ALBERTA CANOLA
SaskCanola
Manitoba Canola Growers
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March 2019

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The Source for Canada's Canola Growers

PROTEIN OPPORTUNITY

/ Page 12

INSIDE:

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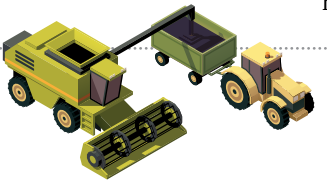
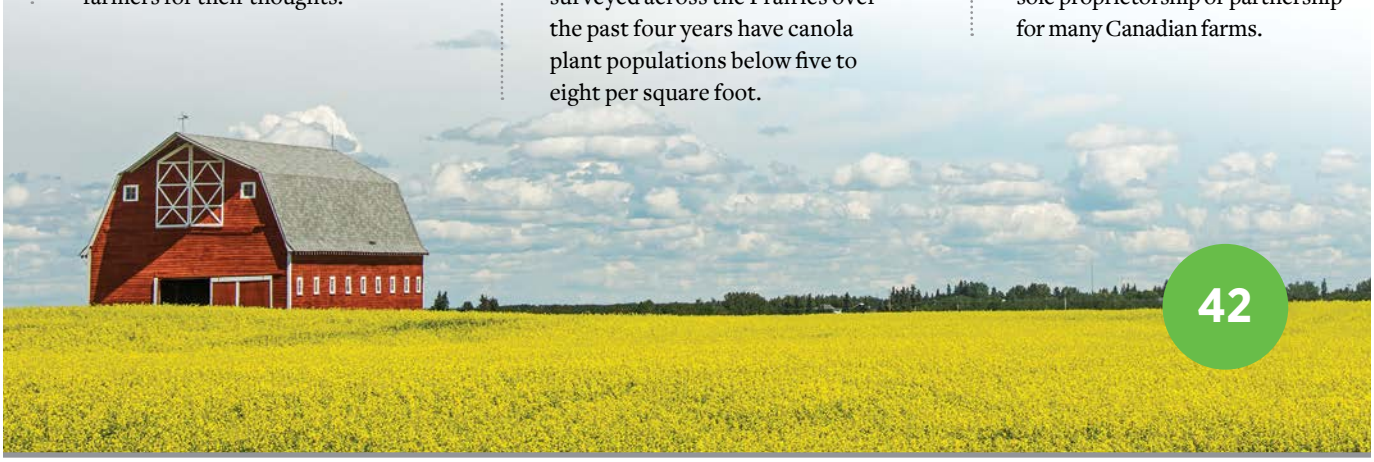


DEPARTMENTS



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PROVINCIAL BULLETINS

6 ALBERTA CANOLA

At Alberta Canola's AGM on January 29, John Guelly of Westlock was elected as chair, and Kevin Serfas of Turin was elected vice-chair. New directors Roger Chevraux of Killam and Wayne Schneider of Nisku begin their first terms.

8 SaskCanola

Zenneth Faye, a driving force behind the establishment of SaskCanola, receives the organization's Canola Influencer Award for 2019. SaskCanola announces Lane Stockbrugger as the chair and Charlene Bradley as the vice-chair. It also welcomes new director Katelyn Duncan.

10 Manitoba Canola Growers

Cindy Grant, former research scientist at AAFC Brandon, receives Manitoba Canola Growers' Canola Award of Excellence for 2019. Members of MCGA can get one free clubroot, glyphosate-resistant kochia and blackleg race test per year from PSI Labs.

CALENDAR

COMBINE COLLEGE – MANITOBA
March 20 | Brandon, Manitoba
canolagrowers.com/upcoming-events/combine-college.

COMBINE COLLEGE – ALBERTA
July 10 | Lethbridge, Alberta
albertacanola.com/combinecollege.

CANOLAPALOOZA - ALBERTA
June 26 | Lacombe, Alberta
albertacanola.com/event/canolapalooza.

CANOLAPALOOZA - SASKATCHEWAN
July 9 | Saskatoon, Saskatchewan
saskcanola.com/news/canolapalooza-2019.

CROPS-A-PALOOZA - MANITOBA
July 24 | Carberry, Manitoba
canolagrowers.com/upcoming-events/crops-a-palooza-2019.

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Be curious

When Corteva announced its new name last year, it also unveiled a catchy set of simply-worded core values. One of them is 'Be curious' with the tag line: We innovate relentlessly. We accelerate our pace of innovation to create solutions that will deliver abundant high-quality food, now and for the future.

They had me at 'be curious'. Behaviour scientist Francesca Gino wrote an article called "The business case for curiosity" in the September/October 2018 issue of *Harvard Business Review*. Most inventions are the result of curiosity, Gino wrote, then emphasized that curiosity is much more important to an enterprise's performance than was previously thought. "When our curiosity is triggered, we think more deeply and rationally about decisions and come up with more-creative solutions," she wrote.

Gino described one of her own behavioural research projects where she sent the following text twice a week to 200 employees in various companies and industries:

What is one topic or activity you are curious about today? What is one thing you usually take for granted that you want to ask about? Please make sure you ask a few "Why questions" as you engage in your work throughout the day. Please set aside a few minutes to identify how you'll approach your work today with these questions in mind.

The control group in the study got a different text designed to trigger reflection but not raise their curiosity. After four weeks, the first group was more likely to make "constructive suggestions for implementing solutions to pressing organizational problems," Gino concluded.

In the article, Gino also encouraged people to listen with curiosity, not just talk. Listening to what others are saying and doing, and asking curiosity-driven questions, can yield strong results for your own business development. Gino shared the term 'intellectual humility,' with a reminder that we can't know everything: "When we accept that our knowledge is finite, we are more apt to see that the world is always changing and that the future will diverge from the present."

We always have more to learn.

Kristjan Hebert, who runs Hebert Grain Ventures near Moosomin, Saskatchewan, explained the importance of 'AHA moments' during his presentation at a Digital Agriculture seminar in Saskatoon in January. Hebert, who got the idea from futurist Jack Bobo, says AHA stands for:

Aware. Can you see how the business situation is changing?

Humility. Are you humble enough to realize your current business model has to adapt?

Action. Can you identify the steps required and then boldly take those steps?

These AHA moments hinge on intellectual humility and are undeniably enhanced with a business culture of curiosity.

Which brings me back to Corteva. David Dzisiak is Corteva's commercial leader for grains and oilseeds. He is also a board member with the Canola Council of Canada and with the new Protein Industries Canada (PIC). In the cover article in this issue, I describe PIC and the plant-based protein opportunities ahead for Canada's canola industry. I quote Dzisiak: "The plant protein industry is growing rapidly and we want to participate and have Canada recognized as a global leader in high-quality plant protein."

He also says, "We want the world to know what we've created."

PIC exists to drive innovation within the private sector, funding ideas and potential solutions to help canola take part in fast-growing market for plant-based proteins – a market currently dominated by soybeans. What is our first requirement to see the opportunities, identify the challenges and create the solutions? Curiosity. Be curious.

canolacouncil OF CANADA

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Alberta Canola elects new chair and new vice-chair

Back L-R:
Ian Chitwood, *Airdrie*
Roger Chevraux, *Killam*
Kevin Serfas, *Turin*
Wayne Schneider, *Nisku*
Cale Staden, *Vermilion*
Dan Doll, *Fairview*

Front L-R:
Denis Guindon, *Falher*
Andre Harpe, *Valhalla Centre*
John Guelly, *Westlock*
John Mayko, *Mundare*
Mike Ammeter, *Sylvan Lake*

Alberta Canola's 29th Annual General Meeting was held January 29 at the FarmTech Conference in Edmonton. Following the meeting, John Guelly of Westlock was elected as chair, and Kevin Serfas of Turin was elected vice-chair.

Roger Chevraux of Killam was elected from the floor of the Annual General Meeting, and Wayne Schneider of Nisku was acclaimed during the October election period. They began their first terms as directors following the Annual General Meeting.

Tax credit for the 2018 tax year open to Alberta canola producers

Canola growers in Alberta that do not request a refund of their check off from the Alberta Canola Producers Commission qualify for a tax credit for the 2018 tax year.

The Scientific Research and Experimental Development (SR&ED) tax credit allows canola growers to claim the tax credit for that portion of the check-off paid that was used to fund qualifying research.

The tax credit rate for Alberta canola producers in 2018 is 17.43 percent. For example, if an individual grower paid $100.00 in chec-off to Alberta Canola in 2018, $17.43 is the eligible amount to be earned as the tax credit.

Individual producers must file a T2038 (IND). Farm corporations must file form T2SCH31. For full details visit **albertacanola.com/sred**.

Thank you to outgoing directors

RENN BREITKREUZ

DALE UGLEM

BRIAN HILDEBRAND

Alberta Canola would like to thank outgoing directors Renn Breitkreuz, Dale Uglem and Brian Hildebrand for all the hard work they have done on behalf of Alberta Canola Farmers.

Renn joined the board in 2014 and served on a variety of board committees, and represented Alberta Canola on the Canadian Canola Growers Association (CCGA) board as well as vice-chair and chair of the board.

Dale joined the board in 2016 and served on the grower relations & extension committee and research committee, represented Alberta Canola on the board of the CCGA and served as chair of the FarmTech planning committee.

Brian joined the board in 2017 and served on the research committee and government & industry affairs committee.Once again, the board would like to thank Renn, Dale and Brian for their service and dedication, and a special thank you to their families for sharing them for the advancement of our remarkable industry. All the best in the future!

Visit **albertacanola.com/about** for more information on the Board of Directors, the committees that guide the board, and Alberta Canola's regions.

Farmtech award for 2019 presented to ACIDF

The 2019 FarmTech Award for outstanding contribution to Alberta's cropping industry was awarded to the Alberta Crop Industry Development Fund Ltd. (ACIDF).

During its life, ACIDF provided investment of over $111 million to projects that promote and enhance the competitiveness of the crop industry in Alberta through leadership in industry research, innovation and marketing initiatives.

This past year, ACIDF Ltd. wound down, but its legacy of research investment has propelled Alberta's cropping sector forward.

Clarence Assenheimer, the final chair of ACIDF, accepts the FarmTech award.

canolaPALOOZA 2019

The 5th annual canolaPALOOZA returns to the Lacombe Research & Development Centre on Wednesday, June 26.

canolaPALOOZA is hosted by Alberta Canola, the Canola Council of Canada and Agriculture & Agri-Food Canada.

There really is nothing like canolaPALOOZA. With over 100 experts spread across more than 25 learning stations... there really is an expert answer for every canola question.

The event is free to attend, and you set your own schedule as you visit the learning stations of your choice – and all at your own pace.

Registration opens in May. If interested in sponsoring canolaPALOOZA 2019, contact Rick Taillieu at **rick@albertacanola.com**.

SaskCanola board elects new leadership

Following SaskCanola's Annual General Meeting on January 14, SaskCanola's board of directors elected new leadership and are pleased to announce Lane Stockbrugger as the chair and Charlene Bradley as the vice-chair.

In addition, leadership positions on SaskCanola's board committees for the 2019 year were elected as follows: Bernie McClean as research chair, Katelyn Duncan as grower relations chair, Doyle Wiebe as policy chair, Charlene Bradley as canola promotion chair, Wayne Truman as governance chair, and keith Fournier as audit and finance chair.

For further information about SaskCanola board committees and external appointments, visit **saskcanola.com/about/directors.php**.

Lane Stockbrugger of Englefeld, SaskCanola board chair.

Charlene Bradley of Stranraer, SaskCanola board vice-chair.

canolaPALOOZA

Save the date for July 9, 2019, when canolaPALOOZA returns to Saskatoon. The event brings the best research and agronomy extension experts from across the country into one field in Saskatchewan for a day of interactive, hands on, in-field learning where farmers and agronomists can move through stations and demos at their own pace.

Above: Specialists engaged in important conversations about clubroot with Saskatchewan farmers at canolaPALOOZA 2018.

Credit: iStock.com/urfinguss

Research tax credits for Saskatchewan canola farmers

The Scientific Research and Experimental Development (SR&ED) is a federal government program designed to encourage research and development through tax-based incentives. SaskCanola invests a significant amount of the producer levy contributions in research to manage new challenges farmers face in their fields. As a result of the research investment, SaskCanola is able to participate in this program and the benefits are passed along to the producers. These tax credits can be claimed by filing form T2038(IND) for individuals or T2SCH31 for corporations.

In addition, farm corporations may claim a portion of their levy contributions as a qualifying expenditure towards the Saskatchewan Research and Development Tax Credit by filing form T2SCH403.

More information is available at **saskcanola.com/research/taxcredit**.

Zenneth Faye receives Canola Influencer Award

To commemorate SaskCanola's 25th anniversary, we initiated the Canola Influencer Award to annually bestow upon a member of the agricultural community that has made significant contributions of knowledge, education and ongoing efforts to promote canola. This year, the SaskCanola board voted for Zenneth Faye to be the third recipient of this award.

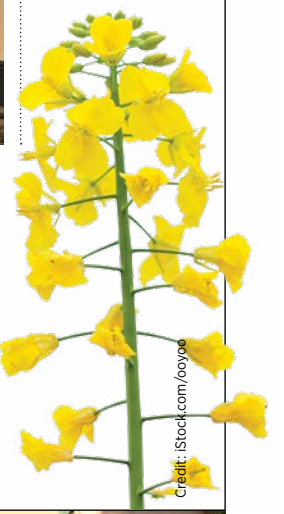
Zenneth Faye was a driving force behind the establishment of SaskCanola. He served as a director of the Saskatchewan Canola Growers Association and was very involved in a number of program areas that benefited farmers including the *Grow with Canola* program. That program, which started with demonstration trials, ultimately led to the establishment of the agronomy team at Canola Council of Canada.

Zenneth was also instrumental in exploring alternative markets for canola and has been respectfully referred to as 'Mr. Biodisel' by some of his colleagues. He was a founding member of the Milligan Biotech plant which was the first commercial biodiesel plant in Canada.

Zenneth is a man of action with strong support from his wife Cindy, children Ambrely and Brittany and their families. He is a dedicated member of his community, known as a progressive farmer who is willing to investigate and try new ideas. He has been active on many community, provincial, and national boards and currently serves as a SaskBarley director. He is a lifetime member of the Saskatchewan Institute of Agrologists, a recipient of the Queen's Diamond Jubilee medal, and an inductee of the Agriculture Hall of Fame.

SaskCanola Board Chair Lane Stockbrugger presents Zenneth Faye with the Canola Influencer Award.

It was SaskCanola's distinct pleasure to recognize Zenneth's accomplishments as we presented him with the Canola Influencer Award at our AGM on January 14. To honour Zenneth, SaskCanola made a donation to the Foam Lake Kids Sport Program (Zenneth's charity of choice). Congratulations and thank-you Zenneth!



Credit: iStock.com/ooyoo

SaskCanola commits $691,735 to collaborative canola research

SaskCanola has committed $691,735 to support 8 new research projects funded under the Saskatchewan Agriculture Development Fund (ADF) in 2019. The project areas include: pre-breeding tools, sclerotinia and clubroot resistance, nutrient management, canola oil and meal utilization. Saskatchewan's Minister of Agriculture, the Hon. David Marit, announced that the government will be investing $12 million into 44 crop-related ADF projects in 2019 at CropSphere on January 16.

Research scientist receives 2019 Canola Award of Excellence

"She's made huge contributions to the development of nutrient management for canola growers in Canada, so I am delighted to see her being recognized with the Canola Award of Excellence."

—Don Flaten

Adequate plant nutrition is required for optimal crop production. It's thanks to research scientists like Dr. Cynthia (Cindy) Grant – former senior research scientist in Soil Fertility Management with Agriculture and Agri-Food Canada of the Brandon Research and Development Centre – that soil fertility and crop nutrition best practices have evolved, making crop production more economic and sustainable for producers.

On account of her contributions, Dr. Grant was recognized with the 2019 Canola Award of Excellence from the Manitoba Canola Growers Association at the CropConnect Banquet in Winnipeg in February.

"It is a real honour to receive the Canola Award of Excellence," says Dr. Grant. "Canola is one of the major crops for Manitoba and for the Prairies, and it's always been close to my heart because it was developed at the University of Manitoba and with Agriculture Canada. Most of the work that I did through the years has had a canola component because it is such an important crop in the rotation."

Dr. Grant and her research teams investigated themes like how to manage sulphur for canola production in no-till compared to conventional till; how canola would influence the following crops in the rotation and vice versa in terms of nutrient cycling; how side-banded nitrogen affects canola yield, stand density, maturity, number of green kernels and chlorophyll content; and how nutrient management influences the fatty acid profile of canola.

Research priorities were based on managing nutrients through soil, agronomic and fertilizer management practices right through to their impact on crop quality. "We looked at the environmental effects of fertilizers (specifically nitrogen, phosphorus and sulphur) and making fertilizers more economic for producers," said Grant. "We wanted to determine how a nutrient would affect canola both in the year it was applied, as well as in the crops following in sequence."

Dr. Grant is passionate about the importance of teamwork and the ability to effectively work together in research and extension to look at farming as a whole and change the way people manage their farms.

"Dr. Cynthia Grant is a world-renowned soil fertility and crop nutrition researcher who is highly respected by industry, farmers, and public agencies, alike," says Don Flaten, professor in the Department of Soil Science at the University of Manitoba. "As a result, she has received a wide variety of international, national, regional and local awards for her agricultural research and extension contributions. Beyond her individual accomplishments, Cindy is also widely regarded by me and many other private industry, academic and government scientists, extension staff and practitioners as an outstanding collaborator... a natural team player. Throughout all of these accomplishments during her career, Cindy has always displayed an exceptional blend of brilliant technical knowledge, combined with an excellent balance of creativity and common sense. She's made huge contributions to the development of nutrient management for canola growers in Canada, so I am delighted to see her being recognized with the Canola Award of Excellence."

Grant earned her B.S.A., M.Sc., and Ph. D. degrees from the University of Manitoba and began her career as an information officer at the Agriculture and Agri-Food Canada Brandon Research and Development Centre. Next, she became a soil fertility researcher where, for the majority of her career, she focused on soil fertility and nutrient management for sustainable crop production.

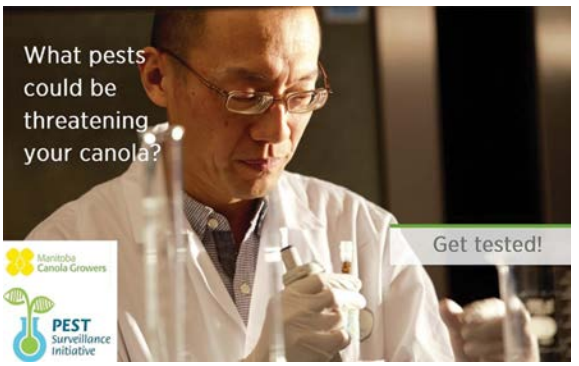
Dr. Grant lives on a family farm north of Minnedosa with her husband. She is an avid golfer, strong fan of Rockin' the Fields in Minnedosa and loves to read, kayak, fish and camp. She has no shortage of activities to keep her busy since her retirement in 2015.

Manitoba Canola Growers would like to thank Dr. Grant for her contributions to the sustained growth and prosperity of Manitoba's canola industry.

"Canola is one of the major crops for Manitoba and for the Prairies, and it's always been close to my heart because it was developed at the University of Manitoba and with Agriculture Canada."

—Dr. Cynthia Grant

Get tested: free testing for MCGA members ($450 value)



The Pest Surveillance Initiative (PSI) Lab was established because farmers in Manitoba were concerned and interested in learning about clubroot and how big of a problem it was going to be. Working together with Manitoba Agriculture, MCGA set up the PSI Lab so farmers could have the capability to look at the DNA of clubroot and document how much clubroot is in the province.

The PSI Lab began by mapping low levels of clubroot in Manitoba, and capabilities have since expanded to include testing and mapping for glyphosate-resistant kochia as well as testing for blackleg and identification of different blackleg races.

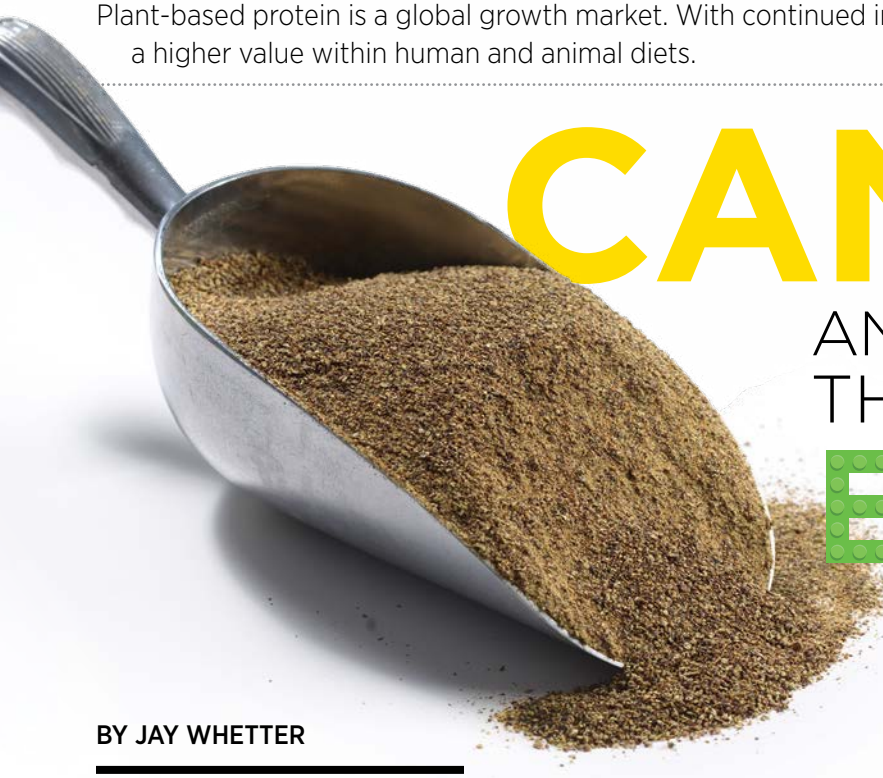
"The PSI Lab is a farmer-led initiative that provides science-based and factual research that farmers in Manitoba need," says Pam Bailey, MCGA director. "The growth of the PSI Lab and its testing capabilities verifies that it is a valuable resource for farmers to get un-biased facts and information relevant to their farm."

Throughout the growing season there are multiple times to scout fields and collect a sample for testing through the PSI Lab. Manitoba Canola Growers are pleased to offer members one free clubroot, glyphosate-resistant kochia and blackleg race test per year, a $450 value. To claim your free tests follow the directions and sampling procedures found at **mbpestlab.ca** under Testing Services.

We hope getting tested helps you maximize net income on your farm.

Manitoba Canola Growers are pleased to offer members one free clubroot, glyphosate-resistant kochia and blackleg race test per year, **a $450 value.**

Plant-based protein is a global growth market. With continued innovation, canola can piece together a higher value within human and animal diets.



CANOLA AND THE LEGO BLOCKS OF LIFE

BY JAY WHETTER

Proteins are massive molecules. Think of them like completed Lego sets and the pieces are the amino acids. The digestive systems of humans and all other animals take in those proteins as food and break them down into their amino acid pieces. Then the body, like a Lego whiz, uses those pieces to make all kinds of things it needs – muscles, bones, enzymes, hormones and more. Amino acids within protein molecules are the Lego blocks of life.

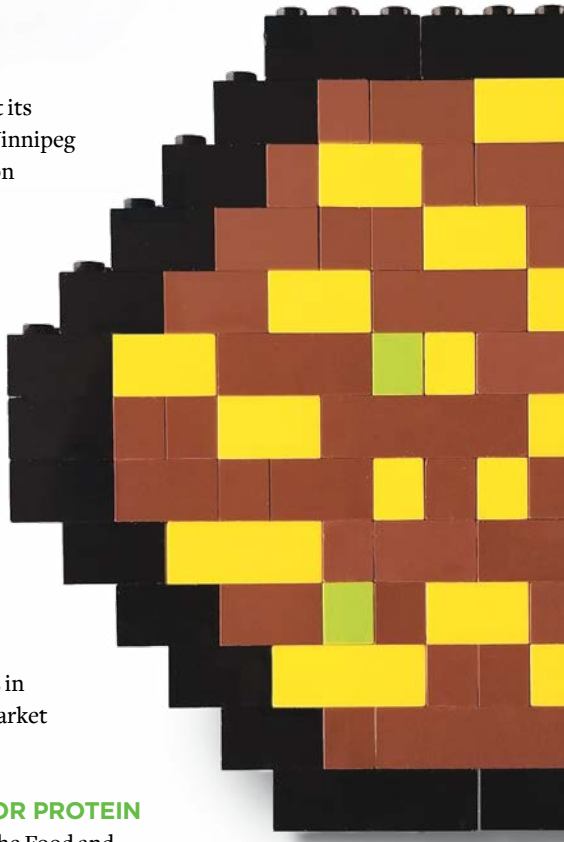
There are 20 common amino acids, including nine that are considered 'essential.' They are essential because they must come from food; the body can't make them. Lysine, a name often heard in reference to animal feed, is one of the nine essentials. "Lysine also tends to be the first amino acid that is limiting in certain plant-based proteins, such as those derived from cereals," says Matthew Nosworthy with the College of Pharmacy and Nutrition at the University of Saskatchewan.

Each protein source will contain the 20 common amino acids, but in different amounts. Animal-based foods – like meat, eggs and cheese – contain all nine essential amino acids in sufficient quantity. Plant-based proteins are often limiting in one or more of the essential amino acids, such as lysine, methionine, cysteine or tryptophan, but by mixing protein sources, a plant-based diet can meet the body's protein needs. This notion is helping to drive consumer interest in plant-based proteins.

The growth potential for plant-based proteins – both for animal feed and for human food directly – is behind the federal government's investment in Protein Industries Canada (PIC). PIC was picked for funding through the research superclusters program the federal government announced in February 2018.

PIC's vision, as described at its Thought Leaders Summit in Winnipeg in October 2018, is: "To position Canada globally as a leading source of high-quality plant protein and plant-based co-products, developed in a carbon-neutral production environment, while substantially contributing to Canada'seconomic growth and international trade balance."

PIC will work with private sector companies to identify and develop opportunities for Canadian crops, especially pulses and canola, to increase their shares in a global plant-based protein market currently dominated by soy.



A canola seed cross-section made out of Lego. Created by the editor.

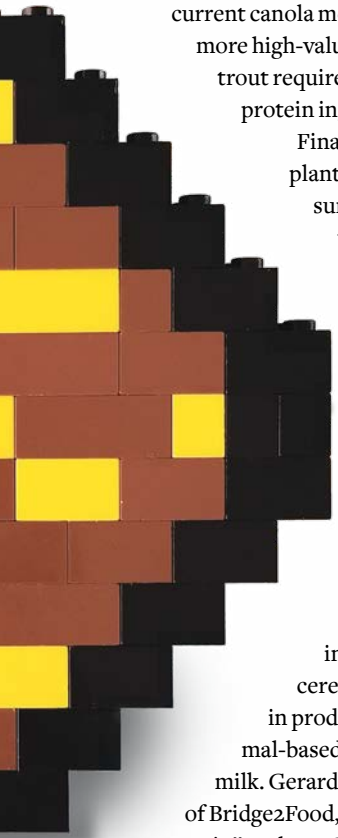
THE GLOBAL MARKET FOR PROTEIN

Here are the latest stats from the Food and Agriculture Organization of the United Nations (FAO) on global production of a few key protein sources: eggs, 80 million tonnes; beef, 66 million tonnes; chicken, 109 million tonnes; pork, 119 million tonnes; rapeseed (including canola), 76 million tonnes; dry peas, 16 million tonnes; and soybeans, 352 million tonnes.

Most of those 352 million tonnes of soybeans, which are 80 per cent meal, are fed to livestock to help generate those meat totals. As for Canadian canola meal, a lot of

it goes to feed dairy cows. Animal feed will remain the major market for plant-based proteins, but Owen Wagner, speaking at PIC's Thought Leaders Summit, raises a red flag. The analyst with LMC says protein concentration is declining in both soy and canola meal. He says canola meal could improve its place in the protein market by reversing the protein trend and exploring ways of broadening its appeal from a functionality standpoint. Recognizing this, the Western Canada Canola/Rapeseed Recommending Committee (WCCRRC), which checks all proposed new varieties for quality before they can be registered, has standards in place to stabilize protein content in canola meal.

Aquaculture is another growth market for plant-based proteins as fish farmers look for more sustainable feed sources. Many fish diets are actually made up of fish meal, and finding plant-based proteins to replace fishmeal is allowing for more sustainable growth in aquaculture. Aquaculture is rapidly expanding but the supply of fish meal is static, so new sources of feed protein must be developed. Some species of fish can consume current canola meal in their diet, while other, more high-value species such as salmon and trout require a more concentrated vegetable protein ingredient.



Finally, humans are demanding more plant-based proteins for direct consumption. Pulses have long been the champion of plant-based proteins, with beans, peas, chickpeas and lentils the protein cornerstones of many diets around the world. While pulses are often eaten as is, plant-based protein isolates, which are being added to many processed foods, could be canola's way into the human food market.

Some plant-based proteins are added to existing foods, such as breakfast cereals and shakes. Some are used in products to replace traditional animal-based protein sources like meat and milk. Gerard Klein Essink, founder and CEO of Bridge2Food, presented on "The Future of Protein" at the PIC Thought Leaders Summit. He gave one example from the Netherlands, where 67 per cent of households purchased plant-based meat in 2018, up from 28 per cent in 2002.

In a report "Canola/Rapeseed Protein: Future Opportunities and Direction," based on a canola protein workshop at the International Rapeseed Congress (IRC) of 2015, Lisa Campbell and Curtis Rempel of the Canola Council of Canada recognized the growth potential of plant-based proteins, writing: "Population pressures, ecological

What's in a canola seed?

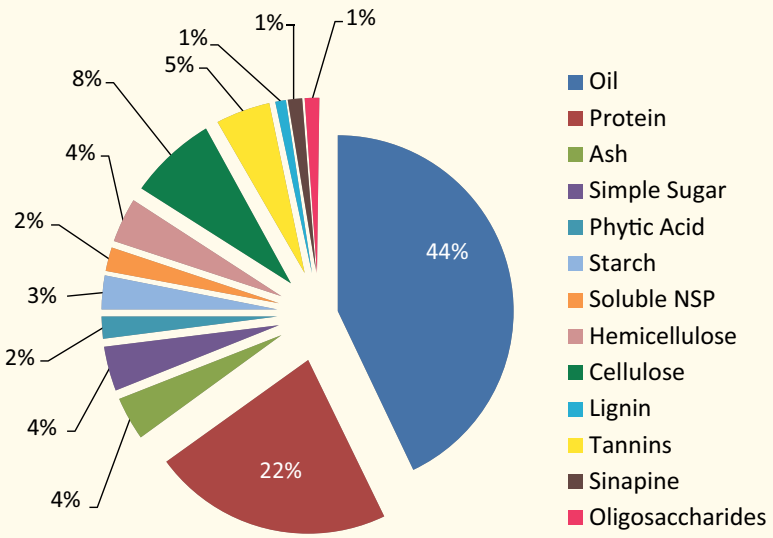
Oil. 44-45 per cent. Canadian Grain Commission results from its Harvest Sample Program report average oil at 44.1 per cent for 2018 and the 10-year average is 44.4.

Protein. 22 per cent of the whole seed. The CGC's 10-year average for protein within the canola meal alone is 37.8 per cent, but 36 per cent is the current common industry standard value. Canola protein is almost entirely made up of cruciferin and napin. These two proteins are different enough in their amino acid composition that their value could be maximized if isolated into separate products.

Cellulose, lignin, tannins and non-starch polysaccharides. These are concentrated in the seed coat, and add little nutritional value. Cellulose is fibre, which is generally negative for monogastric (pigs, poultry) feed sources. So is lignin, a woody fibre that requires a lot of carbon and energy to produce and is tough to break down in the gut. University of Calgary plant biologist Marcus Samuel says it would be better if the plant could use that carbon and energy to accumulate more protein. On tannins, Samuel's Ph.D student Logan Skori says: "Production of tannins within the plant is a defence mechanism that deters herbivory and insect feeding due to its sharp, astringent taste." As expected, tannins also make the taste of canola meal a little less appealing. "Tannins have also been shown to interfere with enzymes responsible for protein and carbohydrate digestion, ultimately reducing the potential energy within livestock feed," Skori adds. Reducing cellulose, lignin and tannins would improve meal energy and protein availability. One option, if a genetic solution is not feasible, could be to remove the seed coat before processing. If processing research could demonstrate an economical large-scale method for seed coat removal, this would allow the seed to retain the in-field protective benefits of its coat.

Oligosaccharides, simple sugar (sucrose) and starch. Germinating plants use these energy sources within the seed to boost stress tolerance, including to cold. Reducing these components may affect seed performance in the field.

This information comes from David Dzisiak (Corteva), Janitha Wanasundara (AAFC Saskatoon), Marcus Samuel (University of Calgary) and Logan Skori (Ph.D. student with Marcus Samuel, U of C).



considerations, and production efficiency underscore the importance of highly bioavailable plant proteins, both for the developed and developing world."

Nosworthy adds, "Research has suggested that increasing consumption of plant-based protein diets can have a beneficial effect on multiple aspects of human health such as regulation of fat metabolism, reducing risk of type-2 diabetes, and lowering blood pressure."

WHERE DOES CANOLA HAVE A FIT?

Canola meal has 36 per cent crude protein compared to soybean's 48. This difference has always dragged down canola meal prices, but PIC-inspired innovators may be able to find market niches based on canola meal's specific protein types.

Janitha Wanasundara, research scientist with Agriculture and Agri-Food Canada in Saskatoon, explains the proteins of brassica seeds (like canola seeds) in great detail in her 44-page report, *Proteins of Brassicaceae Oilseeds and Their Potential as a Plant Protein Source*. "As a food protein source, Brassicaceae proteins have different essential amino acid levels, digestibility profiles, and associated component profiles than soy protein," she wrote.

Two proteins, cruciferin and napin, account for most of the protein in canola meal. As Wanasundara described in her report, cruciferin is a large-sized globulin protein closely related to glycinin, which is the major protein in soybeans. Cruciferin content in *B. napus* seeds can range from 32 to 53 per cent. Napin, an albumin protein, makes up 25 to 45 per cent of the protein in *B. napus* seeds. These protein subunits have different amino acid compositions and therefore have different functionality.

Canola protein for animal feed

Canola meal has shown particular value in dairy diets. Various studies have shown that using canola meal instead of soybean meal can increase dairy cow production by one litre per day, and findings released in 2017 by Wisconsin researchers have shown that the increase among early lactation cows is much higher – an average of 4.45 more litres of milk per day. Canola meal can also be used in swine and poultry diets to some extent, but the lower protein percentage and higher fibre content of canola meal has limited its use compared to soymeal. As a result, a significant portion of canola meal produced in Canada goes to dairies, with the U.S. being the biggest market. ProPound canola, which Corteva Agriscience has in development, has a protein content comparable to soybean meal and improved digestibility and lower levels of fibre than standard canola meal. As developments like this become more commercially common, it should broaden the feed market appeal for canola meal.

Different approaches to canola processing could also improve canola meal's feed quality. In her report, Wanasundara explained that excessive heat in processing can reduce the bioavailability of amino acids, especially lysine. "Lysine is often the limiting amino acid in animal feeds, thus any reduction in lysine availability affects the competitive positioning of canola meal protein ingredients for monogastric nutrition," she wrote.

"Canola protein has an opportunity as a high-quality human protein source, and an economic and sustainable source of protein with high bioavailability and digestibility."

—Lisa Campbell and Curtis Rempel

Canola protein for human food

Protein-rich isolates, almost entirely sourced from soy at this time, are used in a wide range of bakery products, fruit and vegetable juices and flavoured drinks, egg substitutes and processed meat products.

In their report from the IRC meal workshop, Campbell and Rempel wrote: "Canola protein has an opportunity as a high-quality human protein source, and an economic and sustainable source of protein with high bioavailability and digestibility," then added: "Despite decades of research, several technologies being developed, and products being brought to large-scale production, there are still no commercially available canola protein products."

Burcon has been working for years on canola protein isolates. The U.S. Food and Drug Administration has granted Burcon's napin-rich Supertein and cruciferin-rich Puratein isolates 'generally regarded as safe' (GRAS) status for food use. Burcon is on the right track to separate napin and cruciferin, based on this comment from Wanasundara's report: "The technologically valuable functionalities and the nutritional value of cruciferin and napin can be maximized if they are separately utilized."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Protein sources and their amino acid profiles				
	Canola meal	Soybean meal	Peas (split green)	Beef**
Total crude protein (as a % of total weight)	**36**	**46**	**23**	**22**
Amino acids (as a % of total protein)				
Alanine	4.3	4.3	4.5	5.8
Arginine	5.8	7.2	8.2	6.7
Asparagine +/ or Aspartic acid	7	11.7	11	9.2
Cysteine	1.7	1.6	1.2	1.1
Glutamic acid +/or Glutamine	17.5	18.7	16.7	16.3
Glycine	4.9	4.2	4.4	4.5
Histidine	2.7	2.6	2.5	3.3
Isoleucine	4	4	4.3	4.4
Leucine	7	7.8	7.3	8.3
Lysine	5.8	6.4	7.7	9
Methionine	1.9	1.3	0.8	2.9
Phenylalanine	3.8	5	5	3.9
Proline	6	5.1	4.5	4.1
Serine	4.6	5.1	4.5	3.9
Threonine	4.5	4	3.5	4.5
Tryptophan	1.3	1.3	0.7	1.1
Tyrosine	3.1	3.2	2.2	3.5
Valine	5	4.8	4.5	4.6
*TOTAL	90.9	98.3	93.5	97.1

Essential amino acids are in green. The nine essential amino acids must come from our food because the human body cannot make them.
*Totals don't add to 100 per cent. Reasons for this include: non-protein nitrogen present in the samples, variability in sample analysis, and rounding of final values. Use these numbers as a generalized representation only.
**Fresh beef is 72.5 per cent water. Of the non-water components, 80 per cent is protein and 16 per cent is fat. With fat trimmed, beef and other meats are highly concentrated protein sources.
Data sources: Canola and soybean data is from Shahidi, F. "Canola and Rapeseed: Production", Chemistry, Nutrition and Processing; Chapmanand Hall: London, 1990, p18 and from Alashi et al. FRI 29:231-260. 2013. Pea data is for "peas, green, split, mature seeds, raw" from the USDA National Nutrient Database, ID#16085. Beef data is for "chuck for stew, all grades, raw" from the USDA National Nutrient Database, ID#23093. Beef values on that website come from the National Cattleman's Beef Association. Thanks to Matthew Nosworthy, U of S, for help with this table.

THIS IS WHERE PIC COMES IN

PIC will invest its millions into innovative projects led by the private sector. David Dzisiak, PIC board member and Corteva's commercial leader for grains and oilseeds, describes the four PIC pillars that will drive its investment decisions.

1. **Create high-protein seeds.** With canola, the goal would be to improve overall protein content. "The challenge is that this is a really complicated trait," says Dzisiak. "Step change improvement is important, otherwise this could take 15 to 20 years."

2. **Grow high-quality protein.** PIC wants to see precision farming and digital tools employed to improve protein content and sustainable yield growth in the harvested crop. "A lot of companies are working in this space," Dzisiak says. "PIC could attract them to Western Canada to develop the best tools for our geography."

3. **Make novel products.** Forty per cent of the PIC budget will be directed to projects in this pillar. It could be for value-added products, such as protein isolates and ingredients, or for innovations in processing that will improve protein quality in the meal. "We want to up our game in that regard," Dzisiak says. "It doesn't mean we will have to replace what we're doing today in canola processing, which satisfies the current market demand. But we'll have an extra six million tonnes of additional canola processing capacity by 2025 and novel processing technologies could create a new domestic value-added protein industry."

4. **Market and sell.** In this pillar, PIC will direct funds to help develop prototypes and pre-commercial products, do market testing and get customer insights. "We want to the world to know what we've created," Dzisiak says. "The plant protein industry is growing rapidly and we want to participate and have Canada recognized as a global leader in high-quality plant protein."

As Lego has shown, there can be big money in supplying the pieces and the instructions to build great things. The canola industry has an opportunity to turn canola meal's building blocks – protein amino acids – into its own great growth market.

—Jay Whetter is the editor of Canola Digest.

"The plant protein industry is growing rapidly and we want to participate and have Canada recognized as a global leader in high-quality plant protein."

—David Dzisiak

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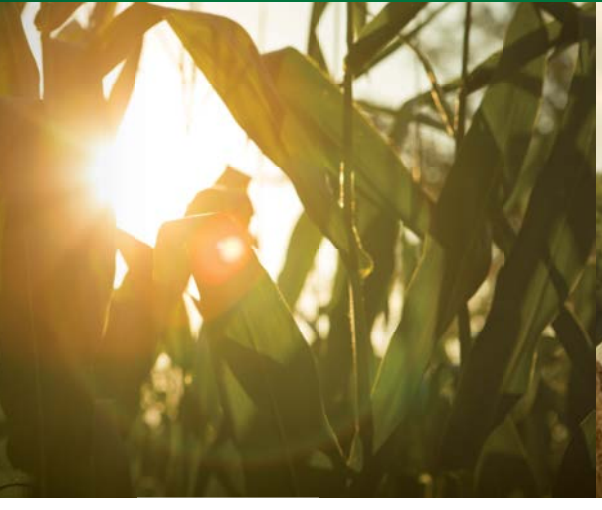

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When trying to predict what to expect for canola markets in 2019, you can find strong clues from chart analysis, supply and demand stats, growing conditions, the soybean market, and politics and trade issues.

FIVE CANOLA MARKET INFLUENCES TO WATCH

BY DUSTIN GABOR
WRITTEN JANUARY 21, 2019

As I stood at the Grain Shark trade show booth in January, handing out iPhone-shaped brochures to passers-by, the most common question was, "When is this canola market going to stop dropping?"

A pile of things can influence the canola market at any given time. This article will describe the major influences worth watching when trying to predict the market.

THE CHARTS

Chart analysis can help clear some of the clutter. I won't go into great detail about all the techniques, but let me do my best to provide a short summary.

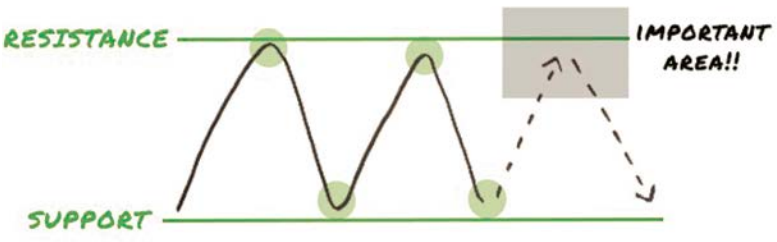
Start by looking at weekly trends and ranges for canola futures for the whole year. By going back a few years, this will give you a view of how the market typically moves over a period of weeks or months. There are some key seasonal trends to watch out for. Market highs typically show up sometime in April-May or June-July, depending on the year. Watch during these timeframes for sell signals to show up on the charts, and be ready to clear out any crop you have been holding through the winter. Market lows are typically seen during harvest or sometime in January to March, depending on the year. This is why it's important to use the seasonal rallies to forward price some canola for harvest movement and contract some canola for winter movement so you aren't stuck selling at the lows.

When watching the charts, look for reversals during the seasonal peaks in the markets. Reversals are patterns that show up on the charts to give you a heads up when the market is about to change direction. There are many types of reversals to watch for, so it's important to learn them ahead of time. You can also use momentum indicators that give indication when a market is becoming overbought or oversold to help confirm the signals.

With any given sale, you always have a chance to gain a certain amount per bushel by targeting near the top end of the range or near the last high in an uptrend. That's because traders have a psychological tendency to push prices back into normal ranges. We call that 'resistance' – an area on the chart where a market will tend to have a hard time getting above. We usually see resistance in a market at the top of a trend or range, into an area of previous highs in the market. You will typically see heavier selling at these prices and that's why the market resists moving above. A wide variety of reversals, momentum indicators and chart patterns can be used, so spend some time doing the research on these terms and how to watch for them. The quick point is that chart analysis can be a major boost to the correct timing of your sales.

So what are the charts saying about canola as I write this article? The market was testing everyone's patience on a correction down to long-term support in the $470-480 per tonne range through the month of January. Futures have held this area on several occasions in the past two years, and so far that's the case right now as well.

Use reversals and momentum indicators to determine trend weakness. Set your targets into areas of resistance, to maximize the price on every sale you make.



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For anyone looking to move canola for cash, if you needed to make bin space between January and March or if you had a deadline coming up to lock in futures on a basis, there was some upside coming based on the chart analysis at that time. We were using $494-504 as the futures target range (or a minimum cash price of $11 per bushel) to consider taking care of short-term needs. More relevant to right now, the long-term charts are also sitting in a pretty good position, even with all the weakness we have seen. There is still a good chance to see at least $520 per tonne before the crop year ends if you are willing and able to hold on that long.

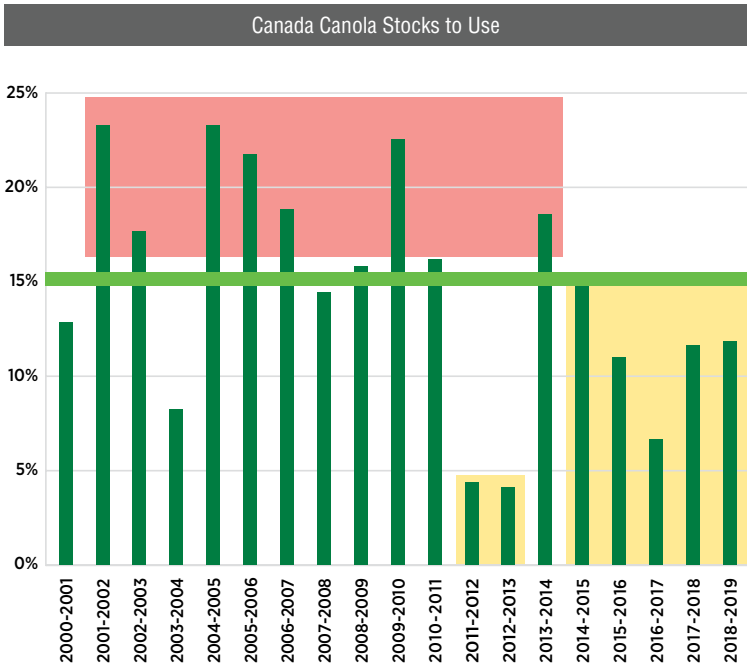
Now, let's play devil's advocate for a second here. Some of you are thinking, "Yah, but what happens when the futures break through the $470 support and keep moving lower?" Here are some seasonal trends to consider.

Over the past four years, the market has found support at $470 two times and has ended up moving down to $440 support on three occasions. In all five instances, regardless of the fundamental outlook for the market, the futures still managed to rebound back to at least $520 into the seasonal time frame of May-July. Sometimes it just doesn't matter what the fundamental outlook is saying. Even in times where stocks are on the rise, production is burdensome, export or crush demand is slowing, or whatever the case may be, the market ignores the info, and we still see futures run up into those higher seasonal trading ranges.

SUPPLY AND DEMAND

Is the current global supply of canola and rapeseed enough to meet global demand? To help answer that question, I like to lean on the stocks-to-use data – how big is the pile vs. how quickly it's being used up? – pretty heavily because it allows you to focus on the net result rather than looking at each stat separately. Agriculture and Agri-Food Canada had stocks-to-use for canola pegged at 12 per cent in January, which is still below the 20-year average of 15 per cent. In years when stocks to use are below the average, we are feeling good. When they are above average, we start to get more negative.

On the demand side, exports and use are expected to outpace last year, even though we've been off to a sluggish start because of quality issues, the higher Canadian dollar and trade issues. The past year's weather brought some big challenges for the canola crop. High green count has slowed movement in some areas as grain companies try to move out the poor quality crop. Trade issues between China and the U.S. have also made for less export activity lately, but it seems like that issue is slowly being sorted out by now.



*Current stocks to use sits at 12%. The 20-year average is 15%. When stocks to use are above average, we feel more negative (red area). When stocks to use are below average, we are feeling good (yellow area). *As of January 21st, 2019*

GROWING CONDITIONS

Weather and crop conditions around the world, especially in big oilseed producing areas like the U.S. and South America, will influence the market. These conditions will likely have changed by the time you read this, but I will still mention some of the highlights.

Western Canada was dealing with some big canola quality issues in some regions, especially green seed driven by the early frost and delayed harvest. These lower grades put some pressure on the market, but I expect to see good opportunities on better grades once the poor stuff has been dealt with.

A hot and dry December had some of Brazil expecting a 10 to 30 per cent drop in soybean production. Argentina saw some heavy rains in December and January but their crop was still in good shape. South America will remain a big player in the export market and any loss in production would support oilseed prices.

Australia had a rough crop year due to hot and dry conditions, leading to a 40 per cent drop in canola production estimates. The European Union had a massive heatwave and drought that affected summer crops in 2018 and also resulted in a cut back in winter rapeseed area. These crop conditions in Australia and the EU should lead to an improvement in exports for Canada in 2019.

Weather is an unreliable source of information because it changes so frequently, but it's still fun to talk about and it gives us something to complain about when it doesn't go our way!

"South America will remain a big player in the export market and any loss in production would support oilseed prices."
– Dustin Gabor

SOYBEANS

The soybean market will always affect the canola market, so keep an eye on soy. Funding cuts to the USDA due to the government shutdown meant that traders had been missing out on important supply and demand data they normally use to help make buy and sell decisions. The December USDA data showed higher soybean production for the third straight year, but that trend may change given the stockpiles of soybeans U.S. farmers are sick of looking at. This could lead to a rise in corn acres, which would help the soybean price situation some. Stocks of soybeans are still double last year, but this could improve once some trade disputes are settled.

Some U.S. Commodity Futures Trading Commission (CFTC) funding was also cut during the government shutdown and the Commitment of Traders Report (COT) was not being published as a result. The COT report is a very important tool that the trade uses to identify strength or weakness of positions in the market. The report outlines the current long and short positions of the commercial, non-commercial and non-reporting traders. This information sheds lights on some very important trends in the market. The report is used as a setup tool for many traders and without the data, it brought some unease or uncertainty in the market. Hopefully by the time you read this, the government shutdown has ended and funding has been restored to both USDA and CFTC reporting.

POLITICS AND POLICIES

While politics and changing trade policies around the world are mostly out your hands, there are still some interesting points to note. For example, the market does react to what U.S. President Donald Trump says: On November 1 at 9:09 a.m., Trump sent out a tweet that suggested trade discussions were moving along nicely with China. Soybean futures were trading at $8.53 per bushel at that moment, but by 9:20, 11 minutes after the tweet, they had rallied to $8.80/bu. That's some pretty spooky stuff right there!

At the time of writing this, the U.S. and China were just past the midpoint of a trade truce that runs until March 1. China had just approved imports on five new genetically-modified soybean and canola varieties, calling the move a goodwill gesture towards the U.S. But what happens after March 1? Will the U.S. and China have come to trade terms before then? It's sounding more positive out there lately, and we were seeing some imports of U.S. soybeans into China. These are signs of some better times ahead for the soybean market, which would support canola as well. This is by no means a guarantee, but at least things are sounding a little more promising.

LOOK FORWARD

The market has been buried by negative information lately, and that is common to see when we are approaching the lows. The market stress causes people to look straight down, looking for the worst case situations, and that's usually when things start to turn around. I say it's best to remain as optimistic as possible, otherwise you may find yourself looking back at sales you made at the low end of the market when there was some brightness on the horizon all along.

*—Dustin Gabor is lead analyst and owner of Grain Shark in Winnipeg. Find out more at **grainshark.com**. You can also follow @grainshark on Twitter.*

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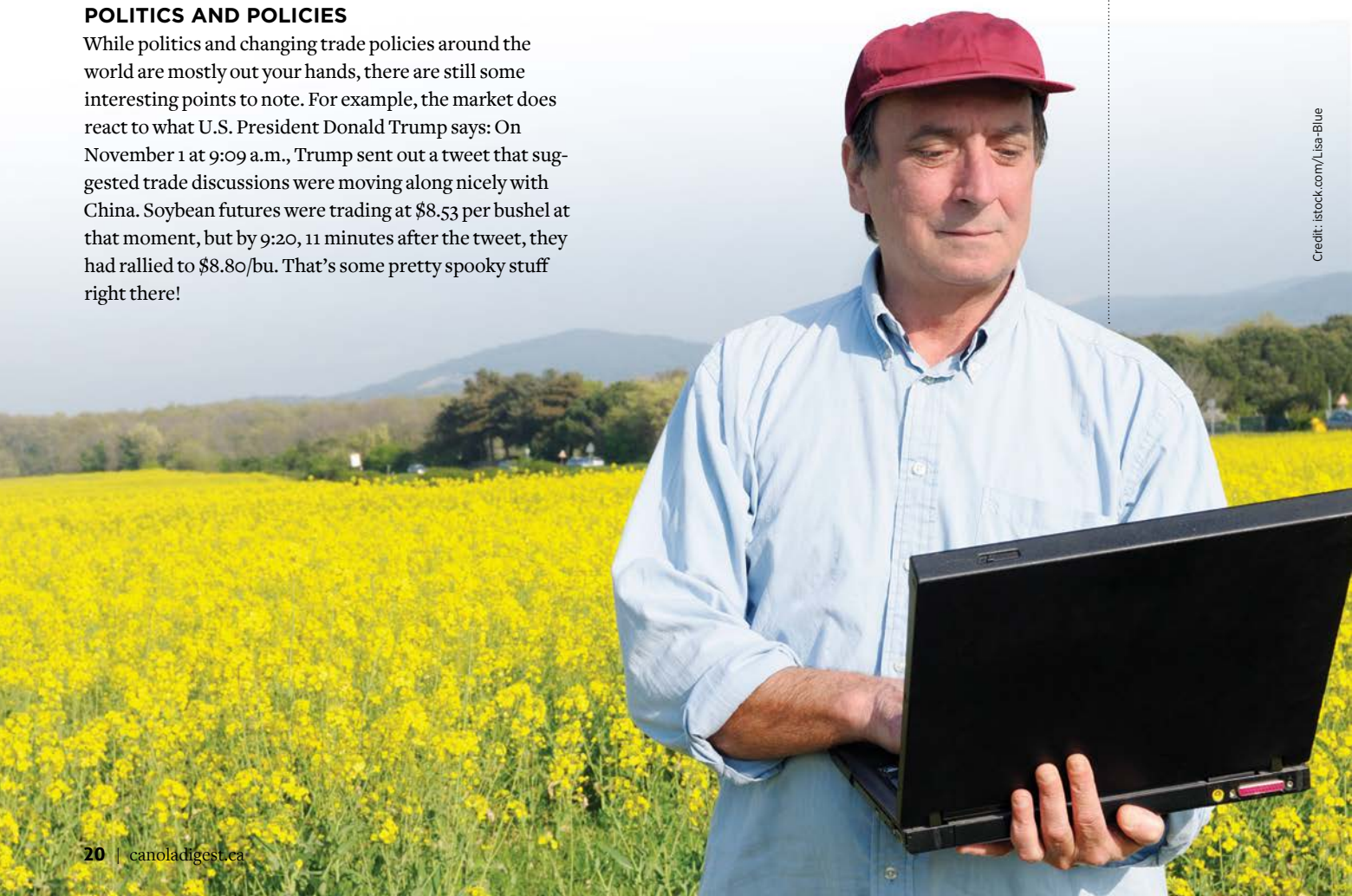

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Gene editing can make hybrid enhancements faster and more precise, and RNA interference provides a new pathway to refine pest management. Both can improve productivity, profitability and sustainability of canola, but commercial launch of any seed or spray needs to pass as-yet-untested regulations in Canada and in our customer countries.

NEW TOOLS BRING NEW TRAITS FASTER

BY JAY WHETTER

RNA interference disrupts cellular signals and is highly species specific, allowing for insecticide sprays or built-in defence traits to protect against only the target insects or diseases. Flea beetle sprays, for example, would not do anything to non-target beneficials.

Gene-editing tools such as CRISPR and Cibus's GRON system are highly targeted and can be used to tweak already high-performing hybrids, adding new traits for specific end-use qualities, protection from new disease pathotypes or better weather tolerance. "And instead of taking 10 years to develop a commercial-ready line with a brand new trait, with gene editing it might only take two years," says Krista Thomas, director of plant innovation with the Canada Grains Council (CGC).

David Sippell, Cibus vice president and North America general manager for canola, agrees that the speed of development is a key factor. "Because gene editing can bring a lot of new traits to market and so much faster than current technology, it can put canola in an extremely competitive situation and help Canada's canola industry achieve its goals," he says.

Gene editing and RNA interference can improve agriculture's ability to protect bees from off-target sprays, enhance productivity in the face of challenging pests and keep pace with consumer demand for protein, to give just a few examples.

Given all this potential benefit, where are we with regulations?

GENE EDITING: THE TOOL AND THE REGULATIONS

CRISPR, probably the best-known of the gene-editing tools, was adapted from a genome-editing system that bacteria naturally use to attack viruses. CRISPR uses an enzyme (Cas9 is the most common) to cut DNA at a target location. The enzyme can also bring with it genetic instructions to change, add or remove genetic material, allowing researchers to customize a new trait, relying on a cell's natural DNA-repair system to complete the job. With these tools, seed companies can quickly add a new trait to their existing top-performing varieties without the need to work the trait up to commercial lines through years of crossing and back-crossing.

Cibus uses another gene-editing technique that employs a gene-repair oligonucleotide (GRON) to work with the plant DNA's natural repair system to make very targeted improvements to genetic code.

> "Because gene editing can bring a lot of new traits to market and so much faster than current technology, it can put canola in an extremely competitive situation and help Canada's canola industry achieve its goals."
>
> —David Sippell

Sippell hopes that this summer the company can field-test a new shatter-tolerant canola, developed using its gene-editing techniques. These trials will produce data needed for the registration process. Also well underway from Cibus are a new disease-resistance and high-oleic specialty oil traits. "It will be a little different from other high oleic oils on the market, but we'll be sharing those details later," he says.

Gene editing has brought other new companies into plant genetics. Saturn AgriSciences, based in Guelph, Ontario, is a new subsidiary of U.S. company Benson Hill Biosystems. In partnership with scientists at the University of Guelph, Saturn is looking at gene editing to "turn off genes that are anti-yield," says Mohammed Oufattole, vice president of research and development at Benson Hill. Additionally, the Guelph team has developed the know-how to improve photosynthesis efficiency in crops and is gearing up to deploy its technology in canola using gene editing.

Oufattole says the relatively low-cost of getting commercial results using gene-editing tools can bring smaller companies into the innovation space, as long as regulations are science-based and not too burdensome on innovation. "If regulations

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Bayer has an RNA interference (RNAi) product to treat for varroa mites in honeybee hives. Honeybees carry the product into brood cells within their hives where the mites initially infest bees, with the product having no effect on the bees. Kristin Huizinga, who leads RNAi regulatory efforts for Bayer, expects the company to make a submission to the U.S. Environment Protection Agency sometime this year and then to the Pest Management Regulatory Agency (PMRA) in Canada in the following years.

are too expensive, innovation will keep consolidating among the big corporations," he says.

Regulatory steps to bring gene-edited varieties to market have not been tested so no one is clear yet on how it will go.

"The regulatory system we have now is the same one we had 20 years ago. It's case-by-case," says Thomas with the CGC. "What we need now is a more predictable system, based on risk, where all the steps are clear. Some of Canada's trading partners are providing a much better regulatory climate for crop innovation."

> "What we need now is a more predictable system, based on risk, where all the steps are clear. Some of Canada's trading partners are providing a much better regulatory climate for crop innovation."
>
> —Krista Thomas

The United States Department of Agriculture (USDA) provided some clarity in March 2018 when it announced it has no plans to regulate plants that could otherwise have been developed through traditional breeding techniques – as long as they are not plant pests. In addition, the USDA has a process called 'Am I Regulated?' where developers can query the agency as to whether their latest genome edited product is a regulated article. While this is a step forward for innovation, Thomas says the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) – who also have authority in this space – continue to evaluate their regulatory approaches.

Japan is also pulling further ahead, she says, with public consultations this spring on its gene-editing regulations. China is doing a lot of research and development on CRISPR in crops, but the domestic seed industry wants to see clear rules, Thomas says, adding, "We are eager to see what China's approach will be because it could have a major impact on trade."

In Canada, gene-edited plants can fall under 'novel products' regulations, which are the domain of the Canadian Food Inspection Agency (CFIA) and Health Canada. The CFIA looks at the environmental and feed safety of the plant, and approves it for sale as seed or animal feed. Health Canada covers food safety.

"We believe," Sippell says, "that given the precise nature of the changes that these tools allow, they will be perceived favourably by the regulators."

RNA INTERFERENCE: THE TOOL AND THE REGULATIONS

An explanation of RNA interference starts with deoxyribonucleic acid (DNA), the long double-helix molecules repeated in all cells. DNA contains the genetic codes for growth and function of an organism. Ribonucleic acid (RNA) picks up those codes and sends code-containing messages throughout the organism to grow, defend, set seed, senesce, and everything else a plant does. DNA is the instruction book, RNA is the foreman carrying out the instructions. RNA interference (RNAi) is as it sounds: Researchers have found out how to use strands of RNA code to interfere with these critical messages. To give a Canadian canola example, Mark Belmonte and his colleagues at the University of Manitoba have found an RNAi-targeted gene within the sclerotinia pathogen that controls a function necessary for its survival. With that discovery, they then made an RNAi molecular fungicide that stops that function and kills the fungus.

There are two choices to deploy such an RNAi discovery. One, the RNAi molecule can be made into a foliar spray. Two, a plant could be given a gene to produce the defence molecule itself.

No RNAi pesticide sprays have been approved in Canada or any of our major markets. Bayer has a product in development to treat for varroa mites in honeybee hives. Honeybees actually carry the product into brood cells within their hives where the mites initially infest bees, with the product having no effect on the bees. Kristin Huizinga, who leads RNAi regulatory efforts for Bayer in St. Louis, Missouri, expects the company to make a submission to the U.S. EPA sometime this year and then to the Pest Management Regulatory Agency (PMRA) in Canada in the following years.

"We see this as a biological pesticide, but there hasn't been another RNAi pesticide of this type to advance through the regulatory process," Huizinga says. "In general, the first product in a category receives lots of scrutiny just by nature of being the first – and that means the approval process may take longer."

Even before making an official submission for approval, a new product needs to go through a series of tests, including mammalian toxicity and ecological toxicity on non-target organisms. Companies must also provide details on how a product is made and how it will be used.

"We are in close communication with the EPA throughout the process," Huizinga says.

Close communication with regulators is important, says André Gagnon, media relations officer for Health Canada. PMRA requires a similar set of studies, and Gagnon says the first step in bringing a pesticide to market in Canada is to request a pre-submission consultation with PMRA. "In general, a pre-submission consultation will provide guidance on how to

Syngenta is actively researching the use of RNA-based biocontrols as a targeted foliar spray for flea beetle control. "We have demonstrated that this platform is effective as a control agent and we are focused on field trials to understand this activity in production agriculture settings," says Chris Davison with Syngenta Canada.

submit a complete, high-quality application package to register a pest control product or to amend the registration of a registered pest control product," Gagnon says. It also sets application timelines and outlines the required forms and data requirements.

"Currently, there are no open applications to register RNAi pesticides in Canada," Gagnon says, but adds: "In 2017 and 2018, PMRA received several research applications for RNAi pesticides for use under specific conditions (including a restriction on the size of the area treated and the requirement that the crop be destroyed at the end of the trial), most of which were approved."

The potential for RNAi has brought some new names into the space. GreenLight Biosciences, for one, developed a new way of scaling up RNAi products for commercial use and, seeing the potential in agriculture, has hired some agricultural expertise. Mick Messman, GreenLight's chief commercial officer, says they're furthest along with a Colorado potato beetle protection product. The company also has a potential RNAi flea beetle product in the discovery phase.

Farther along the flea beetle pathway is Syngenta, which is actively researching the use of RNA-based biocontrols as a foliar spray for flea beetle control. "We have demonstrated that this platform is effective as a control agent and we are focused on field trials to understand this activity in production agriculture settings," says Chris Davison with Syngenta Canada.

"It is difficult to anticipate exactly when a new RNA-based biocontrol product will come to market, especially when they are in active research mode, but we expect it will be several years yet," Davison says. "We continue to work with regulators around the world regarding the regulatory pathway and what is required as part of the development process."

MARKET ACCEPTANCE KEY

No matter what we approve in Canada, whether a gene-edited variety or an RNAi pesticide, the Canola Council of Canada will not support the use of seed innovation or pesticides that would cause concerns in our major markets.

"We have a strong record of partnership in the canola industry," says Brian Innes, vice president of public affairs with the Canola Council. "Our value chain, which brings growers, life science companies, processors and exporters together, continues to have a strong commitment to encouraging innovation while ensuring stable access to export markets."

"We have a strong record of partnership in the canola industry. Our value chain, which brings growers, life science companies, processors and exporters together, continues to have a strong commitment to encouraging innovation while ensuring stable access to export markets."

—Brian Innes

Sometimes this means that beneficial seeds or pesticides can't be commercialized in Canada because they are not accepted in export markets, Innes says.

With significant uncertainty around how large canola markets will regulate new plant breeding tools, how these policies are finalized is of significant interest to the canola industry. That's why the Canola Council is a member and significant funder of the Canada Grains Council's work to advance trade promoting plant breeding policies internationally. With policy issues affecting grains being similar across commodities, the Grains Council takes the lead on national and international advocacy related to plant breeding for all grains.

When it comes to innovation in canola, the Canola Council is responsible for ensuring coordination among the canola value chain and advocating for canola innovation. By promoting transparency and bringing the weight of the full value chain to advocacy efforts, the Canola Council works for the long-term success of all members of the canola value chain.

While agriculture works through these regulations and eventually brings these new tools to the fields, Sippell anticipates a positive outcome. "This is a good news story around innovation for canola in Canada."

—Jay Whetter is the editor of Canola Digest.

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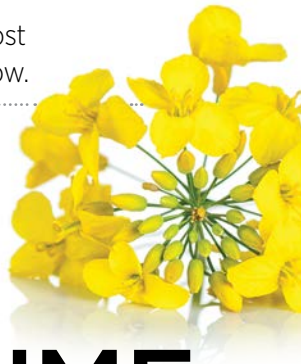
Canada's three new trade agreements will do more than increase the demand for canola. The most important advantage is the opportunity to extract more value from every tonne of canola we grow.



THREE NEW TRADE AGREEMENTS BRING VALUE BEYOND VOLUME

BY GAIL GRANGER

The past 18 months have been momentous for Canadian canola exporters. Since September 2017, three major trade agreements have either come into force or moved toward ratification, giving Canada preferential access to markets making up two-thirds of the world economy.

Shrinking tariffs means more Canadian canola will be bound for export markets and more value will make it back to Canada. But the goal of these trade agreements is more strategic. The ultimate aim is to get the most for our canola in export markets so that the benefits can ripple through the value chain and throughout the Canadian economy.

"At the end of the day, these trade agreements are not about the big corporations getting a two per cent or five per cent reduction in tariffs. They're about bringing more money into the local economy," says Kevin Serfas, a Canola Council of Canada board member who farms near Turin, Alta. "It starts with the exporters, moves down to the farmers and carries through to the farm machinery dealerships and other local businesses."

MORE OPPORTUNITY FOR VALUE-ADDED PRODUCTS

One of the most exciting aspects of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is the elimination of tariffs on Canadian canola oil exports to Japan. That's a huge boon to Canadian oilseed processors. High tariffs will gradually decline to zero by 2023, putting Canada on equal footing with our Australia competitors, who have enjoyed a free trade agreement with Japan for several years. Japanese customers will then be able to choose whether they import canola seed, canola oil or canola meal.

Japan is not a new market for Canadian canola. In fact, Japan is our most consistent importer, and canola oil has become the number one edible oil in the country. But until now, Japan has imported only canola seed, which is then processed at its own plants. That means the value-added benefits of our strong trade relations with Japan were limited – until CPTPP was implemented at the end of 2018.

"Once the tariffs on value-added products are phased out, we expect canola oil and meal exports to grow by up to $780 million,"

Table 1: The three agreements, at a glance

AGREEMENT	WHAT IT MEANS FOR CANOLA	STATUS	EXPECTED IMPACT
CETA Canada-European Union Comprehensive Economic and Trade Agreement	Elimination of all tariffs on canola oil and biodiesel entering the 28 member-states of the EU.	Implemented in September 2017. Ratification continues in individual member states.	Increased exports valued at up to $90 million annually.
CPTPP Comprehensive and Progressive agreement for Trans-Pacific Partnership	Gradual reductions in tariffs on imports of canola oil and meal, with complete elimination by 2023.	Ratified by seven countries (Canada, Mexico, Japan, Singapore, New Zealand, Australia and Vietnam), with Chile, Peru, Brunei and Malaysia countries expected to come on board in 2019. Tariff reductions started December 30, 2018.	Up to $780 million increase in annual exports of canola oil and meal.
CUSMA Canada-United States-Mexico Agreement	Canola seed, oil and meal remain free of tariffs. Tariffs will be removed on further-processed products like margarine. Dispute settlement mechanisms. strengthened through new chapters on competitiveness and good regulatory practices.	Signed in November 2018. Awaiting ratification in Canada, the U.S. and Mexico.	Continued stability in a $3.7 billion market for Canadian canola oil, meal and seed.

Brian Innes (left), Canola Council of Canada vice president of public affairs, talks trade with Jim Carr, Canada's Minister of Trade Diversification.

says Brian Innes, the Canola Council's vice president of public affairs. "We've been chasing this market for years and it's really amazing that it's finally going to happen."

The CPTPP is opening up similar opportunities for value-added products in the promising market of Vietnam. That country's tariff on Canadian meal imports completely disappeared on January 14, 2018, and the country's tariff on oil will gradually drop to zero by 2022.

Meanwhile, the Canada-European Union Comprehensive Economic and Trade Agreement (CETA) has opened up more opportunities for value-added products by eliminating all tariffs on Canadian canola oil and biodiesel entering the world's largest market for biofuels.

MORE PROCESSING JOBS TO STIMULATE LOCAL ECONOMIES

With the certainty of tariff-free access for value-added products in nearly 40 countries, Canadian companies are gearing up to expand domestic processing. One company looking forward to the new opportunities is Cargill, which has steadily grown its Canadian processing capacity over the past few years – most notably at Camrose, Alta., where a new state-of-the-art plant opened in 2015.

Ken Stone, assistant vice president for Cargill's Canadian canola processing business, says the new trade agreements will allow the industry to go toe-to-toe against the big vegetable oil commodities like sunflower, palm and soy. "Then we'll really be in a position to leverage the economies of scale we have at places like Camrose, while bringing a great product to these markets," he said.

As processing expands here in Canada, new jobs will soon follow. In Camrose, for example, the Cargill plant has created 75 new jobs.

PRESERVING AN INTEGRATED SUPPLY CHAIN WITH OUR BIGGEST MARKET

For Kevin Serfas, the most impactful of the three new trade accords is the Canada-United States-Mexico Agreement (CUSMA), which is aimed at maintaining tariff-free access to two of Canadian canola's largest markets.

Tariffs Facing Canola Oil in CPTPP Countries

The CPTPP entered into force on December 30, 2018, with the members that have ratified it – Mexico, Singapore, Japan, Australia, New Zealand and Canada. Vietnam has also ratified it, and the implementation date for tariff reductions to start with Vietnam was January 14, when two tariff cuts occurred.

Table 2: Tariffs for Canadian Canola Oil Going to Japan under CPTPP

	Crude	Refined
	%*	%*
Previous	11.9	14.4
December 30, 2018	9.9	12.0
April 1, 2019	7.9	9.6
April 1, 2020	6.0	7.2
April 1, 2021	4.0	4.8
April 1, 2022	2.0	2.4
April 1, 2023	0.0	0.0

*Percentages are approximate as Japanese tariffs are calculated as yen/kg. % tariffs calculated using oil at $1104/tonne and 82.8 yen/CAD.

Table 3: Tariffs for Canadian Canola Oil Going to Vietnam under CPTPP

	Crude/Refined
Previous	5%
January 14, 2019	3%
January 1, 2020	2%
January 1, 2021	1%
January 1, 2022	0

Current Vietnamese bound tariffs on crude/refined oil (5%) will be phased out over five years. Bound tariffs on meal (5%) will be eliminated immediately. Currently oil has a 5% tariff applied, whereas meal enters duty free.

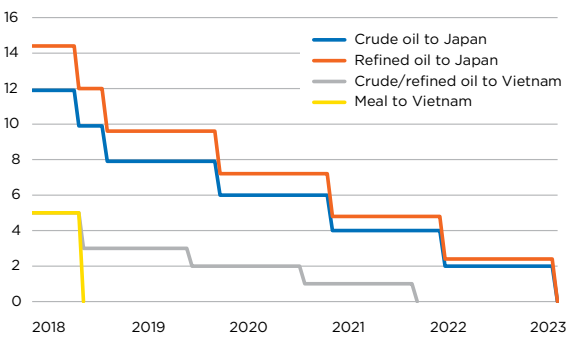
"Some see it as just a rejigging of NAFTA, but keeping that trade relationship in place is the most important part of the puzzle," says the Alberta farmer. "To lose it would be disastrous."

The many companies involved in agri-food processing on both sides of our border would agree, and for a variety of reasons. Under NAFTA, these companies have formed regional supply chains that rely on the free flow of products back and forth across borders as they undergo further processing.

For example, a U.S. food manufacturer might import canola oil as an ingredient for its salad dressing or frozen lasagna, which it then ships back to Canada for sale through retailers and restaurants. The absence of tariffs means businesses can keep operating costs low as products move through these cross-border supply chains, which ultimately results in lower prices to the consumer and a globally competitive North American agri-food industry. The CUSMA will preserve this advantage, boding well for the future of North America's food manufacturing sector.

"There were also some additional wins for supply chains under the CUSMA," Innes says. "The rules of origin were updated for further-processed products, which means that canola-based margarine will be tariff-free as it enters the U.S. market."

Table 4



*By 2023, tariffs on imports of Canadian canola oil and meal will gradually disappear in Japan and Vietnam. Tariffs will be substantially lower by 2020, creating a new market for $780 million in oil and meal exports.**

**Japanese tariffs are approximate, as they are specific rate tariffs calculated as yen/kg.*

WHAT'S NEXT

The Canola Council and industry partners spent countless hours working with Canadian negotiators as the CPTPP, CETA and CUSMA took shape. Now that the agreements are signed, the next goal is to make progress on the non-tariff barriers that can interfere with market access in a highly regulated realm like agri-food. Alignment of food and feed safety regulations, maximum residue limits related to pesticides and plant breeding innovations are among the many potential issues that can be resolved through the working groups committed to by members of the CPTPP and CETA.

"Through NAFTA, we've seen how effective this approach can be," Innes said. "The working group on pesticides was the most successful of the NAFTA working groups, and we now have the opportunity to continue this good work with a much larger group of trading partners."

–Gail Granger is a freelance writer based in Winnipeg.

"Some see [CUSMA] as just a rejigging of NAFTA, but keeping that trade relationship in place is the most important part of the puzzle. To lose it would be disastrous."

–Kevin Serfas

5 SIMPLE TIPS TO KEEP YOUR CANOLA READY FOR MARKET

1 Use acceptable pesticides only

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

2 Always read and follow the label

Applying pesticides or desiccants without following label directions may result in unacceptable residues.

3 Grow disease-resistant varieties & use practices that reduce infection

Diseased crops may create a market risk.

4 Store your crop properly

Maintain crop quality and keep canola bins malathion-free.

5 Deliver what you declare

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One change for the better

As you head into the 2019 growing season, what one thing would you like to change in the business this year? Machinery? Logistics? Farm size? Crop rotation? Staff management? Canola Digest asked these four farmers for their thoughts.

BY JAY WHETTER

TREVOR THOMPSON
ASSINIBOIA, SASK.

Trevor Thompson plans to use soil moisture monitoring technology to improve his fertilizer management. Two years of really dry conditions in southern Saskatchewan has left the farm with very little reserve moisture. "We're at the equivalent of about 1 inch of rainfall in the soil right now," he says.

The moisture situation has him thinking extra hard this year about fertilizer rates. Thompson wants to keep a lid on input costs if the drought continues, but he also wants to be able to respond with in-crop fertilizer if in-season rains return to something close to normal. He will use a fertilizer rate at seeding that reflects the soil moisture situation, with perhaps a little extra in anticipation of at least some rain. "With budgets based on the current soil moisture situation, it's too risky to apply nutrient for much more than about a 35 bu./ac. canola yield," he says.

Soil moisture probes will be a key tool for his in-crop management decisions. Taking inspiration from well-known Saskatchewan soil scientist Les Henry, who says "soil moisture is like money in the bank," Thompson will install soil moisture probes on at least two, possibly three, weather stations on his farm this year. Stations will be placed in a representative area of the field after seeding, with soil moisture probes buried three feet deep. He's using John Deere Field Connect probes, which use capacitance sensors to measure soil water. "The probe sees exactly what the plant root sees in terms of total moisture and usable moisture," Thompson says.

The probes and their yield-estimating algorithms determine the 'water-driven yield potential' at any given moment. "If we get 10 inches of rain and yield expectation goes to 55 bu./ac., then I will have to apply a lot of nutrient to make up the yield gap," Thompson says.

Phase two of the plan for 2019 is to figure out the best way to apply that fertilizer. He's still working on which is the most efficiency method. "I think it's a game changer if I can use these moisture probes to estimate yield potential and then figure out how to get top-up nitrogen and sulphur into the crop efficiently," Thompson says.

"I think it's a game changer if I can use these moisture probes to estimate yield potential and then figure out how to get top-up nitrogen and sulphur into the crop efficiently."

–Trevor Thompson

JAMIE MITCHELL
EAGLESHAM, ALTA.

Jamie Mitchell would like to upgrade his equipment to match the size of the farm. Mitchell and his wife, Laura, a vet who works in Grande Prairie, were just about to leave the farm three years ago. Mitchell was farming with his older brother David and the farm wasn't quite big enough for two families. Two days after they had the conversation, a neighbour offered to sell the Mitchells his whole farm, lock, stock and barrel.

So they bought the farm and stayed put. It was a big jump, bringing the family operation up to 5,000 acres. The bank approved the mortgage, but asked if they could handle that many acres with the same equipment. The Mitchells said they could, but now three years later, they're looking at some upgrades.

They currently seed with a 64-foot Bourgault 5710 with Model 6550 tank. "I would love to move to a para-link drill with a bigger tank for more efficiency," Mitchell says. "It all starts in the spring. For us, the keys are consistent seed depth and distribution."

He likes the idea of seeding canola with a planter for accurate seed depth and spacing. At Ag In Motion 2018 in Saskatoon, he noticed a focus on some of the smaller, faster European seeding tools, but at the end of the day, he has to justify the cost. As it is, the new model drill-tank combo he has in mind is $700,000. "There seems to be a disconnect between the cost of equipment and what a farmer can afford," he says.

He sees a lot of benefit in section control to eliminate overlap. "Neighbours have it and love it," he says. But he doesn't see any benefit yet in investing in a variable-rate application system. "If you only get two inches of rain, you're not getting the yields to justify that investment."

"I would love to move to a para-link drill with a bigger tank for more efficiency. It all starts in the spring. For us, the keys are consistent seed depth and distribution."

–Jamie Mitchell

SCOTT MOWBRAY
CARTWRIGHT, MAN.

"If I could change one thing, I'd like to have all my debts paid off," says Scott Mowbray. "That would make farming pretty fun."

Instead, the Mowbrays are making a change in 2019 that some might think would move the farm in the opposite direction: they're extending their rotation.

"We're finally going to fully realize a three-year rotation across the farm, with one third in canola, one third in wheat and one third in soybeans and peas," Mowbray says.

"We had been heavy on canola," he says. "We had wheat and the odd field of soybeans and flax, but never enough for a proper rotation."

Clubroot is a key motivator. Clubroot DNA was detected on one of their fields at very low levels, and Mowbray wants to keep it that way with clubroot-resistant varieties and a three-year rotation.

So how does he balance the financial goals of the farm by going to a rotation that maybe doesn't produce the same revenues? It starts with an accurate assessment of whole-rotation returns, he says.

"We originally thought of soybeans as a replacement for canola. But because our soybean yields in the beginning were 10 to 20 bu./ac. less than our canola yields, it didn't make any sense financially to reduce canola acres and increase soybean acres," Mowbray says. "But then we got thinking that soybeans are actually a replacement for canola *and* wheat acres." The improved return from the soybeans that replace wheat acres will balance off any losses from soybeans that replace canola acres, he says.

It also helps that genetic improvements over the past 10 years have narrowed the yield gap between soybeans and canola on their farm. "That makes it even easier to profitably integrate soybeans into our rotation," he says. "There will be no negative effect on our ability to service our debt."

And the Mowbrays get the risk management benefits that come with a three-year rotation. "We're trying to take the long view. We've got to do this for the health of the farm and the soil."

Mowbray says if their growing conditions were a little drier, he'd like to grow more peas as an alternative to some of the soybean acres. He likes that peas provide some residual nitrogen and he's had some good pea crops, but high moisture increases disease and lodging. "If they would just stand up, I'd grow more of them."

"We originally thought of soybeans as a replacement for canola. But because our soybean yields in the beginning were 10 to 20 bu./ac. less than our canola yields, it didn't make any sense financially to reduce canola acres and increase soybean acres. But then we got thinking that soybeans are actually a replacement for canola *and* wheat acres."

–Scott Mowbray

LEONARD FOSTER - SPRINGSIDE, SASK.

Leonard Foster worked with CCC agronomy specialist Warren Ward in 2018 on a sentinel field project for canolawatch.org. After this experience, Foster plans to raise his canola yield target to 50 bu./ac. for 2019, up from 45 bu./ac. in 2018. "I plan to increase my nitrogen and phosphorus fertility rates, and continue to apply some potassium," he says. In 2018, he applied 105-35-10-25 on his canola, including 15 lb./ac. of phosphate in the seed row.

Foster will also test a new seeding date. "I usually seed all of my canola at once after my peas and after some of my wheat. For 2019, I am going to seed some canola first before any other crop, then come back and seed the remainder a bit later."

As a third step, he'd like to upgrade to an independent opener drill... if he can find a really good deal. "Depth control is something that I struggle with because my drill does not have independent openers and I always see some variability with it," he says. If he does buy a drill, used or demo'd, he'll make sure it's spotless before bringing it home. "I don't want clubroot," he says.

When it comes to seed, Foster likes pod-shatter tolerance. "Even though I swath, I like this trait because it allows me to swath later and not have the same losses as with a non-tolerant variety." He used the trait for the first time in 2018 and will use it again. He's also paying close attention to blackleg and clubroot resistance. "Blackleg resistance is important. Although I have not utilized the new gene labels yet, it will be something I look for in the future," he says. "Clubroot resistance is also not a trait I have used on my farm yet, and don't plan on it for 2019, but I will probably be using it for the following growing season."

–Jay Whetter is the editor of Canola Digest.

PAMI compared seed damage and distribution for two common drills running at low, medium and high fan speeds. The study found minimal damage to canola seed, even at high fan speed. The study also found that while distribution of canola seed tended to be lowest at the outer extremes, higher fan speed reduced this variability.

PAMI STUDIES FAN SPEED EFFECT ON DRILL FUNCTION

BY RICHARD KAMCHEN

Some surprises emerged from recent Prairie Agricultural Machinery Institute (PAMI) trials that studied air seeder distribution and damage.

"One of the variables we wanted to understand was how fan speed affected both distribution and seed germination at low, medium and high fan speeds, or airflow rates," says Lorne Grieger, PAMI's Manitoba operations manager of agricultural research and development services. "In canola, this is especially important due to the large quantity of fertilizer that is typically applied and distributed through the air seeder."

For the canola trials, PAMI used seed and fertilizer to represent a typical operating condition and interaction between the seed and fertilizer granules.

Higher air flow rates produced by higher fan speeds reduce the risk of plugging in the distribution system. But the test sought to explain how this can affect distribution and seed germination in order to allow producers to adjust their air flow, or metering rates, to accommodate any changes, if necessary.

"In this study we found the fan speed had a minimal effect on canola germination," says Grieger. "We also found that higher fan speeds decreased the variation in canola."

SURPRISING

Grieger, an agricultural engineer, said he expected to see fan speeds have a greater impact on seed germination. Average rate of germination for canola was 96.4 per cent at low fan speed, 96.0 per cent at medium fan speed and 95.2 per cent at high fan speed. Although finding the reason why wasn't part of the study, he thinks it might reflect the smaller size of canola seeds, which lessened the chances of them sustaining damage.

Not only was there little damage, but the higher fan speed actually improved the variation of seeding rates across the drill when canola was applied with fertilizer, Grieger notes.

In trials comparing results for canola, wheat and soybeans, canola generally had the greatest variability in distribution. Manifolds on the outer extremes tended to receive less product. Grieger says the high amount of fertilizer that's put down with the canola seed accounts for at least some of the variation.

EQUIPMENT

The trials, conducted last year, used two used 60-foot air seeders – a John Deere 1910 cart and 1890 tool and a Bourgault 6550 cart and 3710 tool – and three fan speeds: high, medium and low. The low speed was the lowest recommended by the manufacturer. PAMI increased fan speed by 15 per cent for medium and another 15 per cent (or up to the max speed recommended) for high.

"It is important to note that we worked with local producers using their air seeders after they completed their seeding operations," says Grieger. "Both air seeders were used and, therefore, results from newer systems will likely be different."

Both units are effective at metering all seed types and delivering seed and fertilizer across the width of the seeder, he says.

Grieger adds both systems have variability but are in the range he would expect for wide distribution systems moving large quantities of product and having seeded thousands of acres.

STUDY RELEASE

Grieger planned to have full study results available at the Crop Connect Conference in Winnipeg in February. By now, results should be free for download on PAMI's website at **pami.ca**. Grieger thanks the producer groups Manitoba Canola Growers, Manitoba Pulse and Soybean Growers, and Manitoba Wheat and Barley Growers Association for their support.

–Richard Kamchen is an agricultural freelance writer based in Winnipeg.

"In this study we found the fan speed had a minimal effect on canola germination. We also found that higher fan speeds decreased the variation in canola."

–Lorne Grieger

LEFT: This John Deere 1890 seeding tool with Model 1910 cart was one of two units tested in the PAMI study. RIGHT: The other was this Bourgault 3710 tool with a Model 6550 cart.

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AGRONOMY INSIGHTS

Tips and tools from the Canola Council of Canada Agronomy Team

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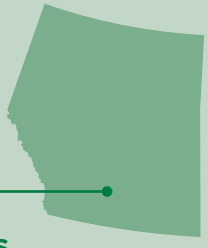

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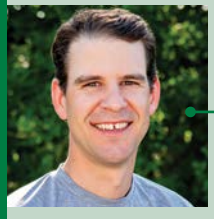

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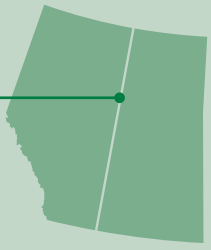

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Twitter: @JurkeCCC

Find the whole team at **canolawatch.org/contact-us**.

TOP 10 WEEDS IN CANOLA

Julia Leeson, weed monitoring biologist with Agriculture and Agri-Food Canada (AAFC) in Saskatoon, lists the top 10 weeds in canola based on results from the latest Prairie-wide weed surveys, conducted from 2014-17.

For the survey, quarter sections were selected by random sample and owners called for permission to check the fields. Surveys are done after in-crop weed control. Surveyors count weeds in 20 quadrats (half a metre by half a metre squares) in each field, taking care to avoid field edges and abnormal areas (drowned areas, bluffs, etc.) Weeds are noted for frequency (per cent of fields with that weed), field uniformity (per cent of quadrats in a field that have that weed), field density (number of weeds per square metre) and relative abundance (which weeds are the most common).

Here are the top 10 most common weeds in canola crops across the Prairies:

1. **Wild buckwheat.** Found in 56.5 per cent of fields, wild buckwheat had the highest frequency by far. Wild buckwheat has been in the top four for decades, but is number one for the first time.
2. **Wild oats.** This familiar weed has been in top three for decades, but overall numbers are going down.
3. **Green foxtail.** This weed was found in 25 per cent of fields, but among those fields, it had the highest average density of any other weed in the top 10.
4. **Volunteer wheat.** Wheat had never cracked the top 10, until now, possibly reflecting typical rotations where wheat precedes canola.
5. **Cleavers.** More accurately called 'false cleavers', this weed keeps moving up the list. Perhaps better in-crop control in canola, with the availability of quinclorac, will help.
6. **Chickweed.** This was found in only 14 per cent of fields, but within those fields it can be very heavy in patches. In one field, surveyors recorded an average density of 1,073 per square metre.
7. **Volunteer canola.** This made a big jump from spot 32 in the 2000s survey.
8. **Spiny annual sow thistle.** This is another weed that, like chickweed, can be very heavy in small patches. In one field, surveyors recorded an average density of 545 per square metre. Spiny annual sow thistle made the top 10 for the first time, up from spot 20 in the 2000s survey and 33 in the previous two surveys.
9. **Lamb's-quarters.** This was the number two weed in the 1980s, and frequency has been going down ever since.
10. **Canada thistle.** Frequency is down from the previous survey. It just slightly edged out shepherd's purse (which is also going down) and dandelion.

While not in the top 10, these weeds are moving up the list: Barnyard grass (13), cudweed (15), plantain (18), round-leaved mallow (21), northern willowherb (24) and foxtail barley (27). Farms noticing an increase in these weeds may want to check weed management practices to see how they can be controlled.

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canolagrowers.com/upcoming-events/combine-college

JULY 10 in Lethbridge, Alberta | Enmax Centre
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Credit: Case IH

THE RISK WITH LOW PLANT POPULATIONS

Credit: iStock.com/ooyoo

Economic analysis suggests that a canola stand of five to eight plants per square foot is the most profitable based on yield potential and input costs. But while surveying for weeds, the team led by AAFC weed monitoring biologist Julia Leeson, also surveyed canola stand densities and found that more than half of canola fields are below that threshold.

Here are the latest canola results for each Prairie province:

2017 in Alberta: This survey had the lowest canola plant-density recordings, with fewer than five per square foot in 75 per cent of fields. (One third of fields surveyed had fewer than three canola plants per square foot.)

2016 in Manitoba: Sixty per cent of fields had fewer than five plants per square foot. (One in five had fewer than three canola plants per square foot.)

2014-15 in Saskatchewan: Fifty per cent of fields had fewer than five plants per square foot. (One in five had fewer than three canola plants per square foot.)

UNIFORMITY A CONCERN WITH LOW COUNTS

Low counts that are uniform can yield quite well in good growing conditions, but one of the risks is that low plant counts combine with poor uniformity across a field. That will mean large patches where fields are not producing canola at an optimal level, Leeson says. Her surveys showed that in fields with an average density of three to 3.9 plants per square foot, over 40 per cent of the area in those fields had areas with an average below three. Even in fields with an average density over four plants per square foot, 20 per cent of quadrats had fewer than three plants per square foot.

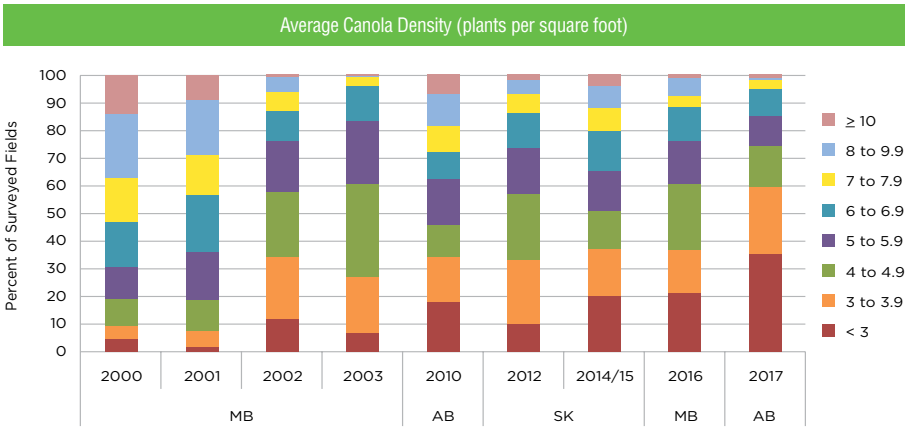
In another canola harvest loss survey of 206 fields from earlier this decade, University of Manitoba professor and researcher Rob Gulden recorded canola stubble density at harvest. Stubble density for the fields ranged from 20 to 120 plants per square metre (or about two to 12 per square foot). Interestingly, the amount of variation, expressed as a percent relative to the stand density, was basically the same for all stand densities. Fields with low plant counts did have variability, but it wasn't better or worse than fields with high counts. However, what this stat does not tell us is that with low plant counts, those thinnest parts of the field could have much lower yields. Thinner areas within already thin stands (areas with less than one plant per square foot in fields with an average of two plants, for example) do not have the same capacity to compensate for lost yield potential the way that thin areas within thick stands can (areas with less than three plants per square foot in fields with an average of six plants).

LOW PLANT POPULATIONS AND MATURITY

Canola plants with lots of space to grow will get bigger and branchier. That is why yields can still be fairly good with low plant populations. But those big plants with lots of side branches will take longer to mature, and quality of harvested seeds in those side branches is at risk of higher green if frost hits them before the green has cleared.

A Saskatchewan study called, "Response of canola to low plant populations and evaluation of reseeding options," by Anne Kirk et al, compared various plant stands from field trials at locations across the province over three years, 2010-12.

The study confirmed that thin stands flower longer and take longer to mature. When site years were combined, the study found a reduction in plant density from 70 to 21 plants per square metre (roughly seven to two per square foot) resulted in a six-day increase in flowering period and a three-day increase in days to maturity. The difference in days to maturity between seven plants per square foot and 0.5 per square foot is nine days, showing how thin patches in a non-uniform field can be unmanageably delayed.



STAND ESTABLISHMENT DATA AT THE RESEARCH HUB

The Canola Research Hub at **canolaresearch.ca** will help you navigate the results from recent research projects, including those on canola plant establishment. In the "Research database" box, click on "What are some of the factors that impact canola emergence," then use the filters to pull out the data that applies most to your farm situation. You can filter the tables in this query by province, year, drill type or other factors. To read more about the studies from which the tables were extracted, select the project in the 'Related Research Summaries' section at the bottom of the page. The same database also has customizable queries on seed-placed fertilizer and flea beetle management.

It's been a busy few months between Canada and China. Over the winter a new trade goal was set, two new canola traits were approved and a Canola Dialogue brought together industry and government.

CANADA AND CHINA SET GOAL TO DOUBLE AG TRADE BY 2025

Jim Everson, president of the Canola Council of Canada, speaks at the Second Canada-China Canola Dialogue in Beijing in November 2018.

Canadian canola will benefit if Canada and China achieve a goal to double agricultural trade between them by 2025. The goal was set at the Canada-China Economic and Financial Strategic Dialogue between governments in Beijing in November 2018 – one of a number of activities that brought positive news for canola.

Jim Everson, president of the Canola Council of Canada (CCC), says the overall Canada-China trade goal aligns with the Canadian canola industry's goal of 26 million tonnes of canola production and demand by 2025. Achieving that goal will require about a 25 per cent increase in Canadian production and exports from the current three-year average. China, which is already Canada's largest canola seed customer, will continue to be an important growth market, Everson says.

November also marked the second annual Canola Dialogue that brought together industry and government from both Canada and China. Organized by the CCC, the event included representation from all segments of the canola value chain and helped to create conversation on how to make canola trade more stable and predictable.

Speaking after the November meetings with China, Everson said: "Doubling exports means that we will need to address barriers to trade and turn commitments into outcomes."

One area Everson was referring to was the approval of three canola traits in particular – a Liberty-tolerance trait from BASF, Bayer's TruFlex and Corteva's Optimum GLY. The traits were developed using biotechnology and, though approved in Canada since 2012, were still not approved in China as of November 2018. Without approval in major markets, the traits had not been commercialized in Canada.

Just two months later, on January 8, China approved two of the traits – the Liberty-tolerance trait and the TruFlex trait. This allows for commercial launch of the traits in Canada, an important step to improve Canada's canola productivity and meet export targets.

Everson called it a great day for canola innovation. "These traits will make Canada's canola crop more resilient in the face of weed, disease and weather stresses. Not only will we be able to produce more canola to meet growing world demand, we'll also be able to do it sustainably, using the same land base," Everson says.

Once these two traits and Corteva's Optimum GLY are fully commercialized, the industry expects growers will produce 800,000 tonnes more canola, worth approximately $400 million, every year using the same amount of land – a step-change for canola productivity.

Everson adds: "It's encouraging to see government engagement result in action."

He says official dialogues with China, the memorandum of understand (MOU) on blackleg and the approval of traits are all part of the effort to match growing Chinese demand with increased Canadian productivity. Canada's canola sector will continue to work with China to improve trade predictability, an important step in achieving the goal to double agriculture trade between the two countries by 2025.

YOUR KEEP IT CLEAN! CROP CALENDAR

From deciding what to grow, to crop protection, to harvest and storage, the choices you make along the way can make a big difference. Help maintain Canada's reputation as a supplier of high quality canola by following the ***Keep it Clean!*** best practices throughout the year.

PLAN YOUR PLANTING

- **ROTATE** blackleg resistance genes.
- **DO NOT PLANT** de-registered varieties.

SPRAY SMART

- Only use acceptable pesticides and always **FOLLOW THE LABEL.**
- Apply pre-harvest glyphosate only when seed moisture is **LESS THAN 30%**.

GET OUT AND SCOUT

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EXPORTED

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- Make sure your storage bins are **CLEAN** and free of **CROSS CONTAMINANTS.**

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For more information, visit: **keepingitclean.ca/canola**

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Keep it Clean!

The Canadian Canola Growers Association works to ensure farmers and modern agriculture practices are recognized as a solution to global challenges such as food security and ending hunger. CCGA representatives shared their views at recent United Nations events in Rome.

Photo credit: FAO

CANADIAN FARMERS SUPPORT MODERN AGRICULTURE AT **U.N.** EVENTS

BY SANDI KNIGHT

When it comes to international policy discussions, the most trusted and respected voice is that of the farmer. They speak with authenticity, passion and have hands-on knowledge about modern agriculture production and practices in Canada.

Discussions and decisions made far from the Prairies have an impact on domestic agriculture policy, the environment we trade into, as well as the development and acceptance of new agricultural technology. For example, multilateral institutions, including the United Nations' Food and Agriculture Organization (FAO), set global policies and standards for the world to follow.

In 2015, the 193 members to the United Nations adopted 17 sustainable development goals (SDGs) including one to 'End Hunger'. Currently, the FAO is exploring what can be done to realize these goals and how to measure progress. As a member of the International Agri-Food Network (IAFN), the Canadian Canola Growers Association (CCGA) is working to ensure modern agriculture is recognized as part of the solution, and that farmers are central to any solution.

"The Canadian Canola Growers Association is committed to ensuring canola farmers have access to innovative tools to grow their crops sustainably," says Rick White, CCGA's CEO. "Our interest is ensuring that modern agriculture is fully recognized as a solution to global food security, and that systematic barriers don't infringe on farmers' access to new tools – technological, chemical, mechanical or social."

Having the farmers' voice heard on the global stage is key to achieving that goal. Last fall, two meetings at the FAO headquarters in Rome provided a prime opportunity to do so.

CCGA attended the 45th Committee on World Food Security meeting October 15-18, 2018.

Decision makers and influencers from 40 countries came together at this annual event to discuss how to address food security, advance nutrition globally and explore a variety

"Globally, there are fundamentally different views on how to advance sustainable agriculture systems and the best approach to achieving food security and ending hunger."

–Janelle Whitley, policy manager at CCGA

Photo credit: FAO

"It is crucially important for farmers to have a say in the discussions that impact agriculture globally, particularly in showcasing the advancements we have achieved in Canada through technology."

–Jack Froese, president of CCGA

CCGA CEO Rick White speaks at The Future of Farming side event at the 45th Committee on World Food Security meeting October 15-18, 2018 in Rome. White discussed the financial, social and environmental benefits conservation tillage has created in Canada.

LEFT: CCGA representatives attended the first ever FAO International Symposium on Agricultural Innovation for Family Farmers, November 21-23, 2018 in Rome. Jack Froese, CCGA board president and farmer from Winkler, Manitoba, presented at the symposium.

of issues relating to agriculture. This included policy recommendations on sustainable agriculture development.

White attended and presented as a panelist at a side event called The Future of Farming. He discussed the financial, social and environmental benefits conservation tillage has created in Canada. White highlighted how Prairie farmers are now using resources more efficiently and achieving environmental gains. While conservation tillage has become a regular practice in Western Canada, many developing country farmers continue to struggle with soil erosion and degradation.

CCGA representatives also attended the first ever FAO International Symposium on Agricultural Innovation for Family Farmers, November 21-23, 2018. The symposium theme was 'Unlocking the potential of agricultural innovation to achieve the Sustainable Development Goals'.

This important inaugural event was a direct response to member countries' encouragement that the FAO empower smallholders and family farmers through innovation. Delegates from 92 countries attended. They included representatives from intergovernmental organizations, private sector entities, civil society organizations, academia/research organizations and producer organizations.

Jack Froese, CCGA board president, and Janelle Whitley, CCGA manager of policy development, took part in various bilateral meetings and special events focused on innovation. Froese presented at another Future of Farming panel event, speaking on the importance of seed breeding and his farm's experience with biotechnology and seed pod shatter resistance. He highlighted seed innovation as an invaluable tool to increase yield, manage disease and climate pressures and use resources more efficiently.

"Decisions made multilaterally impact farming in Canada," he explains. "As, such, it is crucially important for farmers to have a say in the discussions that impact agriculture globally, particularly in showcasing the advancements we have achieved in Canada through technology."

Whitley adds, "While Canadian farmers have embraced and fully incorporated technology, many of the world farmers, particularly those from developing countries, don't have access to the same benefits. Globally, there are fundamentally different views on how to advance sustainable agriculture systems and the best approach to achieving food security and ending hunger."

Attending and presenting at multilateral and multi-sector meetings is key in fostering further innovation not only in Canada, but across the world.

"The canola sustainability story is quite remarkable, and should be shared outside Canada," says White. "Technology has transformed agriculture in Canada, enabling the efficient use of resources and softening agriculture's environmental footprint, while achieving increased yields and enhancing their farmers' livelihoods."

CCGA continues to look for opportunities to raise farmers' voice at a global level. Just as farmers' direct conversations with Canadian consumers are powerful and leave a lasting impression, so do talks with the international community, where face-to-face interactions are highly valued.

Farmers are key in nurturing, maintaining and growing our market presence across the world, and ensuring access to the many tools which improve both environmental and economic sustainability. With exports valued at over $11 billion and canola contributing $26.7 billion to the Canadian economy, it is important not only to Canada's 43,000 canola farmers, but to everyone in the value chain.

–Sandi Knight is a farm-based freelance writer from Macdonald, Manitoba.

For more on CCGA's policy and advocacy initiatives, go to **ccga.ca** and look under the Policy tab.

What is the International Agri-Food Network?

The IAFN brings together 15 international organizations, which include thousands of international companies, and hundreds of national associations which represent tens of thousands of small and medium sized enterprises (SMEs), thousands of co-operatives, and millions of farmers. The associations that comprise IAFN have members in 135 of the 193 countries in the United Nations. Find out more at **agrifood.net**.

Does it still make sense to incorporate a farm?

Changes to the income tax rules have made it harder to benefit from the small business tax rates within a corporation, but incorporation can still have significant benefits over a sole proprietorship or partnership for many Canadian farms.

BY JAY WHETTER

Credit: iStock.com/razihusin

As farms become bigger, they can consistently generate income that pushes earnings into the higher personal income tax rates. As a result, a lot of farms incorporate to take advantage of the lower small-business tax rates.

This article provides a quick review of the reasons to incorporate, highlighting the effect of recent changes to tax rules. Kurt Oelschlagel, farm tax specialist and partner with BDO in Hanover, Ontario, provided guidance for this article.

REASON: TAX DEFERRAL

If farm profits put incomes for active members of the operation into a high income tax bracket, incorporation offers an opportunity to pay individuals a wage (taxed in a lower tax bracket) and keep most of the income in the corporation, which is taxed a lower rate. This is particularly beneficial where a corporation is reinvesting proceeds (new equipment, buildings, etc.) or paying down debt.

The small-business tax rate applies to the first $500,000 in profit ($600,000 in Saskatchewan). If not incorporated, the farmer who generated that amount of profit would be in the top income bracket and would pay the personal tax rate of 50 per cent or more (varies by province) for most of that income. If incorporated, farm profits that quality for the small-business tax rate would be taxed at nine to 15 per cent. The actual rate varies by province. (See the table for the Prairie provinces.)

Change: Small-business tax rates dropping. As of January 1, 2019, the federal small business tax rate was reduced by one percentage point across all provinces.

Change: Investment income will reduce the small-business threshold. Effective for taxation years that begin after 2018, corporations earning more than $50,000 in investment income in a year will see their small-business tax exemption threshold clawed back incrementally. With $150,000 or more in investment income in the previous tax year, the exemption is eliminated entirely for the current year.

Change: Income splitting restricted. Income splitting is a way to share income with members of a family who are in lower tax brackets, thus reducing the overall tax owing for the family. As of January 1, 2018, dividends paid to family members from the family farm corporation will be subject to the 'tax on split income' (TOSI), which is the highest rate of income tax, unless specific exemptions apply. For example, those who are actively involved in the business at least 20 hours per week on average in the year or any of the five preceding years will not be subject to TOSI.

Change: Restriction on income from sales to other family businesses. For taxation years of corporations ending after March 20, 2017, there are restrictive rules on accessing the small business deduction. These rules could apply, as an example, when a farm corporation sells property or services to another private company that is owned (even just one share) by a parent, sibling or child.

Let's say you own a farm corporation that sells canola to your brother's corporation which carries on a small specialty canola oil processing business, and the net income of your company from these sales is more than 10 per cent of its total net income. The net income of your corporation from selling that canola is not eligible for the small business deduction and would be taxed at the standard business rate (see the table). In this situation your brother may agree to have his company assign some of its small business deduction to your company, but there is no certainty to that since your brother's company may need it all.

REASON: SUCCESSION PLANNING

Transferring ownership of the farm from one generation to the next can be onerous. Incorporation of a farm, while not necessarily an easy process in itself, can make succession planning a lot easier when that day comes.

"You don't have to change ownership of any assets, such as equipment and inventory, if they are owned by the corporation. You are usually just changing who owns the issued shares of the corporation, such as introducing a child as a new shareholder," Oelschlagel says.

Incorporated farms also have tax-saving benefits when it comes to estate planning, which can reduce the tax burden on surviving members of the corporation.

REASON: LIABILITY PROTECTION

"In general, the personal assets of a shareholder in a corporation are protected from creditor claims against the corporation," Oelschlagel says. Incorporation can also protect personal assets when lawsuits are brought against the corporation. There are exceptions in both cases, Oelschlagel notes. "A shareholder who personally guarantees corporate debt is liable for that debt, and directors can be held legally liable for activities of the corporation," he says.

Incorporation can help with succession. "You don't have to change ownership of any assets, such as equipment and inventory, if they are owned by the corporation. You are usually just changing who owns the issued shares of the corporation, such as introducing a child as a new shareholder."

–Kurt Oelschlagel

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*Source: Bayer DSTs (2014–2018).

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R-39-01/25-11108997-E

Table 1 : Incorporated business tax rates, Prairie provinces						
	Alberta		Saskatchewan		Manitoba	
	2018	2019	2018	2019	2018	2019
Small business tax rate	12%	11%	12%	11%	10%	9%
Standard business tax rate	27%	27%	27%	27%	27%	27%
Income threshold for small business tax rate	$500,000	$500,000	$500,000	$600,000	$450,000	$500,000

DOWNSIDES TO INCORPORATION

Oelschlagel also notes a few downsides to keep in mind. Incorporation does require more record-keeping and tax compliance costs, including a corporate tax return. Incorporation means you can't use business losses in the corporation to offset personal income. "That is why incorporation can make more sense for farms that are consistently profitable, regularly invest in capital upgrades or expansion, and have debt to service," he says. A corporation does not have a capital gains exemption, like an individual does. And when farm residences are transferred to the corporation, the house becomes an annual taxable benefit for the person living there and it also means the loss of the personal principal residence exemption for the years it is owned by the company.

Details of the benefits and downsides to incorporating a farm business cannot be covered in a short article, and the best business structure for any one farm will depend on situations specific to that farm. Accounting firms have good information on farm incorporation. As a start, read the farm incorporation fact-sheets on their websites. When ready to discuss the options, make sure to have an accountant equipped to work through these conversations.

"Despite changes to the tax rules, incorporation is still a very good option for obtaining a tax deferral, succession planning and liability protection for many Canadian farms," Oelschlagel says.

–Jay Whetter is the editor of Canola Digest.

All details on the benefits and downsides of incorporation cannot be covered in a short article. Ag accounting firms often have good information on farm incorporation on their websites. When ready to discuss the options, make sure to have an accountant equipped to work through these conversations.


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