certainly not least, the development of highly-qualified personnel, with acquired expertise that does not currently exist, to serve Canadian oat and dairy sectors in the future.

The final-results report for this project will be received in 2023. The project is co-funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) for Collaborative Research and Development Funding (CRD) and POGA.

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SaskOats Goes to School! Sharing the Goodness of Oats at Preeceville School

Miss Heidi Paterson, a Science teacher at Preeceville School, gives oats a 'gold star' for participation, healthy diet and deliciousness! [Here is her report:](#)

The Saskatchewan provincial government designated October as Agriculture Month in the province. The Breakfast Café at Preeceville School decided to take the opportunity to connect with different Saskatchewan producers in order to showcase SK-grown products and different ways that they could be incorporated into breakfast items. We had a fabulous response from different organizations and decided to do theme weeks.



During the week of October 15th to October 19th we featured oat products. This week was sponsored by SaskOats. In addition to providing money for oat-based items, we also received posters to display so that people could learn about the nutrition and versatility of oats. We began the week by opening a hot oatmeal corner. Due to its popularity, it has become a permanent station in the Breakfast Café. On Tuesday, Ms. Hamilton made granola and breakfast bars utilizing the oats that we were able to purchase with the SaskOats sponsorship. They hardly lasted the week and Ms. Hamilton has kindly made them on several occasions since. Mrs. Kashuba (our food mentor) had a lot of fun looking for oat products to include in the daily choices available for students. She purchased different cereals and bread containing oats for students to try. For hot breakfast Friday, she made a baked hot oatmeal. Students loved it so much that it has become the third most requested item!

We are very thankful to SaskOats for funding the week's tasty oat additions so that we could try new things and encourage people to include this nutrition powerhouse in their food choices.



Oat recipes prepared during the week included: [No-Bake Chewy Granola Bars](#); [Caramel-Apple Oatmeal](#); and [Red Velvet Baked Oatmeal](#). (To access the links, go to poga.ca, open the newsletter, and click on these recipe titles.)

Diversifying Markets: Update on Mexico[®] POGA and Emerging Ag Work to Increase Exports and Promote the Goodness of Canadian Oats

Robynne Anderson, President of Emerging Ag, presented updates on the on-going Mexico project and November mission at the 2018 POGA conference in Saskatoon. The Mexico project focuses on increasing Canadian oat exports to Mexico; increasing consumer awareness of the health benefits of oats; and developing partnerships with the Mexican health advocates and processors.

In the past, Mexico has been the primary oat customer of the United States, Canada, Australia and sometimes Chile. Anderson states, "Based on the current market statistics, this has been a very successful POGA project on behalf of oat producers. According to the numbers to date, Canada almost tripled its 2018 imports to Mexico compared to 2017. Canada currently holds more than 95% of the Mexico oat market share. We must note, however, that part of this increase was driven by low production in Australia in 2018. However, Canada has had the largest amount of exported oats to Mexico in three of the four years since this project began and 2017 still beat 2012-2014 even with a large Australian crop. POGA continues its promotion of oats through the online channels built in the past years: avenacanada.com and the Facebook fan page Avena Canadiense. The November trade mission to Mexico focused on World Diabetes Day activities and new materials were developed to be used during this mission."

Two new materials were produced this year. A 24-page recipe booklet in Spanish to be used as handouts during events promoting World Diabetes Day (which includes the 9 winning contest recipes and Avena Canada promotions); which were all quickly picked up. POGA also developed a Glyphosate Factsheet regarding the presence of glyphosate residues in oats (in Spanish and English). Anderson mentions, "Copies [of the factsheet] were kept available if any question were to arise during the November mission. However, no questions were asked by either journalists or participants."



Winners of POGA's recipe contest in Mexico receive their awards at the Canadian embassy.

Diabetes education and mitigation is a real concern in Mexico; many people suffer from the condition, yet half of them remain undiagnosed. The following is a list of 2018 events and projects POGA conducted in Mexico:

- Cooking workshops were held on November 8, 2018 with renowned chefs from the Superior College of Gastronomy, working with 35 diabetes patients and 35 health professionals. A diverse menu of oat dishes was prepared using recipes from POGA's new recipe booklet, and five Mexican Diabetes Federation (MDF) nutritionists spoke on the value of oats for people living with diabetes. A social media booklet was given to workshop participants and an article about the event is to be published in 'Diabetes Hoy' magazine. Anderson explains, "The principle is a train-the-trainer approach and POGA is working with MDF to engage people from different regions."



Cooking workshop at Superior College of Gastronomy (Colegio Superior de Gastronomía), Mexico City. Chef Omar Sánchez Guzmán, banquet chef at the School, uses the POGA recipe booklet, *Cocinar con Avena*, to demonstrate how creatively oats can be used in simple or sophisticated cooking.

- A Media Event, 'Oats, the healthy choice for Mexican cuisine' was hosted on November 9 at the Superior College of Gastronomy. Fourteen journalists and five of the nine recipe contest winners were in attendance. Representatives from the Canadian Embassy and the Mexican Diabetes Federation (MDF) spoke.
- Avena Canada hosted a booth at the Annual MDF Diabetes Fair on November 11. All recipe booklets and flyers at the booth were gone at day's end.
- World Diabetes Day in Mexico City was held on November 14, to highlight the health benefits and affordability of including oats in the diet. In addition to educational material and visuals, recipes and photo albums were posted to Facebook, which generated very good online participation results.

The Mexico project team has forged a good relationship with Grupo Vida and Almacenes Vaca, the largest oat importers and millers in Mexico, and engages them in

many activities and events. An important focus of the project is to get people involved in online discussion and education about the health benefits and the versatility of cooking with oats.

The social media campaign continues, and Anderson says, “The online community has become extremely active and responsive, and participants have become expert spokespeople. There is a great cross section of recipes available. We partnered with two food bloggers to create and post oat recipes in February, 2018 and have established new collaborations with two other bloggers in September. One of these bloggers has already produced one recipe a month for three months, the other will do the same for three months starting in December, 2018.” The online activity is not limited to blogs, but will travel across other social media platforms (e.g., Instagram, Facebook, and Twitter) and will also be promoted on one blogger’s radio program.

The 4th Annual Oat Recipe Contest received 82 submissions and nine winners were selected. An awards ceremony was held at the Canadian Embassy in Mexico City during Canada Day celebrations on Friday, June 29. These recipes are being shared via the Facebook fan page, and some were adapted and used in the November cooking workshops as well as featured in the oat recipe booklet. To ensure that at least two new recipes per month could be shared, the Emerging Ag team developed 10 new healthy oat recipes.

POGA funds this project in part with support from the AgriMarketing Program – National Industry Association Component under the Canadian Agricultural Partnership.

**Note: For detailed results, data and information, visit poga.ca ‘AGM & Conference’, for a link to a pdf of the presentation, ‘Diversifying Markets. Updates on China and Mexico.’*

Diversifying Markets: Update on China ♦ **POGA Continues to Work to Create Demand and Increase Oat Exports to China**

POGA Board members Ray Mazinke and Jenneth Johanson, and Robynne Anderson, President of Emerging Ag, presented updates on the on-going China project and November mission at 2018 POGA conference in Saskatoon. The project focuses on finding solutions to the lack of a phytosanitary protocol for shipping raw Canadian oats to China. The team traveled to Shanghai, Shenzhen and Beijing along with the delegation of Agriculture and Agri-Food Canada (AAFC) Ministerial Trade Mission to China on November 12 to 18, 2018.

In her report, Anderson spoke to the market statistics: “China is the second largest importer of oats globally. Australia largely dominates the market (holding ~97% market share) due to geographical proximity and the

existence of a free trade agreement. Canadian oat exports for human and feed use to China are blocked due to the absence of specific phytosanitary protocols and Canadian oat products have only partial market access – for oat seeds and processed oats. In spite of this, Canadian oats are gaining market shares over the last five years and 2017 Canadian oat exports to China saw a 345% increase compared to 2016. This makes Canada the second largest oat exporter into China after Australia.” However, Canada still has a long way to go with ~3% market share now.

Ray Mazinke presented the team’s itinerary. The mission team began their activities by attending the ‘Shanghai: Food and Hotel China Expo’ on November 12-13. Mazinke noted, “There were quite a few Canadian companies selling goods at the Expo and buyers were interested. This increasing interest sets the tone for our future work.”

On November 14, Mazinke and Johanson split up for meetings with the Beijing Chamber of Commerce of Foodstuffs and Native Produce (CFNA), Chunbo Food Safety Laboratory and e-commerce grocery facilities. The team met with oat suppliers on November 15. Mazinke explains, “We met with a range of companies of various sizes. These meetings helped us to get a feel for what buyers are wanting. For example, a ‘taco’ type of product is made with a combination of oat and legume flours. Grupo Vida, the largest Mexican oat miller also attended, and we met with them over the mission. This kind of continuing communication with them will serve us well for future work in Mexico.”

The team participated in an E-Commerce seminar at the Canadian embassy and a Business-to-Business Networking event on November 16. Mazinke shares, “Social media is used everywhere; there has been a big shift to the internet for shopping in China, including shopping for food and home delivery.”

The POGA team worked to generate interest for Canadian oat imports from companies based in Beijing, Shenzhen, Shanghai and Dalian. They also continued to develop their relationship with the Trade Commissioner Service, CFIA and AAFC. They were pleased to spend extra time with The Honourable Lawrence MacAulay, Minister of Agriculture and Agri-Food [through to February 2019], and Jean-Emmanuel Poitras, Senior Market Development Officer of AAFC’s Market Development Coordination and Branding. Both sat with them during some of the meetings and discussed progress from the 2017 mission.

Jenneth Johanson shared her impressions of the mission to China: “Canadian oats to China are gaining market share, even though we have limited access. There is increased demand for processed oats and oat seed because of the growth of the middle class. Consumers are technologically savvy, can see what’s out there, and want

healthy food products. The speed of things is incredible – they can order food products from a grocery store and have them delivered within 15 minutes. The Chinese have access to many different online shopping platforms and the purchasing volume is mind-boggling.”

POGA launched a website in Chinese in November, ahead of the mission. In addition, a logo, “Oats China,” was created for the new website (oatscanada.cn). Johanson continues, “Because the Chinese are limited in what they can do on the internet, they focus on their purchasing power and use the speed of the internet to enhance their influence. As a result, processors, retailers and manufacturers have direct access to the consumer. Consumers in China now insist on direct shopping experiences and that results in equal access to products.”

Regarding the plant health issue, the mission team spent quality time with the CFIA Asia team and engaged in a briefing with the head of the CFIA. The team reminded Minister MacAulay of the issues surrounding sales of Canadian oats to China prior to Minister MacAulay’s meeting with Minister Han. There has been no word from the Chinese Government since September, other than some questions submitted to CFIA (which have been answered). Johanson states, “Although Canada has oat sales access to China for seed and processed oats, raw oats are the lion’s share of Chinese demand. The Canadian government has been very responsive and exceeded deadlines for submitting communications material to China and meeting with POGA to gain our perspective. They are also compiling a technical information base to provide research and statistical data and answer questions coming from China. We have done what we can; now we wait for their next response. China has made changes in their government departments, and we have been told to expect a five to nine month wait while they reorganize.”

As for an analysis of the situation as it stands today – for the most part, the Chinese market is being served by contracts. However, by the second quarter of 2019, significant price hikes are expected for Australian oats (up to 50%) due to the poor crop Australia had in 2018. Small Canadian companies are working on exports to China and need to build relationships with Chinese buyers. The phytosanitary project is moving slowly and will probably continue to do so; POGA’s focus will be to continue their outreach efforts to encourage demand for Canadian oats. Johanson concludes, “The Chinese show a preference for raw oats, but in the face of significant Australian raw oat price hikes, some traditional raw oat purchasing companies have expressed interest in Canadian processed oats. Exporting oats to China is expensive right now, with the exchange rate and duty; we also face limitations of processed versus raw demand. With the price hikes coming for 2019 from Australian oats, it is a

good time to ask the Chinese government if it is willing to waive the 20% duty on processed oats, and POGA has suggested this.”

Mazinke clarified the current phytosanitary situation: “We are working through a process that will probably take five to seven years (2019 is “officially” Year Two). When the Canadian government forwarded their answers to the questionnaire, they asked China to name what issue they are looking for. We can speak to any concerns once we know the specifics of those concerns. We have cooperated to compile technical data from researchers, breeders and agronomists, and CFIA can use that information, but only after they have received a detailed response from China. We are as ready as we can be to take further action when that happens.”

POGA funds this project in part with support from the AgriMarketing Program – National Industry Association Component under the Canadian Agricultural Partnership.

**Note: For detailed results, data and information, visit poga.ca ‘AGM & Conference’ for a link to a pdf of the presentation, ‘Diversifying Markets. Updates on China and Mexico.’*



POGA representatives in China on the Ministerial mission together with Mexico’s largest buyer of oats. L to R: Robynne Anderson (POGA), Felipe Gomez (Grupo Vida), Jenneth Johanson (POGA), Ray Mazinke (POGA), Karla Godoy Villanueva (Grupo Vida).

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AOGC Board Tours the Laboratory[®]

University of Alberta - Dr. Lingyun Chen

On January 28, 2018, the Board of Alberta Oat Growers Commission (AOGC) were provided with a tour of the University of Alberta's laboratory used by Dr. Lingyun Chen. For more about Dr. Chen's work, please see the July, 2018 Oat Scoop (Oats - At Home in the Lab). The Board was happy to have the opportunity to learn more about the projects and the facility where they are conducted.



Gordon Pope, Bruce Thomi, Darwin Trenholm (Vice Chairman), Shawna Mathieson, Nick Jonk and Dr. Chen

The group toured several laboratory areas that Dr. Chen uses in her research. Darwin Trenholm (AOGC Vice Chairman) explains, "Each area contains various instruments and devices. They are isolated for specific tasks in order to maintain the integrity of the scientific processes being done."

Especially interesting to the group were the equipment and methods used in the fractionation projects for which POGA provides funding support. Trenholm states, "Dr. Chen explained the key equipment for the oat fraction project, such as the air classifier that can separate oats into flours enriched in protein, starch and dietary fiber, and the high-pressure homogenizer that is used to prepare oat milk and oat emulsions. We were also able to view samples of emulsions for the non-dairy creamer research project. The lab is equipped with analytical equipment to evaluate the nutritive, sensory quality and shelf stability of the oat products."

Another positive note that the board learned was that a company is interested in buying one of the products Dr. Chen has been working on through this funding. While the details are confidential it's very exciting that oat growers are able to help fund projects that may lead to more oats consumed, and, therefore grown and sold by oat producers across Western Canada.

Trenholm wraps up his impressions of the tour: "It is very enlightening to see the depth of research that goes into enhancing our agricultural commodities. Few of us realize all the science that goes into creating the products available to us at the retail level."

Parmesan and Oat-Breaded Asparagus



This crunchy baked treat, courtesy of the oatseveryday.com crew, gives an 'oat-coated spin' on asparagus preparation. It makes a great side dish or finger food. Try serving it with a creamy dip.

Prep Time: 15 minutes | Cook Time: 15 minutes
Servings: 4

Ingredients

- 1 lb asparagus, trimmed (500 g)
- 1 cup rolled oats (250 ml)
- 1/2 cup grated parmesan cheese (125 ml)
- 1 tsp olive oil, plus more for baking sheet (5 ml)
- Salt and freshly ground black pepper
- 1/4 cup oat flour (60 ml)
- 2 eggs, lightly beaten

Instructions

Preheat oven to 425°F (220°C). Lightly brush a large baking sheet with olive oil.

1. Place oats and parmesan cheese into the bowl of a food processor, along with a generous pinch of salt and some freshly ground pepper.
2. Drizzle with 1 tsp olive oil and pulse until mixture resembles coarse bread crumbs. Pour into a shallow dish. Pour eggs into a second dish.
3. Dust asparagus spears with oat flour, gently tapping to remove excess.
4. One at a time, thoroughly coat asparagus spears in beaten egg, then roll in parmesan oat mixture.
5. Place breaded spears on prepared pan, making sure they do not touch.

Bake for 12-15 minutes or until tender-crisp and browned, turning once during baking.

Unique and Specialized: Saskatchewan Oat Vodka and Whisky®

John Cote, Black Fox Farm and Distillery

John Cote and Barb Stephanyshyn-Cote, Black Fox Farm and Distillery, have been farming for a long time, and also studied, taught and participated in agriculture on every continent except Africa. They are now back home on their 80-acre farm close to Saskatoon, where they operate the largest cut-flower farm on the Canadian prairies. They also lease an additional 60 acres of farm land to supplement grain production, and grow soft fruit and triticale, which are processed on-farm and become a unique value-added commodity: Saskatchewan spirits.

Black Fox buys other grains they do not grow themselves, such as oats, to make the spirits: all sourced from Saskatchewan producers because they know they can trust the quality of these products. John warns, "I'll give you some advice about making spirits with triticale and oats. They do not produce a good yield in the distilling process, but the unique flavours they impart make it worth the lower yield and effort."

Customers often ask if they farm organically. John shares, "We research and investigate all types of practices and combine various technologies to achieve the best results with the most positive impact on the ecosystem. We aim for efficiency and sustainability. I believe there are either good farmers or bad farmers - good ones make responsible and effective decisions."

To date, they predominantly produce and sell gin, vodka and liqueur, but lately have created various whiskies which have recently come of age (which means a minimum of three years aging in a cask). John shares, "Whisky is made throughout the world - from any type of grain. I believe we can make the best whisky in the world and this opportunity is available to anyone. The cold nights in Saskatchewan change the way a plant behaves and cause compounds to 'settle into' the plant. These compounds affect the spirits and distinguish them from spirits made elsewhere."

To prove his point, at the 2018 POGA conference in Saskatoon, John provided samples of one of those new whiskies - and considered his audience well, because that whisky was made from oats. John explained, "This particular whisky caused quite a ruckus when it was offered to collectors, and current bids are as high as \$600/litre."

Gauging the audience reaction, it seems that many agreed - this is one fine whisky! John explained, "Most whisky in storage is usually of a poor quality, because it is made as cheaply as possible and stored in poor quality barrels. Whisky of the quality you are tasting tonight is

often added in small amounts to those of lesser quality to improve the taste. However, we are marketing this whisky to people who appreciate the distinctive quality and enjoy sharing and creating special moments with friends." Black Fox Distillery is one of only two locations in North America making an oat vodka so the oat whisky is not the only very rare find at this local business!

John and Barb are proud to be producing in Saskatchewan with local products. John says, "It's a great feeling to be producing something special, and that's due to all of the people we are involved with throughout the whole industry. Everyone we work with is a great resource: prairie farmers (because they understand the meaning of professionalism), industry researchers, and processors - the list goes on."

What's next for Black Fox? John states, "A key goal for us is to keep working with oats because we're very pleased with the results so far. We have been awarded a scholarship to study distilleries around the world, so will be very busy for the next while."

Black Fox has also received many awards for its gin and word is spreading, as they have recently signed a contract to sell gin to China. John and Barb have also garnered awards and recognition along their entrepreneurial journey. For a list of accolades, visit blackfoxfarmanddistillery.com. Black Fox has also made a commitment with several local bars to sell some of their whisky at an affordable price. So, you may happen upon a local establishment selling Black Fox whisky. If you don't, then be sure to mention that you'd love to see them offer Black Fox oat whisky and vodka. If you do - lucky you: buy one, sip it slowly and stretch out those special moments that Black Fox strives to produce!



John Cote, Black Fox Farm and Distillery
at the 2018 POGA Conference

Gauging Oats on a Global Scale

How Does Canada Compare for Miller-Desired Traits?

Dr. Nancy Ames, a cereal research scientist at Agriculture and Agri-Food Canada, has completed the report for a one-year project which provides data that compares the nutritional composition of oats from a variety of international sources.

Dr. Ames states, "Oats obtained from eight countries including Australia, Brazil, Chile, China, Finland, New Zealand, United States and United Kingdom, in addition to samples grown in Western Canada, were analyzed for beta-glucan, protein and oil. In total 50 samples of oats were analyzed from international sources, representing 42 varieties. The 40 Canadian samples were selected from several crop trials to include the 10 most commonly grown varieties from multiple locations in western Canada. In general we found that Canadian oats are comparable. The variation among samples suggests that it may be beneficial to identify specific varieties for introduction into new international markets."

Each country determined which variety to submit and no conditions were placed on factors such as growing location. Says Dr. Ames, "No real information was provided with each sample. This research activity is, therefore, more like an informal survey, and formal conclusions cannot be drawn."

So where do Canadian oats land in the comparison data? In her report summary, Ames states: "Low oil and medium protein and beta-glucan content was the uniqueness of the oats grown in Canada. In general, the results suggest that Canadian oats are comparable to those originating from other countries tested."

Shawna Mathieson, POGA Executive Director, remarks, "It's great to see that Canada does have low oil content in our oats when evaluated internationally, and are comparable in other characteristics. This is important when other countries are considering where to purchase their oats."

Dr. Ames also mentions, "Our research program is often asked by industry to provide beta glucan or fiber composition data for commonly grown oat varieties. We will be able to generate this data for western Canada from these sample sets."

A complete genotype-environment interaction (GXE) study on Canadian oat quality is also underway in Nancy Ames' lab at AAFC and a summary report is expected in the future.

This Project is co-funded by the AgriInnovation Program (AIP) – an Industry led Research Development Stream under Growing Forward 2 a federal, provincial and territorial initiative.

POGA Pays Tribute to Bill Wilton

Bill Wilton was "officially" the POGA President from 2005-2013 but he worked long and hard for oat producers well before that! POGA was proud to present Bill with a small token of appreciation at the 2018 POGA AGM and will forever be grateful for his past, and current, contributions to Oat Growers around Western Canada!



Bill Wilton and Shawna Mathieson at the 2018 POGA Conference

Climate, Genomics and Disruptors[®] Important Factors that Affect Your Business

Three presenters at the 2018 POGA conference in Saskatoon spoke of other important influences affecting oat production. *For detailed information on the presentations, go to poga.ca, AGM & Conference.*

Dave Sauchyn, of University of Regina's Prairie Adaption Research Collaborative, shared climate data and predictions for the future.

In spite of highs and lows due to temperature and precipitation, Saskatchewan's average oat yield has been climbing over the last 40 years. Average temperatures have gradually been increasing and winters have less extreme cold days. Since 2010-11, precipitation has been declining. While this is part of regular 'peak and valley' cycles, Sauchyn explains, "Global warming's influence on temperature and precipitation trends is increasing more as time goes on."

Climate models are a valuable tool for weather predictions. Sauchyn says, "Climate models have been run thousands of times, with very similar results each time: predictions are for overall warmer winters, some warmer summers and more vast fluctuations in precipitation; we expect more extremes in the climate all around. There is opportunity for crop production if producers can deal with greater climate variability from year to year. Longer growing seasons, more heat units, and increased winter precipitation and temperatures provide opportunities. The challenges will be increased climate variability, less water stored as snow, reoccurrence of sustained drought (in a warmer climate) and an increase in pests and invasive species."

Continued....

Nick Tinker, AAFC Research Scientist in Cereal Genomics, has a full appreciation for the complexity of the oat genome. To illustrate: one oat genome could be stretched across Saskatchewan's east-west border.

While oat genomic research has been increasing over the past 30 years, it falls well behind genomic research for other main cereal crops such as wheat and barley. Oat genomic accomplishments include creation of an integrated genetic map; molecular markers and mapping of gene locations; marker-assisted selection for key rust genes; better understanding of germplasm; as well, complete genome sequences are currently in progress. Currently, researchers are working on genomic selection with a focus on three traits: more rust resistance; more fibre; and more yield. The ultimate goal is to combine high levels of yield, lodging resistance, test weight, fiber, groat content, and rust resistance into a single oat cultivar.

Future goals for oat genomics include: faster, cheaper and more automated genomic selection; fully-sequenced oat genome; increased scientific training environments; ensuring genomic application is cost-effective and indispensable; create a gene diversity database; and, gene editing processes (for gene validation).

Tinker states, "One gene can make a difference in a multitude of traits, such as rust, dwarfing, flowering time, beta glucan and oil, and drought. We have a responsibility to invest in oat genomics in Canada."

Marty Seymour, Director of Farm Credit Canada's Industry and Stakeholder Relations, used the exponential evolution of the cell phone to exemplify how all industries evolve and change due to science. Seymour states, "Having experience is no longer an advantage; staying on top of and learning to use technology is the path into the future. You don't *have* to have the latest technology, but you *will* compete against those *who do*."

Most large industries are engaging in the Internet of Things (OIT). However, Seymour states, "Ag is lagging in IOT applications." Driverless, infrared and autonomous technology is being perfected and used. However, Seymour stresses, "Data is the new oil - it isn't about *collection*, it's about *connection*. Data interpretation will become essential to everyone."

Seymour provided examples of technology that is being used in agricultural applications, such as Blockchain, a food safety traceability application. Research and technology are needed to meet global demand for things such as plant-based protein products, snack foods (one of the fastest growing food trends), and cultured meat. He advises industries to pay attention to cultural and social norms (i.e., how and what people want to eat).

Seymour's last note: "Artificial intelligence (AI) is the one technology to pay particular attention to. AI uses data to make informed decision. It's our biggest asset as an industry."

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