ALBERTA CANOLA
SaskCanola
Manitoba Canola Growers
canolacouncil OF CANADA

March 2022

canola DIGEST

The Source for Canada's Canola Growers

GOOD STEWARDS

Our six farmer panelists, including Leonard Waldner from Maple Grove Colony, describe how they use 4R to increase fertilizer efficiency and do better for their land.

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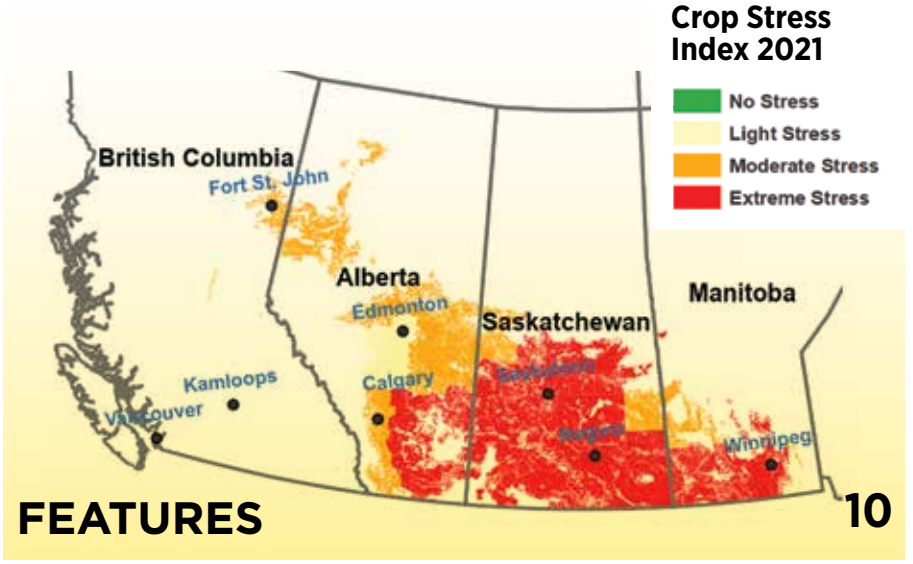

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DEPARTMENTS

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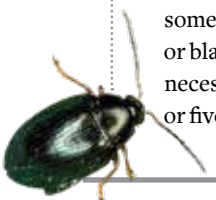

CALENDAR

CANOLA WATCH WINTER WEBINAR SERIES —
March 24, 2022
April 13, 2022
canolacouncil.org/event/canola-watch-webinar-series

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THE EDITOR'S DESK

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The hummingbird

Online events have one benefit – they give me a chance to participate in presentations outside of my immediate mandate. New ideas at low cost. In January, I attended a 90-minute session on Regenerative Cities, part of a webinar series on regenerative thinking. The presenter was Dominique Hes, an Australian architect who designed The Paddock, a park-like neighbourhood in a reclaimed mine site near Castlemaine, Australia. (thepaddockcastlemaine.com.au)

Hes encouraged people feeling immobilized by the scope of a problem to do the best they can within the area they can influence. That area could be a magazine. A town. A farm. A yard. She recommended we look up the hummingbird story. So I did.

The centuries-old hummingbird story originated in Ecuador or Peru, so the Internet tells me, and YouTube has a few short versions. Some call it a parable, which implies a moral or a message, which it has. The story is about a forest fire. All the animals flee to watch from the sidelines, all except the hummingbird. The tiny bird scoops up a droplet of water from a stream and drops it on the fire. It does this over and over again. The animals ask what the hummingbird is doing, and the bird says, "I'm doing what I can."

Rattan Lal has a similar message about small actions having mighty results, as long as we all get involved. I met Lal through Jean-Charles Le Vallée, and I met Le Vallée in the chat room during the Canadian Centre for Food Integrity's online Public Trust Summit back in October. Le Vallée is Canada's representative on the Inter-American Institute of Cooperation in Agriculture (IICA). IICA started in 1942 and supports agricultural development and rural well-being in 34 member countries from Canada to Chile. Le Vallée suggested I interview Rattan Lal, a renowned soil scientist from Ohio State University and goodwill ambassador for IICA. So I did.

Lal gave me a global perspective on soil health initiatives, especially the acute challenge for hundreds of millions of small landowners (farms of just a few acres) who eat the grains from their small fields, then feed the crop biomass to their cattle, then use what's left, including manure, for cooking fuel. Soil biomass and soil health are in bad shape for many of these small farms. One IICA objective is to help small landowners in the Americas identify steps they can take to protect and improve their soil.

You can read more about my conversation with Lal in the article "People are a mirror image of the land" on page 36. At the end of our call, I asked Lal, "If you could inspire crop farmers of Canada and the United States to change even one thing, what would that be?"

Building on a Sanskrit saying – "The world is one family" – Lal said, "One member of the family cannot say, 'I don't care'. We should all care. We don't live in isolation. We are all responsible. If each person does small things each year to help the planet, you multiply that by eight billion and it becomes a big thing."

He didn't mention the hummingbird story, but the message is the same. Individually, our efforts may seem like spitting on a forest fire, but if we each do what we can, it can add up to progress.

Farmers in Canada will benefit from clear actions on how to increase soil organic matter and soil carbon, reduce nitrogen emissions, increase biodiversity, and so on. Articles in this issue of Canola Digest describe the innovation and research needed to identify these actions and guide farming forward.

As I learned from a life online, ideas and inspirations can come from people outside Canada, like Rattan Lal, and from people outside agriculture, like Dominique Hes. It can also come from ancient parables. No matter our size, we do what we can within our area of influence. Like the hummingbird.

Alberta Canola announces new leadership

Roger Chevraux
Chair

Ian Chitwood
Vice-Chair

Charles Simoneau
Incoming Region 3 Director

The 32nd Annual General Meeting of the Alberta Canola Producers Commission was held online on January 25, 2022. Following the Annual General Meeting, the Board elected Roger Chevraux of Killam as the new Chair, and Ian Chitwood of Airdrie as the new Vice-Chair.

Alberta Canola is pleased to welcome a new Director to the Board. Charles Simoneau from Guy, Alberta was elected to represent Alberta Canola's region 3.

The Board of Alberta Canola would like to thank outgoing directors, Kevin Serfas – Region 9, Denis Guindon – Region 3 and Holly White – Region 12, for all the hard work they have done on behalf of Alberta's canola farmers.

"I would like to thank Kevin, Holly and Denis for the time and effort they put into Alberta Canola. Representing canola growers and bringing the different needs and conditions of canola growers to the Board table allowed us to make far better decisions," said Roger Chevraux. "The Board is truly grateful for their input and advice."

For more information on how to become a director, information on the board, the committees that guide the board, and Alberta Canola's regions, visit **albertacanola.com**.

2022 BOARD OF DIRECTORS

Region 1: Dan Doll, Fairview

Region 2: Andre Harpe, Valhalla Centre

Region 3: Charles Simoneau, Guy

Region 4: John Mayko, Mundare

Region 5: Justin Nanninga, Neerlandia

Region 6: Wayne Schneider, Nisku

Region 7: Mike Ammeter, Sylvan Lake

Region 8: Ian Chitwood, Airdrie

Region 9: Vacant

Region 10: Cale Staden, Vermilion

Region 11: Roger Chevraux, Killam

Region 12: Vacant

THANK YOU TO OUTGOING DIRECTORS

Kevin Serfas

Holly White

Denis Guindon

Alberta Canola – working for all canola growers in Alberta

Alberta Canola focuses on four key areas:
- Government and Industry Affairs
- Research
- Grower Relations and Extension
- Public Engagement and Promotion

Our activities in these areas are guided by our elected farmer directors and driven by our mission statement: to improve the long-term profitability of Alberta's canola producers. For complete details, check out our Annual Report and our 'Year in Review' video (featuring the farmer directors) on our website at **albertacanola.com/annualreport**.

Tax Credit for the 2021 Tax Year Available to Canola Farmers in Alberta

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 2021 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 is an additional benefit for growers who contribute check-off on canola", says John Mayko a farmer from Mundare, Alberta and the Chair of Alberta Canola's research committee. "Farmers are funding research looking for ways to better grow canola. The SR&ED tax credit allows farmers to capture some of that investment back at tax time."

The tax credit rate for canola producers in Alberta for 2021 is 14.59 percent.

For example, for an individual grower that paid $1000.00 in check off to Alberta Canola in 2021, $145.90 is eligible to earn the tax credit.

THE TAX CREDIT CAN:

- offset federal taxes owing in the current year,
- be received as a tax refund,
- be carried forward up to 10 years to offset federal taxes owing, or
- be carried back 3 years to reduce federal taxes paid in those years.
- Individual producers must file a T2038 (IND). Farm corporations must file form T2SCH31.

Historical SR&ED percentages for Alberta Canola and links to more information from the Canada Revenue Agency can be found at **albertacanola.com/SRED**.

Credit: iStock.com/SARINYAPINNGAM

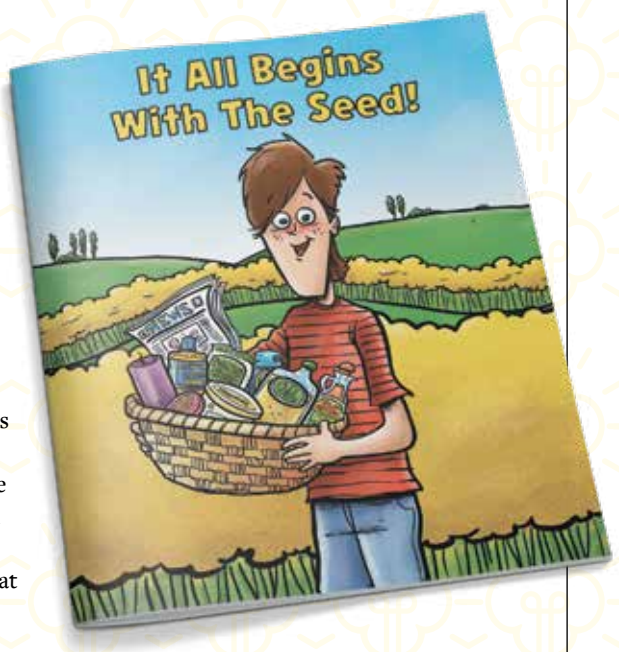
New revamped STEM-based *"It All Begins With The Seed"* activity book now available

Looking for a fun and unique way to start engaging and educating younger students in STEM-based interactive canola-related activities?!? Check out the new revamped *It All Begins With The Seed* activity book.

Kids will have the chance to play new games, engage in some whacky science experiments, and try out some messy canola-related arts and crafts. Chase and Amelia will share some of their favorite recipes with students to allow them to try out these recipes in their homes or in the classroom with adult supervision. Students will learn all sorts of fun-filled facts about canola and canola production and how it relates to health and science. This resource is aligned with the Alberta curriculum and has been teacher peer-reviewed. It is ready to use in any kindergarten to grade 3 classroom as needed!

Two versions of the book are available, as there are different games for grade 3 in each book. You can download the book as a PDF, view the book online, or order a copy to use in your home or in your classroom. We hope students will check out this great resource that will help kids expand their CANowledge!

Visit **learncanola.com/resources** to get your copy.



Focus on Verticillium Stripe

WHAT IS VERTICILLIUM STRIPE?

Verticillium stripe (VS) of canola is caused by the fungal species *Verticillium longisporum*. It was first detected in 2014 and then found across the Prairies in disease surveys in 2015. Although new to Canada, it is a serious problem for canola growers in Europe – and there is potential for it to have a similar impact on yields here.

Disease symptoms in canola include leaf chlorosis, early ripening, stunting and, as the disease progresses, necrosis and shredding of stem tissue. Once the plant is fully ripe, the stem peels to reveal tiny black microsclerotia, which resemble ground pepper in appearance. For more information on the disease, see the Canola Encyclopedia at **canolaencyclopedia.ca.**

WHAT ACTION IS BEING TAKEN TO COMBAT THE DISEASE?

Most of our understanding about VS comes from Europe. Dr. Jasper Depotter, an agronomist and researcher from Germany, has shared his knowledge of the disease, which has served as a basis for research projects in Canada.

Because VS spreads so quickly, SaskCanola's research team identified the need for more information and better tools for assessing severity and risk of yield loss.

SaskCanola has invested a total of $739,940 in VS research over the past 4 years. These projects were highlighted in last month's Verticillium Stripe Workshop:

- Dr. Dilantha Fernando at the University of Manitoba is working on a project to learn more about the biology of verticillium stripe.
- Dr. Hossein Borhan at AAFC in Saskatoon is developing tools for genotyping and monitoring changes in the pathogen, and the interaction between canola and the pathogen.
- Dr. Sheau-Fang Hwang and Ph.D. student Yixiao (Becky) Wang, at the University of Alberta, are studying verticillium stripe management examining and quantifying yield loss from this disease and evaluating performance of canola cultivars against the disease.

VIDEO AVAILABLE THIS SPRING!

Be sure to keep your eye on the SaskCanola website to check for a new verticillium stripe video that summarizes current knowledge and best management practices.

To learn more about SaskCanola's research investments and to view research results, visit our website at **saskcanola.com**

Credit: CCC

2022 SaskCanola Board Election

SaskCanola is looking for growers who are interested in taking on leadership positions and honing their leadership skills to help build a healthy future for canola. Four director positions will open for nominations this Summer.

The goal of SaskCanola's Board of Directors is to ensure that the Commission is prudently managing the investment of 20,000 levy paying canola growers in Saskatchewan. Director responsibilities include five board meetings per year, plus participation on various committees and appointments to external boards.

If you are interested in running for the Board, we encourage you to reach out to one of our current directors to discuss the opportunity further.

NEW SaskCanola Website

Launching this Spring! SaskCanola is revamping its website to more effectively support farmers and provide a better user experience. Research results will be available with additional information about each project. It will also feature more streamlined content, comprehensive resources for canola production, plus expanded information on SaskCanola's investment priorities.

saskcanola.com

Driving Market Expansion through Strategic Alliances

SaskCanola has strategically aligned with respected and influential organizations to create consumer awareness and enhance public trust in canola products. These partner organizations bring the canola story to the national stage and offer persuasive and factual information for Canadians.

NATIONAL PARTNERSHIPS

CANOLA EAT WELL

SaskCanola partners with Alberta Canola and Manitoba Canola Growers under the Canola Eat Well brand to connect canola and consumers.

HEART AND STROKE FOUNDATION

1.6 million Canadians are living with heart disease and stroke and 9 in 10 Canadians have at least one risk factor, such as high blood pressure, obesity, tobacco use, lack of physical activity, and diabetes. Heart disease in Canada is the leading cause of death among Canadians. As National Recipe Partner, we have developed heart-healthy and nutritious recipes and collections that continue to be the most viewed on the Heart and Stroke website.

DIABETES CANADA

One in three Canadians has diabetes or prediabetes. Food is the key to managing diabetes and reducing the risk of heart attacks, stroke, and other complications. Now more than ever due to COVID – 19, the wait time to see health professionals can be long and can leave people who are newly diagnosed unsure of what they can eat. Meal plans are an ideal way to guide people into consuming regular and nutritious amounts of food to keep blood glucose levels within range. Canola-sponsored meal plans have been viewed more 65,000 times since their launch in November 2020.

PROVINCIAL PARTNERSHIPS

SASKCANOLA

SaskCanola provides funding and a board representative to each of the two public trust oriented Saskatchewan-based organizations whose efforts work to bridge the urban-rural gap.

AGRICULTURE IN THE CLASSROOM

SaskCanola is a Superhero sponsor of Agriculture in the Classroom Saskatchewan, whose goal is to connect school-age kids and agriculture through innovative, experiential and curriculum-based programs and resources. SaskCanola director Keith Fournier is appointed to the Ag in the Classroom Sask Board.

FARM & FOOD CARE

SaskCanola is a Principal Member of Farm & Food Care Saskatchewan, an organization that provides a coordinated effort and unified voice for the agriculture industry, connecting consumers with fact-based, modern farming information and resources through their **CanadianFoodFocus.org** initiatives. In 2021, Canadian Food Focus reached over 13 million people with 3 million engagements. Canola oil was featured in articles, recipes and cook-alongs. SaskCanola director David Altrogge is appointed to the Farm & Food Care Sask Board.

Chef receives 2022 Canola Award of Excellence

Ned Bell, chef and owner of the Naramata Inn, is honoured to receive the Canola Award of Excellence.

Chef Ned Bell loves canola oil for its versatility and ability to be used in almost any application in the kitchen. Pictured above at an Ontario #CanolaConnect workshop on sustainable seafood.

Each year, the Canola Award of Excellence is presented to an individual or organization recognizing their contributions to the sustained growth and prosperity of Manitoba's canola industry. Ned Bell, owner and chef at the Naramata Inn near Penticton, B.C., was awarded the 2022 Canola Award of Excellence in February for his active role in promoting canola oil in the kitchen and his long-time commitment to supporting farmers across Canada.

"Canola farmers, and those of us who support them, are so grateful for advocates like Ned," says Delaney Ross Burtnack, executive director of Manitoba Canola Growers Association. "His commitment to sharing the real story of farming in Canada, and particularly coming to the aid of canola farmers when their biggest market was threatened in recent years, demonstrates his selfless commitment to building a better network of understanding and support for Canadian farmers. Ned is in good company among the people who have gone above and beyond for canola farmers, and I'm thrilled we can do something to recognize Ned for his efforts."

Ned has been using and promoting canola oil in the kitchen throughout his career as a chef, keynote speaker and educator. His primary advocacy work has been supporting the long-term health of the world's oceans, lakes and rivers. This work extended inland throughout his career as he also became a champion for Canadian farmers and their stewardship. His love for tasty food and his pledge to choose Canadian ingredients inspires him to celebrate, advocate and educate consumers about sustainable farming and fishing.

Ned has been engaged with canola farmers for years. He has worked closely with Canola Eat Well as a canola ambassador and guest chef at numerous events and workshops, promoting the versatility and functionality of canola oil across the country.

"What an honour. I'm incredibly grateful to be recognized with the Canola Award of Excellence. It is truly my pleasure to be able to celebrate farmers, and work with them from coast to coast," says Ned. "I have worked with Canola Eat Well for years, and I love canola oil – it is one of my favourite ingredients in many of my dishes. Farmers help me to be able to make things tasty and in doing so, celebrate our region, celebrate our communities, and celebrate Canada. At the end of the day, I'm one of the lucky ones because I get to do what I love, and I couldn't do it without canola farmers."

Manitoba Canola Growers would like to thank Ned for his active role in promoting canola oil in the kitchen, advocating and educating consumers and contributing to the sustained growth and prosperity of Manitoba's canola industry.

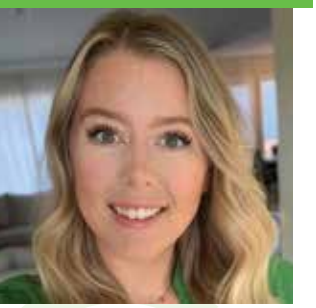
Chef Ned Bell loves canola oil for its versatility and ability to be used in almost any application in the kitchen. "I love canola oil – it is one of my favourite ingredients in many of my dishes," he says.

SUCCESSFUL CANDIDATES

Warren Ellis - Wawanesa

Charles Fossay - Starbuck

Pam Bailey – Dacotah



Jackie Dudgeon - Morden

Election Results Are In

Results of the Manitoba Canola Growers (MCGA) election of directors were announced following an election that saw five candidates running for four positions.

Thank you to the candidates who put their name forward and congratulations to this year's successful farmers.

"We are excited to share that more than 1,000 members submitted their vote to determine the future direction of the MCGA board," says Delaney Ross Burtnack, MCGA executive director. "We welcome back our incumbent directors, and look forward to having two new directors at the table. It is great to see that our members share MCGA's goal to see diversification of farmers on our board, and the perspectives they bring on important canola issues."

MCGA holds an election every two years, with four positions up for election each time. Members have the option to vote by mail-in or electronic ballot using a preferential voting system, allowing members to rank the candidates in order of preference. Please refer to the MCGA website at **CanolaGrowers.com** for detailed tabulation results.

MCGA's commitment to engage with farmers goes beyond the board. The election process has allowed the team to meet more members and expand the network of strong farm leaders helping to guide the future of MCGA. If you are interested in engaging with MCGA, please reach out to explore ways we can work together.

New program provides free one-on-one counselling sessions

The new Manitoba Farmer Wellness Program (MFWP), announced in January 2022, will provide free one-on-one counselling sessions for farmers. Farmers and their immediate family members can access six confidential one-hour sessions with a registered and skilled counsellor who has a background in agriculture. Services are available during the day, evenings or on weekends, and can be in person, by telephone or video chat, depending on the farmer's preference. MFWP was established in October 2021 and provides its counselling service with funding from the agriculture community. To book an appointment or learn more about the program, visit **manitobafarmerwellness.ca**, email info@manitobafarmerwellness.ca or call 204-232-0574.

Manitoba
FARMER WELLNESS PROGRAM
Growing • in • hope

The Canola Week 2021 online conference, held November 30 to December 2, 2021, combined three popular events on the annual canola calendar – Keith Downey's Canola Industry Meeting, Canola Discovery Forum and Canola Innovation Day. This collection of short articles covers just a few of the highlights.

SCIENCE HIGHLIGHTS FROM CANOLA WEEK 2021

Canola Week 2021 had over 50 speakers in three days. Each presentation shared valuable information about the Canadian and global canola sector, agronomy challenges, recent research and required innovations. To relive the experience, view the program at **canolaweek2021.com** and watch the "Canola Week 2021" playlist at **youtube.com/canolacouncil**. The following articles are a curation of highlights, and they just scratch the surface of Canola Week content.

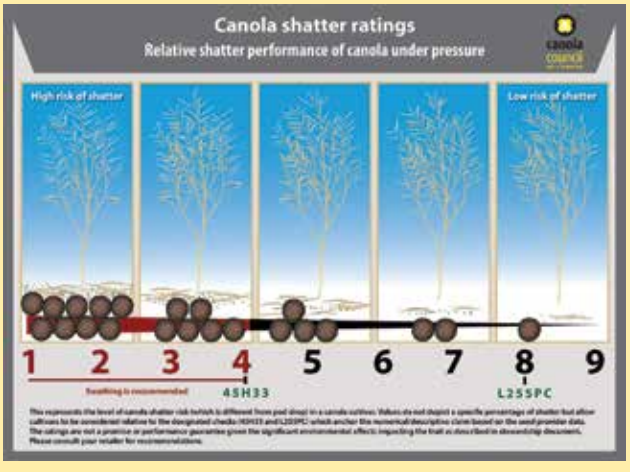
Canola cultivars get pod shatter ratings for 2023

Reduced pod shatter loss will contribute to the canola industry's goal of reaching an average yield of 52 bu./ac. by 2025. Nicolea Dow, farmer from Portage la Prairie and Manitoba Canola Growers director, and Taryn Dickson, resource manager for Crop Production and Innovation with the Canola Council of Canada (CCC), presented the new canola pod shatter ratings tool and described its development process.

The shatter ratings tool represents a cultivar's level of shatter risk on a scale from one to nine, with "1" being high risk of shatter and "9" being low risk. By giving farmers a clear way to assess a cultivar's risk for shattering, the tool will help them manage risk from harvest loss, plan harvest operations and prioritize fields when selecting seed.

Canola pod shatter is highly related to genetic background. Lars Østergaard, group leader at the John Innes Centre in the U.K., also presented on research developments his team has made on understanding the genetic basis of canola pod shatter. Recent experiments conducted with *Arabidopsis*, a plant similar to canola and fellow member of the Brassicaceae family, strongly suggest that higher temperatures are inducing the genetic expression that accelerates pod shatter in *Arabidopsis*. Further experiments are underway to test if this can also be said for other *brassica* crops, like canola.

—Whitney Dencklau



This graphic shows the canola shatter rating scale. The higher the number, the stronger the pod shatter resistance. Two checks are included for reference: 45H33 is a "4" and L255PC is an "8".

Canola protein varies by growing region

The world's population is expected to reach 10 billion by 2050, which means 2.1 billion more mouths to feed. This increases the need to maximize the utilization of high-protein oilseeds already being mass produced. Canola meal is a shining example of this.

Asiyah Suchak, Masters student at the University of Saskatchewan, has a research project to identify regional differences in nutritional value and characteristics of canola protein.

Suchak's project compares five canola "strains" or cultivars grown at four sites: Peace River, Alberta; Vermilion, Alberta; Colonsay, Saskatchewan; and Crystal City, Manitoba. She first extracted the oil from the seeds, then processed the canola meal and compared the average crude protein values. In her results, canola from Colonsay had the highest average crude protein levels, Peace River had the lowest, and Vermillion and Crystal City tied in between.

Next, Suchak began extracting protein from the canola meal. While she did not have all samples processed by the time of Canola Week, early results do show differences based on cultivars and location. Crude protein content in canola meal ranged from 72.2 to 80.6 per cent. As a next step, Suchak will check the functionality of protein isolates to see if it changes by region.

Switching gears to the end use of canola protein, Dan Kraft, operations and supply chain leader from Merit Functional Foods, delivered a Canola Week presentation on the company's history, goals, production guidelines and innovative process.

Merit is a three-year-old Canadian-owned company with a 94,000 square foot facility in Winnipeg. The facility processes canola and peas into protein that can be added to plant-based foods, like non-dairy frozen treats, protein bars and meat alternatives.

The company recently reached its first phase goal of processing 30,000 tonnes of canola and peas and is working toward 60,000 tonnes in phase two and 120,000 tonnes in phase three.

Merit is building a fully traceable supply chain from farm to table, where protein can be traced directly back to the farm where the canola or peas were grown. Kraft referenced "partnering with growers" a few times during his presentation. Growers sign production contracts with Merit that require them to follow a set of guidelines, including purchasing certified seed, adherence to specific farm management and storage protocols, and extensive harvest and grain testing to meet certification requirements. All canola processed at Merit is glyphosate free, soy free, gluten free and non-GMO.

Merit's separation step pulls protein from the canola meal with the help of patented products. Its protein "membrane filtration" step, which removes impurities for improved taste and functionality, is also patented.

Conversations around plant-based protein are only going to grow (pun intended). It will be exciting to see how results from Suchak's project into protein differences by cultivar and growing location could be applied, and to see what the future has in store for canola protein ingredients in human food products.

—Whitney Dencklau

The worst drought on record

The 2021 drought was the most widespread and severe single-year drought for the Canadian Prairies over the past 50 years. In his Canola Week presentation, Aston Chipanshi, agroclimate analytical service lead for Agriculture and Agri-Food Canada, showed how the drought covered 94 per cent of the agricultural land in Western Canada, and extreme or exceptional drought covered over 28 per cent of the area.

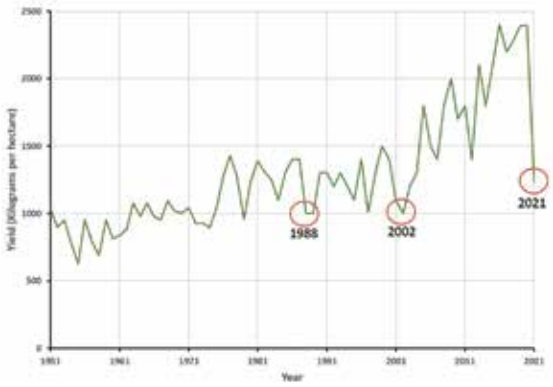
"Record temperatures in July 2021, unprecedented in intensity and duration, amplified the impact of this drought," Chipanshi says, with the hottest and driest weather occurring at a critical period for yield – the plants' reproductive stages.

The result was major yield reduction, including an average canola yield that was about 40 per cent less than the average of the previous five years.

Chipanshi says the 2021 drought was worse than the droughts of 1961, 1988, 2001 and 2002. While weather records for the 1930s are incomplete, Chipanshi says the 2021 drought surpassed the 1930s in terms of drought severity in some places, including southern Manitoba and central Saskatchewan.

Chipanshi notes, interestingly, that despite the severity of the 2021 drought, overall yields were higher than in previous severe droughts because of improvements in agricultural practices. His list of improved practices includes land management, especially the huge reduction in summer-fallowing to conserve soil moisture, as well as direct seeding, selection of drought-resistant varieties and crop substitution. "In some places, our traditional grains may not be sustainable under prolonged droughts," he says. He also says insurance products are also good adaptive options.

Saskatchewan Canola Yield 1951-2021



Despite the severity of the 2021 drought, overall yields were higher than in previous severe droughts because of improvements in agricultural practices.
Source: AAFC

Crop Stress Index 2021

The Crop Stress Index showed high stress on plants by mid summer of 2021. The index is a measure of negative crop response due to water shortage caused by lack of precipitation and excessive evapotranspiration. Evapotranspiration is water lost directly from the soil and through the plant surfaces, usually leaves and stems. This stress index is a key indicator of canola yields. Source: AAFC

Nutrigenetics and personalized diets

Not everyone responds to diets in the same way. In fact, some people may have a positive reaction, some may have no reaction and some may have a negative reaction to the same nutritional treatment. These different responses may be due to lifestyle, gut bacteria and genetics. Nutrigenetics looks into the third factor, studying how genetic variants affect a person's response to a nutrient or diet. David Mutch, associate professor in the Department of Human Health and Nutritional Sciences at the University of Guelph, researches nutrigenetics as it relates to canola oil.

Mutch's research identified a specific marker in a human gene that indicated how a person's blood sugar level responds to canola oil consumption. The research showed that canola oil as a replacement for high-saturated-fat oils could reduce the risk of diabetes or help manage diabetes in those people with that specific genetic variant – but it might have no benefit in people without that marker.

With Mutch's research, health care professionals could use genetic tests like this to create personalized nutrition approaches to encourage changes in their patient's dietary habits and to manage blood glucose levels. People who could truly benefit from a change in dietary oils could be encouraged to consume canola oil more regularly. People who are not likely to benefit from a switch can stay the course.

From a canola perspective, this research will help the CCC refine its canola health message, explaining who can benefit most from a diet that includes canola oil.

Canola oil for brain health

Richard Bazinet, professor and Canada research chair in brain lipid metabolism at the University of Toronto, presented on how canola oil can supply essential omega 3 fatty acids for the brain.

The human brain is half fat, half protein. Bazinet says the brain is "very active tissue" that accounts for two per cent of the body's weight but uses 20 per cent of its energy. Yet, nutritional messages concentrate more on the heart and obesity-related diseases than on brain health. In a review of Canada's new food guide, Bazinet found 62 mentions each of "heart" and "cardio" but no mention of "brain" or "neuro".

The brain needs omega 3 fatty acids and these particular fatty acids have to come from our diet; the body can't synthesize omega 3s from other fats. The brain doesn't need much. Bazinet says the average brain contains about four grams (4,000 milligrams) of omega 3 docosahexaenoic acid (DHA), and it needs to take up about four milligrams per day of DHA to maintain that level.

Fish oil is a good source of DHA. Canola oil contains a different type of omega 3 called alpha-linolenic acid (ALA). Bazinet says the liver can use ALA to synthesize DHA. While he acknowledges that science is split on this, his evidence supports that this synthesis does happen. Conversion efficiency might be as low as one per cent, but the required amounts are small. A tablespoon of canola oil might be enough — even with low conversion. One tablespoon (15g) of canola oil contains about 1.5 grams of ALA. Converted at one per cent efficiency, this tablespoon of canola oil can supply 0.015g (15mg) of DHA per day. The brain needs four mg, as Bazinet has shown.

The bottom line is that people need to eat omega 3 fatty acids for brain health, and canola oil is an accessible source. Canola oil is easy to find and easy to use, and it may be more sustainable than fish sources.

canolacouncil OF CANADA

CCC top 5 agronomy priorities

Clinton Jurke, Canola Council of Canada agronomy director, shared the five agronomic priorities that will contribute most to the industry goals of 52 bu./ac. average yield and 26 million tonnes of total Canadian canola production by 2025. Here they are:

- Use 4R Nutrient Management when making fertilizer decisions.
- Choose the best seed traits for each field.
- Achieve a uniform 5 to 8 plants per square foot.
- Identify and manage the top yield robbers in each field.
- Harvest all seeds and deliver them at No.1 grade.

For detailed information on the five priorities, please read "Five CCC agronomy priorities for canola" in Canola Digest Science 2021 at canoladigest.ca

The Guelph Statement will guide federal research funding

In November 2021, Federal-Provincial-Territorial ministers of agriculture got together in Guelph, Ontario and produced the "Guelph Statement". Marco Valicenti, director general for the Innovation Programs Directorate at Agriculture and Agri-Food Canada (AAFC), showed the Guelph Statement in his presentation and said, "This one slide is the key element to the vision and objectives of the next policy framework."

Valicenti says research approved for federal funding will come under three priority areas: (1) Environmental sustainability and climate change, (2) economic growth and (3) sector resilience – from plant health to artificial intelligence and data.

"We're at a pivotal point in time," Valicenti says. "It is extremely imperative that we talk about sustainable development and growth, ensuring that the sector contributes to climate change goals and ensuring that we have stewardship of our lands for future generations."

Then he adds, "We need to continue to show that research is of strategic value to Canada."

Federal-Provincial-Territorial ministers of agriculture got together in Guelph, Ontario in November 2021 and produced the Guelph Statement, above, which will guide the next round of federal agriculture research funding.

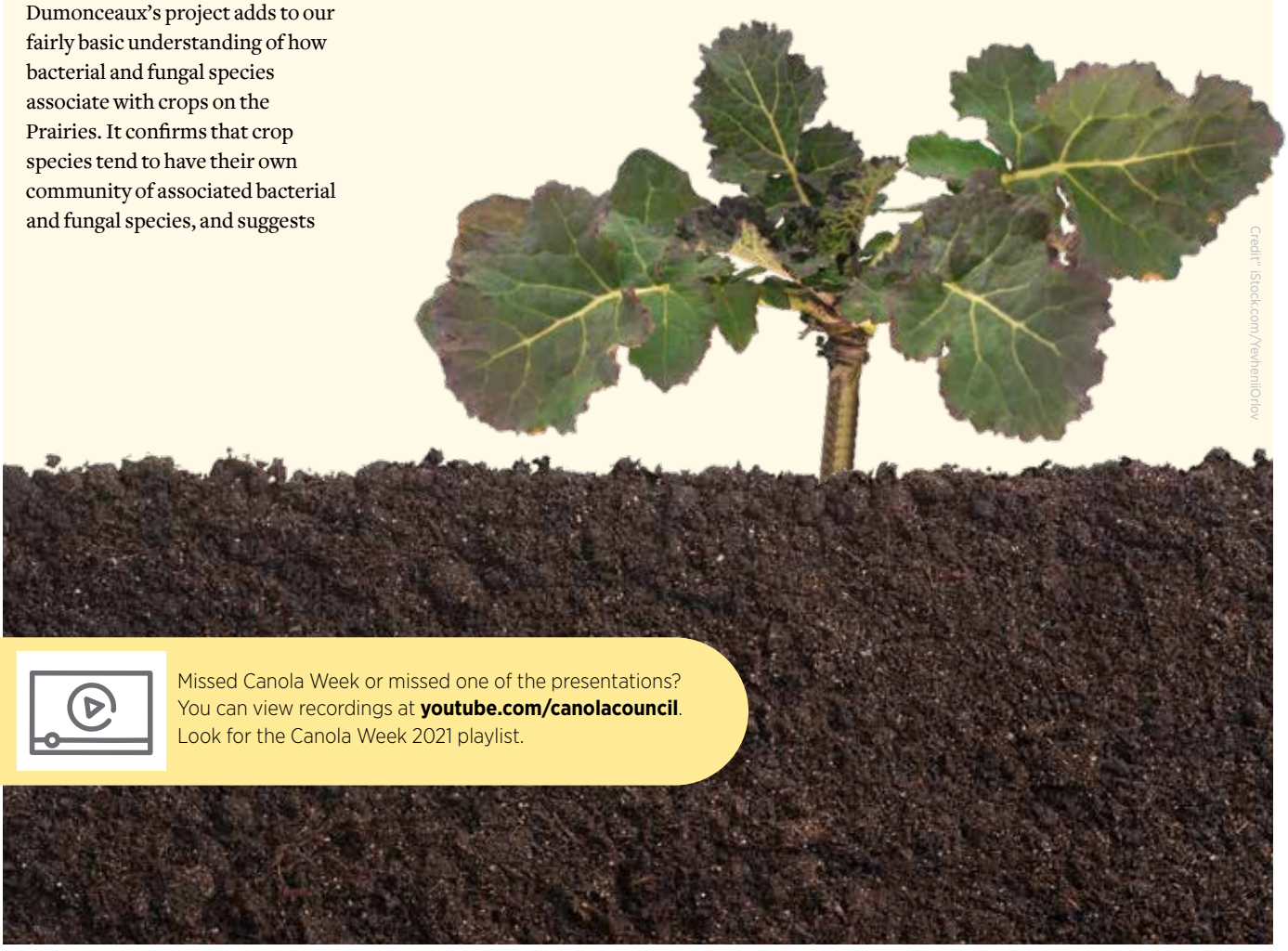
Much more to learn about biologicals

The relationship among plant roots, soil-borne bacterial and fungal microorganisms in the soil is so intertwined that AAFC research scientist Tim Dumonceaux says a plant is best considered as a "holobiont" – consisting of both plant and microbial cells.

Examining these soil microorganisms will reveal biological allies that could manage plant diseases, increase nutrient uptake and more. In a research update session during Canola Week, Dumonceaux gave a summary of his grower-funded project "Canola frequency effects on nutrient turnover and root-microbe interactions". Dumonceaux's project adds to our fairly basic understanding of how bacterial and fungal species associate with crops on the Prairies. It confirms that crop species tend to have their own community of associated bacterial and fungal species, and suggests that some of those species, identified through DNA analysis, could provide crop benefits.

Previously established, long-term (>10 year) rotations of canola-wheat; canola-pea-barley; and canola only were made available for this study. Dumonceaux showed that the soil fungal biome was consistently affected by crop rotation at all sites, and the effect was greatest in the root and rhizosphere – suggesting a clear connection to the crop grown each year. While the study will not result in any immediate recommendations for crop management, results showed that continuous canola resulted in the dominance of one particular fungal species, *Olpidium brassicae*. Dumonceaux concluded his Canola Week presentation saying that *Olpidium brassicae* is a poorly understood root colonizer with a life cycle similar to the clubroot pathogen. It was present in roots at all sites, but was especially dominant in short-rotation canola.

Knowledge of crop rotation effects on the soil and root microbiomes will provide the possibility of culturing potential biological allies within the rhizosphere, adding to the capacity of plants to adapt to agronomic conditions and possibly resist disease.



Credit: iStock.com/YevheniiOrlov

Missed Canola Week or missed one of the presentations? You can view recordings at **youtube.com/canolacouncil**. Look for the Canola Week 2021 playlist.

When your entire season is on the line, you know the right call is going with a pro. For over 25 years, Liberty® 150 herbicide has been the choice of InVigor® hybrid canola growers. In addition to a trusted formulation and consistent, industry-leading performance, it's backed by exceptional agronomic support and service. Because like you, Liberty 150 has earned its reputation in more ways than one. Visit **agsolutions.ca/Liberty150** to learn more.

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At Canola Week 2021, Jim Everson, president of the Canola Council of Canada, presented on the importance of research and innovation to meet increasing demand for Canadian canola, while ensuring sustainability. This article is based on that presentation.

RESEARCH essential to help canola meet strong demand

BY JIM EVERSON

Canola contributes nearly $30 billion annually to the Canadian economy, including more than 207,000 Canadian jobs. That contribution increased by 35 per cent in the last decade alone.

Looking at today's business climate, the word that comes to mind is "unpredictable". The global trade environment is buffeted by challenges:

- Recovery from the global pandemic is uneven, disrupted by a tenacious virus and related supply chain challenges;
- The trade disruption in canola seed with China continues;
- And global efforts to mitigate climate change are altering the commercial environment with taxes and regulation.

But, the fundamentals of global demand are in our favour:

- The world's growing middle class is continuing to seek out healthier food products like canola oil and canola protein.
- Palm oil growth has slowed as the industry has been challenged by sustainability concerns
- And there is growing demand in new areas – including aquaculture and protein for human food ingredients.
- Most significantly, as part of the global effort to address climate change, more countries are introducing renewable fuel mandates to reduce greenhouse gas emissions. Canada and the U.S. are among them.

This is a huge opportunity for our industry because canola oil is one of the best feed stocks available for renewable fuels. (See Image 1.)

The CCC is very active in discussions with the Government of Canada as work is done to finalize the Clean Fuel Regulations, which we anticipate will be in place by the end of 2022. If done properly, the standard will drive new demand for canola.

The impact of these two factors – high demand for Canada's sustainably-produced, healthy oil for food use and low carbon emission canola for diesel fuel – are driving investment and growth in our industry.

By 2025, Canada will be able to process 62 per cent more canola seed

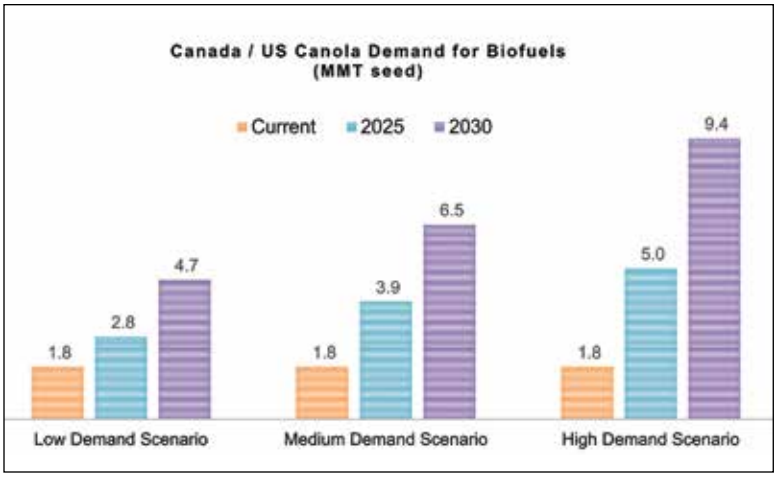


Image 1 shows how much North American demand for canola could increase if we can establish a firm foothold in this market.

Source: The Jacobsen Renewable Fuels Outlook; Advanced Biofuels Canada: WAEES analysis

than today, thanks to more than $2 billion in capital investments announced by our canola processors in 2021 and early 2022.

One of the biggest challenges facing our industry is growing more canola to keep up with demand. Canada's canola industry has a strategic target to achieve average yields of 52 bu./ac. to meet global market demand of 26 million tonnes of production by 2025.

Meeting our yield target is job number one. To get there, growers will need continued advancements in agronomic practices, as well as access to new tools, like higher-yielding cultivars, smart fertilizers and a wider range of resistance to disease, extreme weather and pod shatter.

CANOLA IS A SOLUTION-PROVIDER FOR THE ENVIRONMENT

From the expression of global commitments evident in the recent Glasgow COP26 meetings, to the domestic biofuels agenda, to the recent "Guelph Statement" of federal-provincial-territorial agriculture ministers, climate change and the environment will be a critical lens through which research priorities and funding will be considered.

The canola sector is a 'solution-provider' when it comes to the environment. Canola takes carbon from the atmosphere and turns it into oil and protein that we can use for food and fuel. As it grows, it takes carbon from the atmosphere and sequesters it in the soil.

"With continued investment and teamwork in agronomic research and innovation, we are confident we can break through to the next level of on-farm productivity."

—Jim Everson

As our industry increases production intensification to meet our goal of 52 bu./ac. by 2025, we will sequester an additional five million tonnes of greenhouse gas (GHG) emissions in the soil each year.

Used in renewable fuels production, canola can reduce GHG emissions by up to 90 per cent relative to traditional, petroleum-based diesel fuel, which is why canola demand will increase with government policy to mitigate climate change.

Canadian grain farmers also contribute to production sustainability. Growers care deeply about their stewardship of their most valued resource: their land. We need to

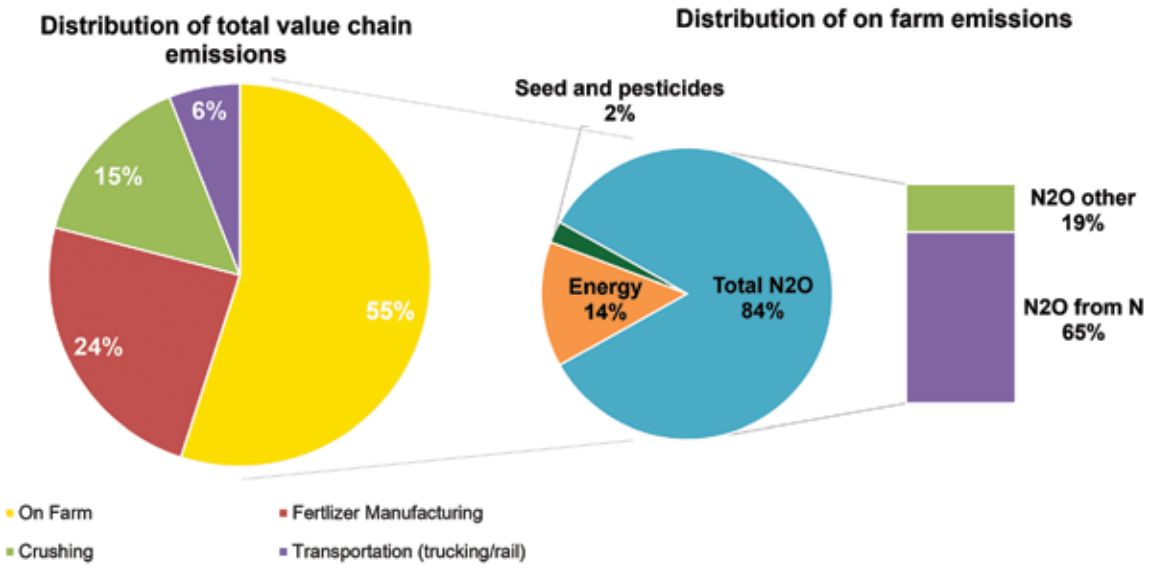


Image 2. Nitrogen is a critically important factor in determining canola production. At the same time, this image shows that a majority of emissions from canola production come from nitrogen (N) fertilizers. Moving forward, there are opportunities to reduce emissions and take advantage of canola's carbon sequestering capabilities as part of yield intensification efforts.

Source: CSRC Metric Platform, S&T Squared – Post Farm Gate Sustainability & LCA Analysis

focus on providing the science-based knowledge and discovery to support them.

I hear a lot about ESG these days – Environmental, Social, Governance. For me, the grower has been there well before others. Growers have been quick to adopt technology that improves environmental outcomes – from no-till to pod shatter resistance. Growers are invested in passing their operations on through the family and aim to improve the productive capability of the land for their children. In the social realm, rural communities draw their energy from growers – who populate the school boards, coach hockey and employ thousands across Canada.

Sustainability is a journey, not a destination. How do we, as an industry, continue to provide innovative products and practices to the grower and the whole value chain, which meet our goals for increased production to meet global demand, while ensuring sustainability and reducing emissions? Investment in innovation and research will be the answer.

NITROGEN EMISSIONS REDUCTION

The "Guelph Statement" released November 2021 set out priorities that will influence the federal government's next five-year agriculture policy framework. Included among those priorities are tackling climate change and environmental protection to support GHG emission reductions, which is also reflected in the federal government's previously stated objective of a 30 per cent emissions reduction target for nitrogen fertilizers by 2030. (See Guelph Statement graphic on page 13.)

Nitrogen fertilizer is a critical tool in growing the world's healthiest vegetable oil. (See Image 2.) Reducing emissions from fertilizer cannot mean simply regulating reductions in fertilizer use. To do so would hinder the competitiveness of Canadian canola farmers in global markets and their ability to meet the world's needs for a healthy vegetable oil. Rather, the objective must be innovating to reduce emissions from fertilizer use, supporting growers in moving to more precise fertility practices and crediting the grower and industry for sequestering carbon through canola production.

To meet these objectives and to comply with the federal government's climate change goals will require a substantial government investment. The Royal Bank of Canada issued a report to describe the investment required to meet the government's commitments to GHG emission reduction. The report suggests an investment of $2.5 billion annually would be required to tackle climate change in agriculture alone.

INVESTMENT IN CANOLA RESEARCH

At this critical time, we need to remind governments that canola is poised to continue to drive economic growth, and that canola research is an essential investment in Canada's economic future.

With continued investment and teamwork in agronomic research and innovation, we are confident we can break through to the next level of on-farm productivity. And we can do it in a way that is truly sustainable and aligned with market demands.

Getting there will require the cooperation of our partners in government – as both research partners and policymakers. We also need the commitment, ideas and enthusiasm of the entire canola value chain. These strengths are the lifeblood of our sector and have never been more essential than right now.

—Jim Everson is president of the Canola Council of Canada. For the complete presentation, including the video and transcript, go to canolacouncil.org/news and look for "Update: Jim Everson provides remarks on 'Navigating change through innovation' at Canola Week".

Renewable diesel processing facilities are in a building boom in the U.S. and Canada. The primary feedstock for renewable diesel is plant-based oils and a secondary feedstock will be as much used cooking oil as the processors can get.

RENEWABLE DIESEL
TAKING OVER FROM BIODIESEL

BY JAY WHETTER

Global demand for plant-based oils increases each year and North American demand will get a big jolt in the next couple of years from renewable diesel production in the U.S. and Canada.

U.S. renewable diesel processing capacity was at around one billion gallons per year in 2021, and the U.S. Energy Information Agency expects a rapid rise, based on facilities under construction and announced, to five billion gallons per year by 2024. Canadian renewable diesel capacity, based on public announcements, could exceed three billion litres (0.8 billion U.S. gallons) per year by 2027, says Chris Vervaet, executive director of the Canadian Oilseed Processors Association (COPA).

One Canadian announcement is from Federated Co-operative Limited (FCL), which is building a renewable diesel processor near Regina. FCL will blend renewable diesel with petroleum diesel for Co-op fuel pumps. In related news, FCL announced in January 2022 a joint venture with AGT Food and Ingredients Inc., to construct a $360 million canola crush facility near the renewable diesel plant. The crush plant will supply approximately half the canola oil needed for the diesel facility, with the rest coming from other canola processing facilities. FCL will have a few suppliers to choose from. Its joint venture is the third new canola processing facility announced for the Regina area and the fourth for Saskatchewan in the past 12 months.

Rapid growth in renewable diesel production capacity is the major factor behind these construction announcements. "Global demand for oil and meal is growing," says Vervaet, "but the catalyst for such a surge in investment is biofuel demand."

Renewable diesel is produced through a different chemical reaction than biodiesel, which retains some properties of its oil source, including cold-weather viscosity. Renewable diesel, meanwhile, is chemically indistinguishable from any other diesel, so it can be used at any amount and "dropped in" at any rate.

Processors can make renewable diesel from any plant or animal fat. In North America, the primary feedstocks will be soybean oil and canola oil. Secondary feedstocks will be tallow and used cooking oil.

Vervaet says renewable diesel could result in a fourfold increase in the use of Canadian canola in American and Canadian biofuels. Current canola use in North American biofuel production represents around 1.8 million tonnes of seed. By 2030, that could be 6.5 million tonnes, Vervaet says. For reference, total Canadian canola production was around 20 million tonnes per year from 2016 to 2020. (Drought and heat reduced production to only 12.6 million in 2021.)

West Coast Reductions in Vancouver handles tallow and used cooking oil. A lot of restaurant cooking oil is already collected and recycled, so there won't be a lot extra to satisfy new demand. However, used cooking oil recycled for renewable diesel has a "really good look", says Jared Girman, manager of strategy initiatives at West Coast Reduction. The carbon intensity score for canola oil used first for healthy frying and then re-used for fuel is very good, he says.

But there isn't near enough used cooking oil, so first generation vegetable oils – soybean and canola straight out of processing plants – will be the primary feedstock for renewable diesel.

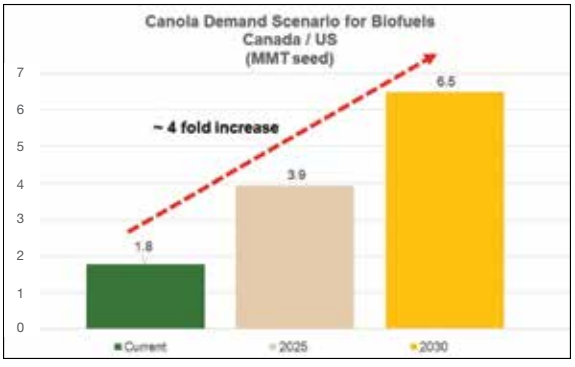
Canada needs to produce more canola. "Productivity increases are essential."

–Chris Vervaet

Whether used as a primary or secondary feedstock, canola oil will reduce the carbon intensity of North America's diesel fuel supply. Vervaet has three key elements required for Canada to meet this demand opportunity:

1. Canada must maintain a competitive and predictable regulatory environment. Biofuel policies must create meaningful and long-term demand signals.
2. Canada needs to produce more canola. "Productivity increases are essential," Vervaet says. He'd like to see a commitment from government to fund research that will boost productivity.
3. Canada needs to maintain market access in existing markets, especially the U.S. renewable diesel supply chain, and we will need new markets for canola meal.

—Jay Whetter is editor of Canola Digest.



Current canola use in North American biofuel production represents around 1.8 million tonnes of seed. Chris Vervaet estimates it could be 6.5 million tonnes by 2030.

Canola needs constant innovation to increase supply, to maintain high demand for its oil and protein, and to improve its environmental footprint. Through 2021, the Canola Council of Canada consulted with canola grower organizations and companies along the value chain to identify innovation focal points to achieve these objectives.

FOUR PILLARS OF THE CANOLA INNOVATION STRATEGY

BY CURTIS REMPEL

Credit: iStock.com/EasyBuy4U

The canola industry contributes $29.9 billion to the Canadian economy annually, including 207,000 jobs from growing, processing and exporting canola. With major expansions to Canada's canola processing capacity anticipated in the next few years, canola has the opportunity to strengthen its place among the major growth sectors in the Canadian economy.

Canadian canola can also be a beacon for what the world needs from its agriculture sectors. With research, technology, and predictable and aligned regulations, the canola value chain can increase productivity per acre, satisfy its customers and continue to lower its environmental footprint per tonne of seed, oil and meal produced.

This Canola Innovation Strategy, developed through 28 in-depth consultations with major stakeholders, provides an aligned value chain vision, from farm to customer, for the innovations we need to keep getting better.

Through the long-term vision of this strategy, growers, government (including Agriculture and Agri-Food Canada, Environment and Climate Change Canada, Health Canada, Innovation, Science and Economic Development Canada, and the provinces), universities and private researchers can collaborate to increase the chances for success.

The Canola Innovation Strategy has four key pillars – performance, precision, protection and product – and emphasizes that sustainability is part of everything we do.

PILLAR 1: PERFORMANCE

The need: To increase productivity (yield per acre) and meet current and future customer needs for oil and protein while remaining a top crop for Canadian producers, sequestering more carbon in the soil and reducing greenhouse gas emissions. More productivity on the same land will also help Canada protect its landscape, increase diversity and preserve non-farmed spaces.

Focus on:

- **Yield intensification.** Increase the efficiency through analysis of each crop input and land management practice.
- **Nutrient use efficiency.** Identify the current nitrogen use efficiency for canola in Canada, how much is lost during production and why, and how to reduce losses and improve efficiency.
- **Genetic improvements.** Canola seed will continue to provide solutions for yield intensification, climate adaptation and other agronomic traits.
- **Soil health.** Foundational research on soil health, particularly the rhizosphere and root-soil interactions, can reduce plant disease impact, increase carbon sequestration, improve nutrient use efficiency and increase yield.
- **Abiotic stress resilience.** Canola plants able to withstand drought, heat and excess moisture will increase yields and potentially reduce inputs.
- **Plant architecture and photosynthesis.** The best carbon sequestration tool is the green plant and photosynthesis. Improved leaf retention could also increase oil content and carbon efficiency.

Advocate for:

- **Regulations that support innovation.** Canada can take a lead role on a science- and risk-based, harmonized regulatory system for plant breeding and genetics tools, including gene editing and RNA interruption (RNAi) technology.
- **Harmonized global seed purity regulations,** especially for low-level presence, to limit trade impediments and increase seed industry investments.
- **Intellectual property policy** with good patent protection so seed developers are incentivized to create value.
- **Transparent and predictable variety registration.** Address varietal purity and confined field trial requirements to continue to ensure no environmental release of unapproved events while also not limiting commercialization of new traits.
- **Communication.** This includes communication of grower needs for seed traits and agronomy practices, 4R nutrient management practices and research results that will improve canola management practices.

Canadian canola can also be a beacon for what the world needs from its agriculture sectors. With research, technology, and predictable and aligned regulations, the canola value chain can increase productivity per acre, satisfy its customers and continue to lower its environmental footprint per tonne of seed, oil and meal produced.

PILLAR 2: PRECISION

The need: Use current and new technologies to increase productivity and reduce the environmental footprint of canola.

Focus on:

- **Strong starts.** Research crop establishment factors to get the crop off to a strong start.
- **Precision tools.** Include canola in trials to study precision techniques that target inputs in a way that improves efficiency and yield.
- **On-farm trials.** Develop a model for on-farm testing for new management practices and products.
- **Economic analysis.** Require economic analysis on all canola funded projects.

PILLAR 3: PROTECTION

The need: Protect the crop from pests and other threats to productivity, including climate change factors, while also protecting markets. Protecting markets means using approved crop protection products and seed traits, and demonstrating attention to sustainability – including economic, environmental and social components.

Focus on:

- **Pre-commercial genetics.** Foundational research can help to identify genetic improvements for tolerance to weather stress, adaptation to climate change, and resistance to root diseases, clubroot, sclerotinia and blackleg.
- **Flea beetles.** Create an industry-wide consortium to improve flea beetle management.
- **Biologicals.** Encourage the development of effective biologicals for pest management.
- **Crop protection alternatives.** Encourage continued research into new and novel crop protection products.
- **More cooperation.** Encourage collaboration between government, growers and industry on setting research targets and paths to commercial launch.
- **Biodiversity.** Improving biodiversity in rural Western Canada includes understanding of beneficial insects and their economic value and identifying lower productivity areas that could be put back into perennial habitat.

Advocate for:

- **Pest surveys.** Provincial and federal governments need to continue pest surveys to help growers manage pests and to develop models for prediction and management.
- **Performance indicators.** Continue to work on objective performance information for growers to make the best decisions on their farms.
- **Harmonized regulations.** A globally harmonized, science- and risk-based regulatory system is necessary for re-approval of older products and for new product registrations.
- **Trait management plans.** Every product and trait needs a management plan to protect it from resistance.
- **Market access for traits.** An industry approach to responsible trait commercialization will help to ensure market access for canola.
- **Alternative products.** Canada needs a transparent and science-based regulatory system for new technology like RNAi and other alternative products. As an example, RNAi could allow for highly targeted crop protection products that pose no risk to off-target insects.
- **Integrated pest management.** Communicate how integrated pest management that combines varietal choice, cultural practices and agronomic decisions will protect the genetic traits and reduce the risk of resistant pathogens, weeds and insects.

PILLAR 4: PRODUCT

The need: The most valuable part of the canola crop is the oil. Canada's canola industry needs to supply current customers while also being flexible to adapt to changing market demands for oil, meal, protein and fuel.

Research on designer oil profiles or altered proteins will be based on market demand and led by commercial enterprises. These opportunities may develop into broad market drivers, but innovation must be integrated into the current value chain or through an identity-preserved system without affecting the integrity or profitability of the value chain.

Focus on:

- **Oil content.** Encourage research to maximize oil content.
- **Processing.** Encourage continued private research on processing technologies and methods that are safe for people, livestock and the environment while maintaining efficiency.
- **Protein consortium.** Develop a consortium of value chain members, private industry, public researchers and regulatory agencies to coordinate interests related to canola protein.
- **Canola definition.** Review the canola definition and rules for output traits that may be outside the primary definition. Canada's canola industry must be open to emerging markets for health, functionality and biofuels while ensuring that we protect the current commodity oil and meal markets.

—Curtis Rempel is vice president, crop production and innovation, with the Canola Council of Canada.

To watch a Curtis Rempel presentation on the Canola Innovation Strategy, go to youtube.com/canolacouncil, select the Canola Week 2021 playlist and look for the video titled "Canola Value Chain: Innovation Strategy - Curtis Rempel, CCC".

Credit: iStock.com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The Advanced Weed Control program gives growers the upper hand in the fight against tough weed challenges.

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Proactively manage resistant weeds by using herbicides that combine different modes of action, to achieve long-term success.

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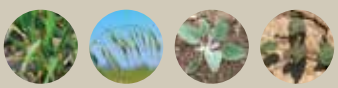
Enjoy the peace of mind that comes with a hassle-free performance guarantee in the unlikely event of weed escapes[1]. That even includes resistant biotypes and flushing weed escapes[2].

[1] When recommended products are used up to labelled guidelines
[2] When two passes of Liberty® 150 are used in the same field in the same season.

Proven strategies to tackle your biggest weed challenges.

Whether you have kochia, cleavers or Group-1 resistant oats, we have a customized solution for you. Use the following chart to find yours.

COMMON CHALLENGING WEEDS		RECOMMENDED SOLUTION
Grassy Weeds Foxtail barley Green and yellow foxtail Quackgrass Volunteer cereals Wild oats	**Broadleaf Weeds** Chickweed Dandelion Flixweed Hemp nettle Lamb's quarters Redroot pigweed Round-leaved mallow Shepherd's purse Stinkweed Volunteer flax Wild buckwheat Wild mustard	IN-CROP Liberty 150 SN Herbicide 1.62 L/acre + Centurion Herbicide 40 to 60 acres/case



*Refer to Centurion and Liberty 150 labels for full list of covered weeds and specific application timing

OTHER WEED ISSUES	RECOMMENDED SOLUTION
Kochia (inc. resistant biotypes) Volunteer canola	PRE-SEED Certitude Herbicide 40 acres/case followed by IN-CROP Liberty 150 SN Herbicide 1.62 L/acre
Cleavers	IN-CROP Liberty 150 SN Herbicide 1.62 L/acre + Facet L Herbicide 160 acres/case

If you have cleavers as well as a range of other challenging weeds, you can use a tank-mix of Liberty 150 + Centurion® + Facet® L herbicides.

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Always read and follow label directions.

How do you follow 4R nutrient management?

The principles of Right fertilizer product at the Right place, Right time and Right rate – the 4Rs – improve nutrient use efficiency and are a Canola Council of Canada priority. How do these farmer panelists follow 4R on their farms?

BY JAY WHETTER

LEONARD WALDNER
LAUDER, MANITOBA

Leonard Waldner farms in sandy soils of the Souris River valley, traditionally one of the drier parts of Manitoba. "We've been following 4R nutrient management," says the farm manager at Maple Grove Colony. One 4R challenge for 2022, with the prospect for another dry year and with high fertilizer prices, will be the right rate.

"We may put on half rates at the time of seeding this year and see what the weather does," Waldner says. "We'll add the other half if we get moisture."

The colony uses a 60-foot Great Plains planter rigged to apply liquid fertilizer, which Waldner says is the right product option for plant safety in their soils. For right place, the planter dribble-bands fertilizer near the seed "so we don't feed the weeds," Waldner says.

One challenge with liquid fertilizer on a planter is the potential maintenance disaster if a hose breaks. "I counted 14 bearings on each planting unit. If we get plugged nozzles and the pressure causes fertilizer hoses to break, we need to clean off the fertilizer right away," he says. Otherwise the corrosion in all of those moving parts can cause bigger maintenance problems.

For right place, the planter dribble-bands fertilizer near the seed "so we don't feed the weeds."

–Leonard Waldner

"From what I learned, we're already following a lot of the 4R protocols on our farm. I'd say most farmers across Western Canada are generally following 4R."

–Brett Jans

BRETT JANS
NEW NORWAY, ALBERTA

Brett Jans was an agronomist with Crop Management Network before going back to the farm full time. He left just before becoming a certified 4R agronomist, but he had all of the qualifications. "From what I learned, we're already following a lot of the 4R protocols on our farm," he says. "I'd say most farmers across Western Canada are generally following 4R."

Applying fertilizer at the time of seeding, with placement in a deeper band separate from the seed row, is a common practice in Jans's area. "Most don't broadcast," he says. This single-pass operation achieves 4R objectives for right time and right place. Any common fertilizer product applied in that system would qualify as right source. And as for right rate, Jans's experience on the retail side would suggest that most farmers do not over apply.

One challenge with the single-pass operation is to apply sulphur. Jans had been broadcasting ammonium sulphate in the fall because the sulphur source reacted with other fertilizer sources in a blend, causing it to bridge and gum up. "Broadcasting ammonium sulphate in the fall is not 4R, but the last straw was when our fertilizer wouldn't flow through the drill," he says. So they switched to a fall application for ammonium sulphate, and eventually

replaced that with gypsum (calcium sulphate) – which is more 4R compliant. "There is no risk of nitrogen loss because gypsum does not contain nitrogen, and it does not reduce soil pH like ammonium sulphate," he says. It also means they can continue to broadcast sulphur in the fall, simplifying the spring blend.

Jans uses ESN for part of his nitrogen supply for canola and wheat. In 2022, he plans to put straight urea in the side band and then split ESN, the polymer-coated urea, between side band and seed row placement. ESN is safer in the seed row than any other nitrogen source. It can reduce nitrogen losses (but losses from a band are low anyway, Jans says). It also has a slower release into the soil solution, providing a source of later-season nitrogen to canola and wheat. ESN also flows better – "It isn't affected by moisture and doesn't bridge," he says.

Ultimately, Jans follows 4R practices because fertilizer is a major input expense and he wants to use it as efficiently as possible.

CODIE NAGY
OGEMA, SASKATCHEWAN

Codie Nagy has been following 4R practices for years. Even though 4R nutrient management has environmental benefits from reduced losses, Nagy says the economic benefits are a clear motivator. "We're not over-applying fertilizer and we're using it most efficiently," he says.

Nagy works with an agronomist to build variable-rate (VR) fertilizer maps, which is an advanced 4R practice. They have a one-pass system, applying all fertilizer (except sulphur) and seed at the same time with a VR-equipped Bourgault drill with mid-row banders. By placing nitrogen away from the seed row, in a 3"-deep band at the time of seeding, Nagy follows recommended practices for Right place and Right time.

If soil moisture is less than ideal in the spring, Nagy will reduce the nitrogen rate and then top up in-crop if conditions improve. In that situation, he'll stream on UAN with an enhanced efficiency additive (he uses Excelis Maxx from Timac Agro) to stabilize the nitrogen. Use of enhanced efficiency fertilizers is another advanced 4R practice.

Nagy says one challenge can be logistics, which is why he broadcasts elemental sulphur in the fall. That is one product that can be broadcast in the fall and still comply with 4R. "If we had to replace that with ammonium sulphate applied in the spring, it would add a logistical challenge to our one-pass system," he says.

"Applying 100 per cent of fertilizer as spring banded is unique in our area, but it avoids the loss that results from fall application. Banding also provides a 10 per cent increase in efficiency over broadcast application in the spring."

–Nicolea Dow

"We're not over-applying fertilizer and we're using it most efficiently."

–Codie Nagy

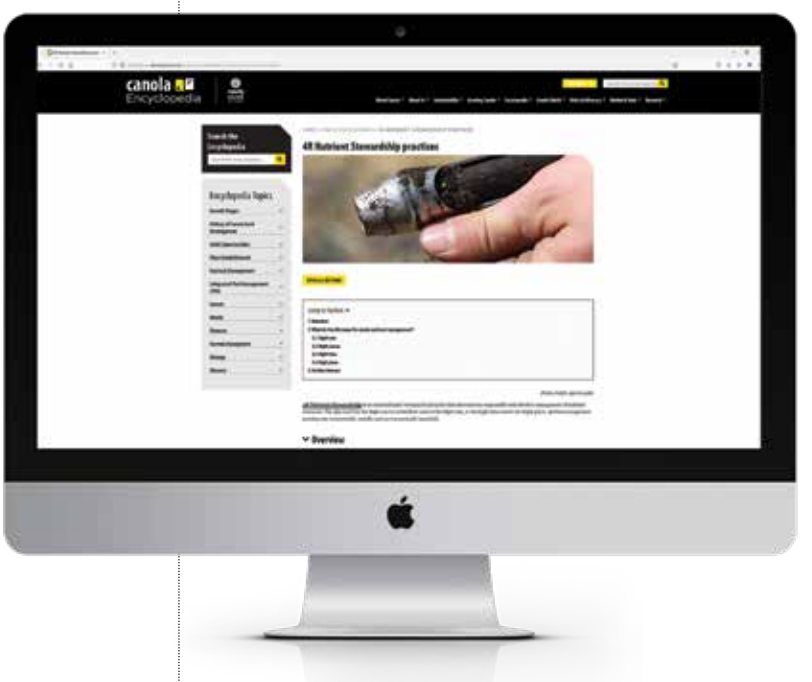
NICOLEA DOW
PORTAGE LA PRAIRIE, MANITOBA

Nicolea Dow says 4R is top of mind for a lot of their farm decisions. Their 4R nutrient management starts with soil testing to set the right rate. "We test every field every year, and we do it ourselves," Dow says. By doing their own tests, they can fine-tune where to collect the samples in case they want to target specific landscape positions within a field.

Their preferred nitrogen source is anhydrous ammonia. "This is the most efficient form of nitrogen," Dow says. "We added the applicator kit to our airseeder and we're all trained to work with it."

They apply all fertilizer in the spring and 100 per cent was banded into the soil in 2021. "Applying 100 per cent of fertilizer as spring banded is unique in our area, but it avoids the loss that results from fall application," she says. "Banding also provides a 10 per cent increase in efficiency over broadcast application in the spring."

While their 4R system is efficient in terms of reducing losses, it does create some logistical challenges. "It does make seeding more intense. We need an extra body to run the fertilizer truck, and we have have to stop the airseeder more frequently to fill," she says. "But we stick with it because we know it's the best decision for our crops and for our land."



The Canola Encyclopedia has a chapter on 4R nutrient management. The quick link is **canolacouncil.org/4R**.

ROLAND CROWE
PIAPOT FIRST NATION, SASKATCHEWAN

If Roland Crowe were to start his farming career all over again, he says he would be more into the 4R program. "I understand the principles," he says, but notes that fertilizer was not always a major part of their farming program.

Piapot First Nation is on the fertile lands of the Qu'Appelle River Valley. It also has another large block of land near Avonlea, which it received in the 1980s to make good on unfulfilled treaty land entitlements. "In the beginning, we didn't want to lease our land to anyone using chemicals or fertilizer, and we lost big time," he says.

Crowe sees now how 4R nutrient management is a good strategy to maintain the productivity of the land. "For soil nutrients, you need to put back what you take out, otherwise you eventually have nothing."

Crowe likes the approach of focusing on areas under the most stress, like hill tops. "Look at the yield monitor to see where yields are low and then find out what is missing," he says. "Monitor the variability in fields and help those areas that need it the most."

LYNDON NAKAMURA
TABER, ALBERTA

At Nakamura Farms, the 4R principles of right rate, source, time and place are all considerations when deciding how to fertilize their crops. "They help us manage bottom-line costs and save money by making efficient use of inputs, which is especially important with the cost of fertilizer today," Nakamura says.

"For soil nutrients, you need to put back what you take out, otherwise you eventually have nothing."

–Roland Crowe

"Fertigation takes a 'spoon feeding' approach. This allows us to supplement crop needs based on leaf samples and soil samples of the crop."

–Lyndon Nakamura

Soil tests are a first step. "The best way to get accurate data is through intensive soil testing, which allows us to have a better understanding of a specific field," Nakamura says. "This will give you current soil fertility status, soil types, organic matter content, salt content, pH and any other variables of your soil that influence your fertilizing decisions."

With irrigation on a large portion of their land, the Nakamuras can add fertilizer to the water – "fertigation" – to refine the right rate and right time throughout the growing season. This is particularly effective once the crop rows close and they are no longer able to apply fertilizer with a tractor without trampling crop. "Fertigation takes a 'spoon feeding' approach," Nakamura says. "This allows us to supplement crop needs based on leaf samples and soil samples of the crop."

Nakamura uses crop nutrient uptake cycles to make better decisions on timing. For hybrid canola seed growers in a typically hot and dry region, these in-season applications can be particularly helpful. "For example, I can add boron to my canola based on soil tests to influence flowering for better pollination and therefore better seed development and yield," he says.

For placement, Nakamura aims to incorporate fertilizer into the root zone as quickly as possible to prevent losses from gassing off. "This can be done mechanically with tillage, or it can be watered in with rain or irrigation. Fertilizer banding also gets the job done," he says.

The Nakamuras use a few different fertilizer sources, including manure. "Generally, we like to put down organic fertilizers – manure – in the fall periods and use synthetic in the spring, but that's not always the case. We use a blend to get the benefits of both," he says. "The slow-release nitrogen fertilizers are helpful when trying to match fertilizer uptake to crop demand."

—Jay Whetter is the editor of Canola Digest.

Credit: iStock.com/zorandimzr

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A few samples: "What's right for your farm isn't the same as what's right for your neighbour's farm" and "Just because you believe something about clubroot or blackleg today might not necessarily be true two years or five years from now" and "If you only have a few insects, you can actually have a boost in yield."

Agronomy tips from the Canola Watch webinars

Canola Watch has a new winter webinar series. When we wrote this article, three of the six webinars had been presented. Here are highlights from those three.

WEBINAR 1: GENETICS, ENVIRONMENT AND MANAGEMENT: FINDING ROOM FOR IMPROVEMENT

What drives yield can be divided into three pillars – genetics, environment, and management (GxExM). Record keeping that includes notes on weather and crop staging will help each farm figure out GxExM combinations that work best for them.

"What's right for your farm isn't the same as what's right for your neighbour's farm," says Keith Fournier, SaskCanola director and farmer at Lone Rock, Saskatchewan. He was a webinar presenter. "We all have different risk tolerances, we all have different equipment. So find out what works for your farm under your management."

The GxExM topic relates to phenology, which is the study of crop development and the influence of biotic and abiotic factors, including two big ones – temperature and precipitation.

Some findings from a Canola Council of Canada (CCC) phenology field project in 2021:

- The 2021 growing season had no weather "normals".
- Fields seeded later into warmer soils emerged more quickly. None of the fields emerged faster than seven days after planting.
- When the number of days from bolting to 60 per cent seed colour change (SCC) increased, so did yield.

The CCC has a new phenology tracking sheet for record keeping to capture GxExM trends for each farm. To download the tracking sheet, go to **canolacouncil.org/research** and scroll to the "Phenology" heading at the bottom.

If you missed this webinar, watch all segments at **youtube.com/canolacouncil** or listen to the podcast at **soundcloud.com/whetterj/phenotyping**.

WEBINAR 2: TARGETING TRAITS TO IMPROVE YIELD AND CONSISTENCY – UNDERSTANDING THE IMPORTANCE OF TRAITS AND CULTIVAR SELECTION

Don't grow one cultivar over the entire farm. Take time to choose the right ones.

"Yield lost to incorrect cultivar choice may be a greater risk than yield gained by choosing the highest yielding cultivar," says Clinton Jurke, CCC agronomy director and webinar presenter. He recommends regular scouting and good record keeping for each field. "When you really understand what's happening in your fields, you can select which traits that correct those most important yield robbers."

Errin Willenborg, agronomy strategist with WinField United Canada, says regular scouting in combination with the latest research and extension messaging will help farmers adapt to continuous changes in each field. "Just because you believe something about clubroot or blackleg today might not necessarily be true two years or five years from now, so try to stay on top of the research and new extension messaging and try to use that in your hybrid decision making," Willenborg says.

A few webinar tips to help with seed decisions:

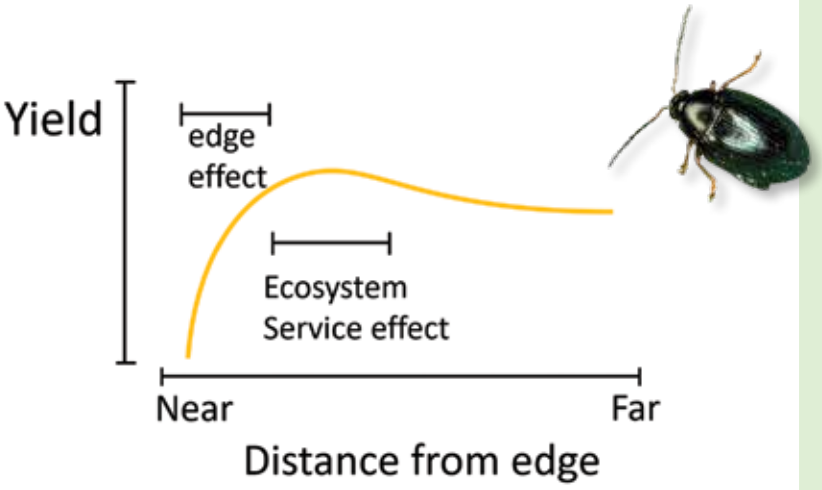
- Genetic resistance should not be our only defense against pests. To protect these genetic tools, include them as one piece of an integrated management strategy.
- "Second generation" clubroot resistance is not inherently better than "first generation." It depends on the clubroot pathotype population in each field.
- The blackleg yield loss calculator is based on a robust model. Use it. Find it at canolacalculator.ca.
- The new Canola Shatter Ratings, ready for seed purchases this fall, will help growers set expectations and make harvest management decisions for canola genetics.
- All canola cultivars have good yield potential. Look beyond yield when making seed decisions.

This webinar covered a lot of ground. If you missed it, watch all segments at youtube.com/canolacouncil or listen to the podcast **soundcloud.com/whetterj/maximizehybridpotential**.

Two more webinars

The Canola Watch Webinar Series has two more:
Thursday, March 24, 2022 | Wednesday, April 13, 2022

For more details on the topics and to register, please go to **canolacouncil.org** and look for Canola Watch Webinar Series in the Events section under the "About us" tab.



Research from Paul Galpern's lab showed a yield "halo effect" around non-farmed areas. Canola yield was lower immediately beside these areas, but a few metres beyond this margin the researchers observed an increase in crop yield and yield stability compared to the field average.

WEBINAR 3: MESSY FIELDS TO BIGGER YIELDS – UNDERSTANDING WHAT IS HAPPENING IN THE FIELD MARGINS AND SURROUNDING LANDSCAPES OF CROP LAND

Biodiversity has benefits for insect pest management and for overall farm yields. This webinar makes a pitch to maintain (or possibly add to) non-farmed spaces such as shelterbelts, wetlands, fence rows and ditches.

Paul Galpern, associate professor in the Department of Biological Sciences at the University of Calgary, is excited by the possibility for "win-wins" from these spaces – where both farm profitability and environmental sustainability objectives can be achieved at the same time.

Galpern's lab collected data on hundreds of fields in central Alberta. The research showed a yield "halo effect" around non-farmed areas. Canola yield was lower immediately beside these areas, but a few metres beyond this margin the researchers observed an increase in crop yield and yield stability compared to the field average. "It isn't going to change profitability to a great degree," Galpern says. "We didn't find a big effect, but we found some effect."

Part of the yield bump could come from the insect-managing biodiversity these areas provide. "Retain these messy areas in your fields, add more maybe, because they keep natural enemies and pollinators close to your fields," Galpern says.

Héctor Cárcamo, research scientist and insect pest management specialist with Agriculture and Agri-Food Canada in Lethbridge, Alberta, also participated in the webinar. Cárcamo gave two good reasons to make insect management decisions based on thresholds. Reason one: "If you only have a few insects, you can actually have a boost in yield," Cárcamo says. Plants are shown to produce more seed yield when stimulated by a small amount of insect feeding. Reason two: Spraying only after pest counts exceed their thresholds will eliminate some sprays. These eliminated sprays will help protect the whole insect ecosystem – including the beneficial insects marching out of non-farmed spaces to lend a hand.

If you missed this webinar, watch all segments at **youtube.com/canolacouncil** or listen to the podcast **soundcloud.com/whetterj/biodiversityandinsects**.

Flea beetles: Management update

Flea beetles remain the most common insect pest of Western Canadian canola. They are also the least predictable. Local areas across the Prairies see damaging levels of feeding each spring. Here are few tips that can improve crop establishment and limit flea beetle damage:

1. Achieve good residue management at harvest
2. Upgrade insecticide seed treatment for flea beetles
3. Use only safe rates of seed-placed phosphate fertilizer
4. Maintain an adequate seeding rate to achieve five to eight plants per square foot
5. Seed into a warm, moist seedbed
6. Check depth and seeder performance regularly
7. Scout frequently in warm dry conditions or where feeding is of concern

Seeding shallow, at a reduced speed, into a warm moist seedbed can reduce flea beetle concerns. These steps help the crop emerge quickly and grow rapidly through the cotyledon to four-leaf stages that are highest risk for feeding injury. Emergence rates under these conditions are well above the typical 50 to 60 per cent.


Credit: Keith Gabert

When a field has five to eight canola plants per square foot and those plants grow rapidly to the four-leaf stage, flea beetle damage is more likely to stay below the action threshold, which is 25 per cent leaf area loss.

While seedbed conditions are somewhat out of the grower's control, growers can control the seeding job to maximize emergence and increase seedling vigour. Anything that increases emergence can help with flea beetle management. For example: Ensure your drill is consistently placing seeds at 0.5 to one inch depth. Consider increasing the seeding rate on fields with challenging emergence conditions. Reduce seed-placed fertilizer. Seed later when soils are typically warmer or even delay seeding to wait for improved moisture conditions.

For more flea beetle management tips, read the Agronomy Insight article from the September 2021 Canola Digest at canoladigest.ca and read the Flea Beetles chapter in the Insects section at **canolaencyclopedia.ca**.

—Keith Gabert

Credit: Keith Gabert

What did we learn from the lygus APOCALYPSE?

AAFC research scientist Héctor Cárcamo uses the term "lygus apocalypse" to describe the scene in some Alberta fields in 2021. The experience with this insect provided a good test for management recommendations.

BY TARYN DICKSON

Héctor Cárcamo titled his Alberta Agronomy Update 2022 presentation "What did we learn from the lygus apocalypse?" To answer his own question, the research scientist with Agriculture and Agri-Food Canada (AAFC) in Lethbridge, considered lygus biology, current knowledge of lygus's interaction with canola and the unique conditions of the 2021 growing season.

Lygus bugs (which belong to the plant bugs, or Miridae family) feed on a variety of commercial crops, including canola, alfalfa, flax, hemp, sunflowers and quinoa. After overwintering as adults, lygus bugs lay eggs that produce the first generation of nymphs around June. (Research near Lethbridge found that a second generation later in the season is possible, especially for regions with longer growing seasons.)

Heat speeds lygus growth. Heat units, such as growing degree days (GDD), will impact the pace of lygus development. For example, *Lygus keltoni* species usually progress from first to fourth instar nymphs in 110 GDD (base 10°C). Therefore, many days with high temperatures in 2021 allowed lygus bugs to develop quicker than in previous years, which allowed the late-instar nymphs to align with the canola growth stage most vulnerable to lygus feeding – which is early pod stage. Hot weather also complicated lygus control measures, as many of the chemical options are not recommended for very high temperatures and/or when plants are under extreme drought stress.

Stick to new thresholds. According to three field trials sites in Alberta and one in Saskatchewan, Cárcamo reported canola yield reductions of about four bu./ac. when lygus counts were well in excess of three per sweep at early flower or pod stage. The findings from this limited dataset led Cárcamo to consider if, under the 2021 growing season conditions, the action threshold was actually greater than three lygus per sweep rather than the current threshold of two to three per sweep. Cárcamo verified the "two to three per sweep" threshold in his recent 'Validation of lygus and other insect pest thresholds in commercial farms throughout the Prairie Provinces' study.

Some feeding is good (in a way). Interestingly, results from a 2021 large plot study near Saskatoon (by AAFC's Tyler Wist) also supported a previous finding that counts of fewer than one lygus per sweep may actually stimulate yield, as Cárcamo also documented.

Don't spray too early. Cárcamo concluded in a previous study that applications for lygus at the bud stage of canola are not usually effective. In canola fields sprayed at early flower stage for cabbage seedpod weevil (CSPW) control, the study still reported a high abundance of lygus by the time the canola reached the mid pod stage. The 2021 experience supported this observation. (See sidebar for more information.)

Finally, Cárcamo emphasized that since insects have a lot of farm-to-farm variability, agronomists and farmers could use on-farm testing to build a long-term quantitative

Lygus bugs (which belong to the plant bugs, or *Miridae* family) feed on a variety of commercial crops, including canola, alfalfa, flax, hemp, sunflowers and quinoa.

historical record of crop injury in relation to biotic stress and input efficacy. This will help everyone better understand lygus and improve management decisions. This approach should also work for other pests, including diseases.

Read more about Cárcamo's research and other lygus bug studies on the Canola Research Hub at CanolaResearch.ca.

—Taryn Dickson is resource manager for Crop Production and Innovation with the Canola Council of Canada. Taryn also coordinates the Canola Research Hub.

MANAGEMENT TIPS

Management for lygus and cabbage seedpod weevil

Héctor Cárcamo's study "Management of lygus bugs and seedpod weevil in canola at the farm level" (which can be found at **CanolaResearch.ca**) recommends:

- Start scouting canola for cabbage seedpod weevils (CSPW) and lygus bug at late bud stage. Make decisions based on thorough field monitoring (not based on neighbouring fields or weather conditions). Sample at least four spots in the field, 50 metres away from the edge.
- Make spray decisions based on thresholds and proper timing for each pest.
- Do NOT spray fields where weevils are below threshold in an attempt to reduce pod-stage lygus bug numbers. Not spraying will conserve natural enemies (which feed on lygus) and allow factors such as rainfall to contribute to the control of pest insects.
- Sweep for lygus bugs after a heavy rainfall before making a spraying decision.
- Avoid tank mixing insecticide with fungicide sprays done at full flower. This can be harmful to pollinators and natural enemies.

Canola crops tend to yield more when they start off with five to eight plants per square foot, and when seedlings emerge at the same time. Growers can also often save extra management costs for flea beetles, for example, when plants germinate and emerge quickly.

How to use stand establishment TO INCREASE YIELD

This is the fourth article in a four-part yield series for the Canola Digest 2021-22 season.

BY JASON CASSELMAN

A canola plant population of five to eight plants per square foot balances yield potential and economics. This range is based on meta-analysis of hybrid canola studies from Western Canada, which showed that canola crops need a minimum of three to four plants per square foot to maintain yield potential. Plant populations lower than this will almost always have yield loss compared to crops with populations higher than three or four per square foot, the analysis concluded. A target of five to eight allows for some loss so the crop stays at or above the four-plant threshold.

Agronomy recommendations are often based on probabilities: what practice is most likely to achieve the desired outcome? This is important to note because canola crops with a thin stand can still yield fairly well in certain circumstances. Canola is often called a flexible or plastic crop because individual plants can adjust the number and size of branches and pods they produce in response to available moisture, light and nutrients. As a result, canola has a famous ability to compensate for a bad start – as long as it gets a long season and clear sailing along the way.

The challenge with a thin stand is that plants will be bigger, which means more yield coming from side branches and more time before the crop is harvest ready. With a lower seeding rate or lower emergence percentages, canola fields can also be patchy. This further reduces yield potential and increases the management challenge. A crop with bald patches and with plants at different growth stages will be a big challenge to optimize spraying and harvest timing, for example.

Results from an Agriculture and Agri-Food Canada (AAFC) study from 2010-12 found that uniform planting produced 14 percent greater seed yield than non-uniform planting at low- to average-yielding sites when plant density was at or below eight plants per square foot. At high yielding sites, uniform and non-uniform plantings resulted in similar seed yield – as long as plant density was greater than six plants per square foot. The bottom line: If you don't have many plants, those plants better be spread uniformly across the field.

Because of these agronomy and yield risk factors, the ultimate recommendation for yield and for comparatively less challenging management is to target five to eight plants per square foot and take steps – such as seeding shallow into warmer soils – to provide rapid, even emergence.

While seeding, monitor field conditions and check seeding performance as soil conditions change from field to field or in different areas in the same field. Prepare to adjust seeding equipment to achieve the end goal of a competitive, high-yielding crop.

DO YOU HAVE THE RIGHT SEEDING RATE?

As growers pick up seed this spring, check the seed weights from each seed lot and then run them through the Seeding Rate Calculator at **canolacalculator.ca** to work out the best seeding rate based on seed size, target stand and estimated emergence percentage. The calculator also provides a cost per acre for that seeding rate.

DID YOU HIT THE TARGET?

AAFC research scientist Julia Leeson surveyed 218 canola fields in Alberta in 2010 and 464 fields Saskatchewan in 2012 to do actual plant counts. Over 40 percent of canola fields surveyed in Alberta in 2010 and over 50 percent of fields surveyed in Saskatchewan in 2012 had overall average stand densities at or below four to five plants per square foot. Basically half the crops did not reach the minimum threshold to maximize yield potential.

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*Internal John Deere test of X9 1100 Combine, based on field conditions.
**PAMI independent comparison between X9 1100 and Claas 8800 Combines.
†Internal John Deere test comparing X9 1100 and S790 Combines, based on field conditions, per unit harvested.

The CCC will run Canola Counts again this spring. Please go to **canolacounts.ca** to enter your counts.

Use the seeding rate tool at canolacalculator.ca to set a seeding rate appropriate for the seed size, then seed at a consistent depth (ideally into warm, moist soils) for a high emergence percentage.

In late 2020, the CCC surveyed 1,000 canola growers to ask about production practices. Of the survey respondents, 75 per cent said they have a target plant stand and the most common target was the recommended five to eight plants per square foot. That is the good news. However, only 55 per cent say they count their plants to check on the actual stand and its uniformity.

To promote counting, the CCC ran a Canola Counts citizen-science program in 2021. Reflective of the challenging spring for some farms, emergence percentages ranged from below 20 per cent to over 90 per cent. Yet, while emergence was low to average, most fields had stands of five to eight plants per square foot. The CCC will run Canola Counts again this spring. Please go to **canolacounts.ca** to enter your counts.

Taking steps ahead of the seeding season to implement a plant stand strategy and working to improve emergence will pay dividends through the whole growing season. Canola stands with enough plants and that emerge evenly across the whole field have the best chance of realizing yield goals. These stands are also the most efficient at utilizing applied resources and provide the best return on investment.

While seeding, monitor field conditions and check seeding performance as soil conditions change from field to field or in different areas in the same field. Prepare to adjust seeding equipment to achieve the end goal of a competitive high-yielding crop.

Feel free to do your on-farm trials with changes in seed rates, seeding speeds and seed depths to compare how those adjustments affect canola stand establishment on your farm. Follow up with in-field evaluation when the canola crop is at the two- to four-leaf stage to see how well you did and figure out what adjustments you need to make to improve stand establishment for next time.

—Jason Casselman is an agronomy specialist and plant establishment lead for the Canola Council of Canada. Email casselmanj@canolacouncil.org.

More stand establishment tips

Higher survival rates increase ROI on seed. With steps to improve seed survival, canola growers can stretch the seed supply to cover as many acres as possible while also achieving their target stand. Steps include shallow seed placement at a consistent depth (1/2" to 1" depth) and into warmer soils. For more tips and details, read Richard Kamchen's article "Get the most out of every seed" in the January 2022 Canola Digest at **canoladigest.ca**.

Quicker to flower could mean higher yield. A Canola Council of Canada (CCC) phenology experiment in 2021 observed that fields with a shorter vegetative period prior to flowering and a longer duration of flowering had greater yield than those with the opposite, a longer vegetative period prior to flowering and a shorter duration of flowering. Read Nate Ort's article "How environment influences canola growth stage timing" in the January 2022 Canola Digest at **canoladigest.ca**.

Why five to eight plants per square foot? To read more about the meta-analysis "Determining the optimum plant density in canola", search for that title at the Canola Research Hub at **canolaresearch.ca**.

Soil conditions for fast emergence. Soil moisture and temperature are the most important environmental factors controlling stand establishment. Read more in the Plant Establishment section at **canolaencyclopedia.ca**.

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This article provides an international perspective on the need to protect and improve the world's soils. Rattan Lal, a world-leading soil scientist, describes how to protect soil health, and explains why private companies are an important ally in sustainability initiatives.

PEOPLE ARE A MIRROR IMAGE OF THE LAND

BY JAY WHETTER

Rattan Lal remembers sitting under a tree with his class in primary school in India when his teacher shared this Sanskrit saying: "*Vasudhaiva kutumbakam*". Sanskrit is the sacred language of Hinduism, and the saying means "the world is one family". Lal lives by that philosophy.

Lal is a distinguished professor of soil science at Ohio State University and director for the CFAES Rattan Lal Center for Carbon Management and Sequestration (C-MASC). He is also a goodwill ambassador for sustainable development for the Inter-American Institute for Cooperation on Agriculture (IICA). IICA is based in San José, Costa Rica, and supports its 34 member countries in agricultural development and rural well-being. Canada is a member.

IICA and Lal have identified that soil health and productivity throughout the Americas, from Argentina and Chile to the U.S. and Canada, are under threat from erosion, desertification, depletion of soil organic matter, nutrient imbalance and salinization. Lal is driven by a personal belief that farmers, when given the tools to improve the soil, will evolve their practices. "We must make agriculture a solution to climate change because we cannot do without agriculture," Lal says.

Lal was born on a small farm in west Punjab, now part of Pakistan. When he was a boy, his family moved to a small farm in India. The farm grew an acre of mustard each year, which they crushed themselves – using the oil for cooking and the meal for cattle feed. They also grew wheat, rice, sugar cane and cotton, and had a buffalo or a cow for milk. They processed what they needed for their own use and sold the rest.

Lal thinks often of his father and brother plowing in 40°C to 45°C heat. The memory reminds him of another expression common in the community: "Plowing in June will turn a respectable farmer into a fakir." A fakir is a monk. When farmers make their jobs that hard (plowing with an ox in 45°C heat), they'd rather quit and become a monk. Today he wonders why his father and brother needed to plow at all? "If the research cannot alleviate this drudgery, then the research is not done," Lal says.

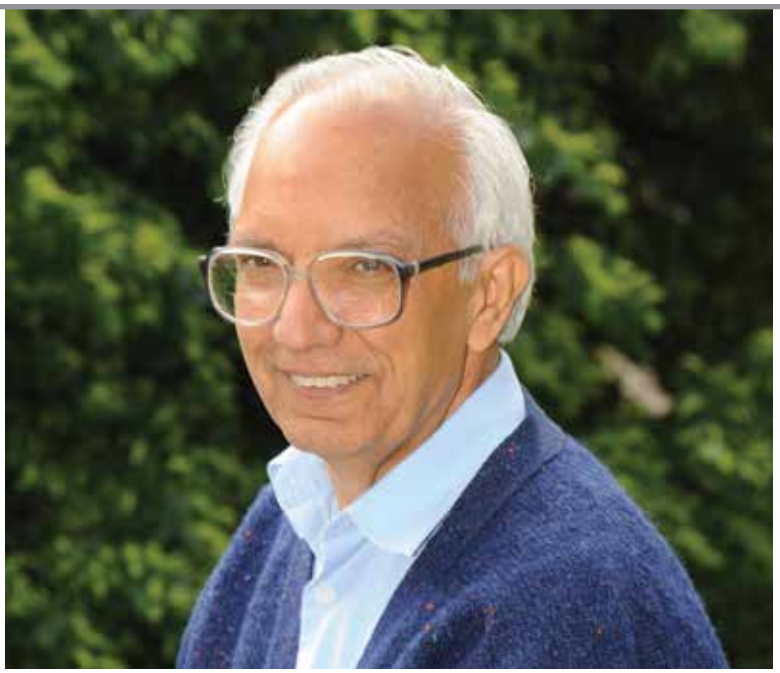
"Organic matter is the heart of soil health, and organic matter depends on how much biomass is returned to the soil."
–Rattan Lal

SOIL HEALTH PRACTICES

Lal says maintaining soil health is an issue for farmers all over the world. Many poor farmers use the whole crop for food, animal feed and cooking fuel. Even manure is used for fuel. The result is a steady decline in soil organic matter and the soil becomes exhausted.

"Organic matter is the heart of soil health, and organic matter depends on how much biomass is returned to the soil," Lal says. "If residue is not returned to the land, the land will rebel and there will be more misery

Credit: iStock.com/CaptureLight



Rattan Lal provides an international perspective on the global need to improve soil health. Lal is a distinguished professor of soil science at Ohio State University and director for the CFAES Rattan Lal Center for Carbon Management and Sequestration (C-MASC). He is also a goodwill ambassador for sustainable development for the Inter-American Institute for Cooperation on Agriculture (IICA).

for people who live on it. People are the mirror image of the land they live on."

Lal describes five steps to regenerate soil:

- no plowing
- leave crop residue and maintain ground cover at all times
- use complex crop rotations
- follow integrated soil fertility management, which includes nitrogen-fixing crops and green manure, not just chemical fertilizer
- integrate crops with trees and livestock

To make this work, Lal says research must develop plants with larger and better root systems, identify the best ways to integrate crops with trees and livestock, and show how soil biodiversity can suppress plant diseases, to give just a few examples.

Lal sees a role for universities, government and private companies. He works with PepsiCo, Syngenta and Microsoft on soil health initiatives. "These companies could be game-changing organizations," he says, particularly for sharing agronomy practices with farmers around the world. "In the process of helping farmers, these companies also help themselves to protect their supply chains. Governments do not have the capacity to do this," he says.

This past fall, PepsiCo joined Living Soils of the Americas, a program IICA and C-MASC designed to "improve rural well-being, productivity and food security while respecting environmental limits and making rational use of natural resources". A major tactic is to teach leaders, including leading farmers, who will be a model to others. PepsiCo will provide technical and financial support.

Lal encourages voluntary programs that help farmers improve efficiency, improve the health of the soil and preserve nature. He also says society should salute farmers who are the greatest stewards of the land. For farmers who don't have the economic capacity to increase soil organic matter, Lal thinks companies could pay farmers for this ecosystem service.

"One member of the family cannot say 'I don't care'. We should all care. We don't live in isolation. We are all responsible. If each person does small things each year to help the planet, you multiply that by eight billion and it becomes a big thing."

–Rattan Lal

While most of these programs are directed at small landowners throughout the Americas, Lal says farmers in Canada and the U.S. also have reasons to improve soil health and take part in other sustainability initiatives.

When asked, "If you could inspire crop farmers of Canada and the United States to change even one thing, what would that be?," Lal goes back to the saying he learned that day under the tree in primary school: *Vasudhaiva kutumbakam*, the world is one family.

"One member of the family cannot say 'I don't care'. We should all care. We don't live in isolation. We are all responsible," he says. "If each person does small things each year to help the planet, you multiply that by eight billion and it becomes a big thing."

—Jay Whetter is editor of Canola Digest.

Canadians' view of the food system has been up and down over the past two years of the pandemic, but results are still better than 2018 and 2019. Research from the Canadian Centre for Food Integrity shows that Canada's food system has room to improve when it comes to building trust.

CANADIANS HAVE A MIXED VIEW OF THEIR FOOD SYSTEM

BY TENESHA LAWSON

After considerable improvement in 2020, the Canadian Centre for Food Integrity's (CCFI) 2021 consumer survey shows a significant decline in those who feel the food system is headed in the right direction. Of course, that's not what those who work in the agricultural sector want to hear, but for Canadian farmers like Jack Froese, it's no surprise given the unpredictable world we've been living in these past two years.

"Everything we farmers do hinges on a good relationship with consumers," says Froese, a fourth-generation farmer in southern Manitoba. "I see it more than producing grains and oilseeds – I'm producing food. Farmers are always looking for ways to improve how we do it, and the public doesn't always get to see that."

CCFI's research shows that most of the movement in 2021 can be attributed to an increase in the number of Canadians who say they 'Don't Know'. (See image 1.) As the results show, there is no significant increase in those who feel the food system is headed in the wrong direction.

CCFI is a member-based non-profit organization that works to build public trust in Canada's food system by leading transparent two-way communications, conducting annual public trust research and providing resources.

"I was dreading sharing [this data] with the food system," says Paighton Smyth, partner engagement coordinator with the CCFI. "But it's not as bad as it seems – everyone in the 'Right Direction' category went into the 'Don't Know' category. It's not ideal, but it's a great opportunity for the food system to share information and earn trust with those who don't know."

Canadians still trust the food system, but many are confused.

Froese explains how he'd like to show consumers how he and his family farm their 4,700-acre grains, oilseeds and special crop farm. "The land and soil are our lifeline," Froese adds. "Everyone in the food chain, including us, are eating the food we're producing like consumers are, and the whole system starts with the farmer."

Building trust isn't about giving consumers more science, more research or more information. CCFI's research shows it's about demonstrating that we as a food system, share the same values as consumers.

So, what do consumers care about?

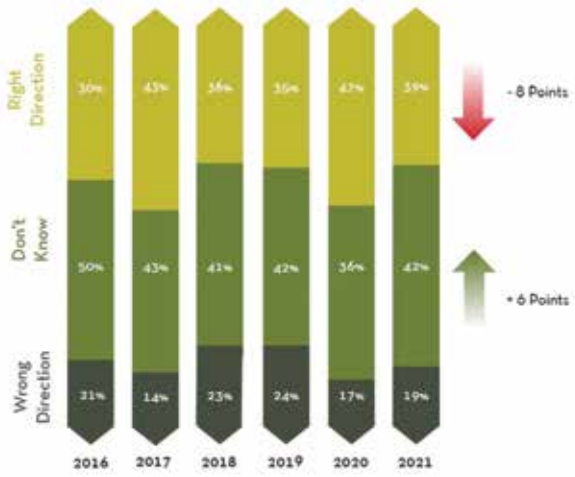


Image 1: Based on Canadian Centre for Food Integrity surveys of Canadians, the percentage of people who say Canada's food system is "moving in the right direction" is down in 2021 compared to 2020, but still better than 2018 and 2019.

FIVE CONSUMER PRIORITIES

The CCFI survey identifies consumer priorities when it comes to their food supply, and climate change entered the top five for the first time. Here are five consumer priorities related to food and farming:

1. **YOU, FARMERS.** Farmers are still consumers' number one trusted source when it comes to food and farming information. Forty-three percent of participants ranked farmers – at the top – as highly trusted, with small, independent producers in second place and university researchers in third. This is good news. Trust remains strong for farmers regardless of how consumers see the food system as a whole.

2. **LOCAL FOOD.** Now more than ever, Canadians are looking to support small businesses and local food production. Now, 'local' can be defined in many ways (think: proximity, regionally, provincially or nationally), but the top-of-mind association consumers have with 'local' is supporting local business with 'farmers markets' and 'u-picks'.

   Research also shows that Canadians trust food produced in Canada more than they trust food beyond the border. Fifty per cent of CCFI's research participants said they have sought out information about food that is grown or produced locally to where they live. In other words, consumers want to buy Canadian-made foods, and many say they are willing to pay more for it.

"Everything we farmers do hinges on a good relationship with consumers... Farmers are always looking for ways to improve how we do it, and the public doesn't always get to see that."

—Jack Froese

3. **HEALTHY, AFFORDABLE FOOD.** Trends show that consumers are moving toward big-picture thinking when it comes to the food system, whereas the intricate details are becoming less of a concern. Since CCFI began tracking data, the most prominent life issue Canadians have identified is the rising cost of food and food affordability. The fear of a profit-driven system is supporting these concerns. We know food production is a business that needs to be profitable, but it's more than that.

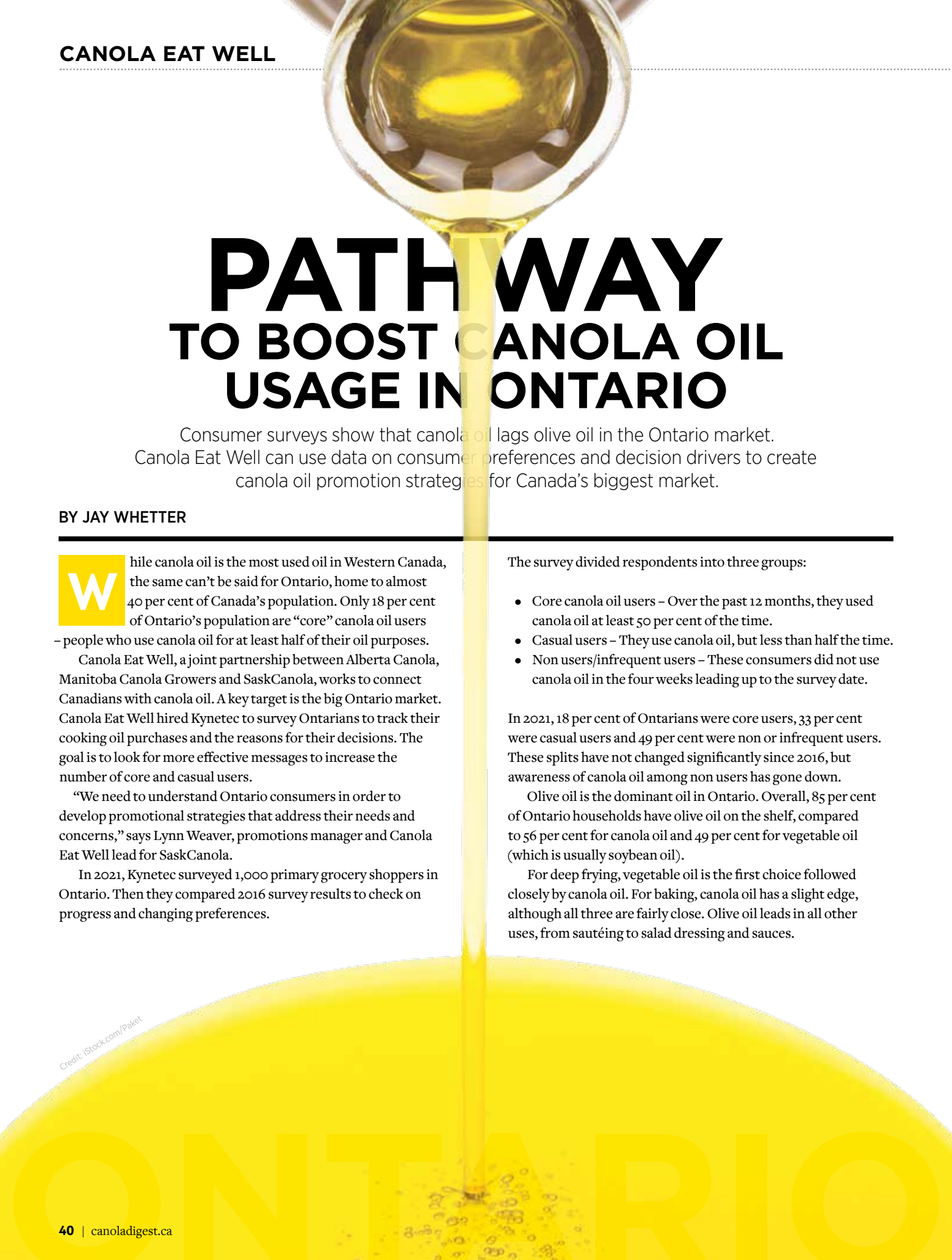
   "You have to be economically viable to be socially responsible and environmentally sustainable. And it falls in that order," says Froese. "There's a cost to everything, and you never make a light decision. You have to look at if you're doing the right thing."

4. **CLIMATE CHANGE.** For the first time, sustainability and environmental concerns have made the top five list of life issues for Canadians. Canadians desire a sustainable food system that takes care of the planet and the environment.

   Froese adds that farmers care greatly about the environment. "Innovations on my farm have a direct impact on environment and sustainability, but it also improves employee fatigue and pushes money into the local economy."

5. **TRANSPARENCY.** When Canadians said the food system is going in the 'wrong direction' they mentioned it was because of a lack of transparency, particularly with food processing. Consumers have a desire for more information on ingredients to help make informed choices.

—Tenesha Lawson is manager, stakeholder communications, with Canadian Canola Growers Association.



PATHWAY TO BOOST CANOLA OIL USAGE IN ONTARIO

Consumer surveys show that canola oil lags olive oil in the Ontario market. Canola Eat Well can use data on consumer preferences and decision drivers to create canola oil promotion strategies for Canada's biggest market.

BY JAY WHETTER

While canola oil is the most used oil in Western Canada, the same can't be said for Ontario, home to almost 40 per cent of Canada's population. Only 18 per cent of Ontario's population are "core" canola oil users – people who use canola oil for at least half of their oil purposes.

Canola Eat Well, a joint partnership between Alberta Canola, Manitoba Canola Growers and SaskCanola, works to connect Canadians with canola oil. A key target is the big Ontario market. Canola Eat Well hired Kynetec to survey Ontarians to track their cooking oil purchases and the reasons for their decisions. The goal is to look for more effective messages to increase the number of core and casual users.

"We need to understand Ontario consumers in order to develop promotional strategies that address their needs and concerns," says Lynn Weaver, promotions manager and Canola Eat Well lead for SaskCanola.

In 2021, Kynetec surveyed 1,000 primary grocery shoppers in Ontario. Then they compared 2016 survey results to check on progress and changing preferences.

The survey divided respondents into three groups:

- Core canola oil users – Over the past 12 months, they used canola oil at least 50 per cent of the time.
- Casual users – They use canola oil, but less than half the time.
- Non users/infrequent users – These consumers did not use canola oil in the four weeks leading up to the survey date.

In 2021, 18 per cent of Ontarians were core users, 33 per cent were casual users and 49 per cent were non or infrequent users. These splits have not changed significantly since 2016, but awareness of canola oil among non users has gone down.

Olive oil is the dominant oil in Ontario. Overall, 85 per cent of Ontario households have olive oil on the shelf, compared to 56 per cent for canola oil and 49 per cent for vegetable oil (which is usually soybean oil).

For deep frying, vegetable oil is the first choice followed closely by canola oil. For baking, canola oil has a slight edge, although all three are fairly close. Olive oil leads in all other uses, from sautéing to salad dressing and sauces.

Credit: iStock.com/Paket

Cooking oil market share across Canada

Neilsen data shows cooking oil retail sales for Canada and for each province. Nationally, canola oil led with 34.8 per cent retail volume market share in 2020, based on litres sold. Olive oil is next at 26.5 per cent and vegetable oil is third at 22.7 per cent. In terms of dollar share, olive oil is way out front, capturing 48.2 per cent of the retail spend on cooking oils in 2020. Canola oil is second at 17.2 per cent.

PROVINCE OR REGION	CANOLA OIL	OLIVE OIL	VEGETABLE OIL	ALL OTHERS
Canada total	34.8%	26.5%	22.7%	16.0%
Maritimes	30.1%	27.6%	27.7%	14.6%
Quebec	29.9%	30.4%	26.1%	13.6%
Ontario	24.5%	27.3%	30.1%	18.1%
Manitoba and Saskatchewan	63.2%	17.2%	8.8%	10.8%
Alberta	54.3%	21.1%	10.4%	14.2%
B.C.	44.9%	27.5%	9.9%	17.7%

Source: Nielson

FOCUS ON VERSATILITY

In terms of target messaging, Canola Eat Well will focus on the 33 per cent of Ontarians in the "casual users" group, as these users are probably more likely than non-users to increase canola oil usage.

"Casual users often have canola oil at home. We want to show them how canola oil's versatility is its advantage, especially compared to vegetable oil," Weaver says.

Key drivers for oil purchases relate to versatility, with "it is a good fit for the way I cook" being the top choice. Factors in canola's favour – "good choice for high temperature cooking", "it's affordable" and "made in Canada" – are not major driving factors behind oil choices in Ontario.

The healthy message could have more traction, Weaver says. The survey shows that people perceive olive oil as the healthiest. When primary grocery shoppers were asked why they use olive oil, the most common answers were "healthier than other oils", "like the taste" and "recipes call for olive oil". Canola oil has a strong health message. Canola oil is low in saturated fat and a source of omega-3 polyunsaturated fatty acids.

"We need to keep talking to people about the healthiness of canola oil," Weaver says. Since 2016, more people say they perceive canola oil as unhealthy (23 per cent in 2021, up from 17 per cent in 2016). On a positive note, only two per cent mention GMO when asked for their perception of canola oil, down from seven per cent in 2016.

"This information will continue to inform our tactics going forward," says Jennifer Dyck, market development director and Canola Eat Well lead for Manitoba Canola Growers. "Canola Eat Well aims to meet the consumer where they're at, and this data is valuable intel that will help to shift messaging and programs as required."

Data clearly show that Ontario remains an opportunity for growth. "Our previous years working with key opinion leaders set us up well to continue into 2022 and beyond," Dyck says, adding, "It's important to note that we value the dedicated Western Canadian user and will continue to maintain a provincial presence within those markets as well."

—Jay Whetter is editor of Canola Digest.

"We need to understand Ontario consumers in order to develop promotional strategies that address their needs and concerns."

–Lynn Weaver

A CONTINGENCY PLAN FOR HEALTH

How will the farm function if one of the major players has a serious injury, illness or dies? A good answer takes some planning. Create "What if" scenarios, plan how to work through these scenarios, and share these plans with every member of the farm team.

BY MATHIEU LIPARI

We all know that agriculture can be dangerous, but it's not a topic that we like to talk about. A study conducted by SMARTRISK shows that in 2009, agriculture-related injuries in Canada caused 295 deaths, 107 permanent and total disabilities, another 1,325 permanent partial disabilities, 4,558 hospitalizations and 76,049 emergency department visits. These numbers are still comparable today.

These injuries have a direct physical and psychological impact on the people involved, including friends and family, and they have a direct impact on the farm business.

To add cold hard numbers, the same study showed that the cost of farm-related injuries to the Canadian economy in that same year was over $373 million. To give you an idea of the economic burden of a farm injury, Worksafe BC has a tool, although it's not specific to agriculture. Go to **worksafebc.com** and search for "Workplace incident cost calculator".

"Planning ahead is one of the best things that anyone can do to ensure the safety and success of their farming operation."

–Robin Anderson

But what does that mean for you, as farmers? Well for one thing, it's important to take these numbers seriously because a farm accident can have a profound impact on you as an individual, on your family, friends, partners and team, and also on the farm business and the bottom line.

When one of the major players has a serious injury that stops them from working, the family has to deal with the direct emotional and psychological effects, and someone has to keep things going. Crops and livestock don't take care of themselves. Without a backup plan, that could be the end of the farm.

Most of us don't like to think about serious injury, disability or death, especially at a younger age, but it's important to do exactly that. Farmers need to prepare, just in case.

"Planning ahead is one of the best things that anyone can do to ensure the safety and success of their farming operation," says Robin Anderson at the Canadian Agricultural Safety Association (CASA). "Creating a farm safety plan, training for all that work on the farm, creating safe play areas, and providing supervision for children are simple ways that all farming families can do to help reduce the likelihood of injury."

This stresses the importance of planning in all aspects of the farm business. Create "What if" scenarios, plan accordingly and share these plans with every member of the farm team. Part of the planning process should identify all the essential tasks of the farm, including the business management activities, and then train and involve someone else in each essential task. Writing everything down so it can be referenced when needed. How often have we heard about farms whose transition plans weren't enacted as planned due to serious injury or death of the farmer owner?

The added benefit is that these plans won't just be useful if something bad happens, they will help to ensure that fewer incidents occur.

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ACTIONS FOR YOUR CONTINGENCY PLAN

Here are a few actions that farmers can take to ensure adequate safety planning:

- Provide regular occupational health and safety training to all workers (including the owners). (e.g., WHMIS)
- Make sure at least one person on the farm has first aid and CPR training and that someone with first aid skills is present on your farm during working hours.
- Ensure complete first aid kits are always readily available and accessible to everyone on the farm. Keep these kits stocked and well maintained.
- Ensure everyone has access to safety equipment that is regularly tested and maintained.
- Ensure proper signage for equipment, buildings, chemicals and dangerous areas on the farm.
- Ensure farm equipment and buildings are outfitted with the appropriate safety features and undergo regular maintenance.
- Make sure everyone working (including the owner) receive regular medical check-ups and health assessments. Especially those who have a higher risk of health issues (e.g., pregnant women, elderly workers, workers with an existing medical condition, etc.).
- Have clear emergency procedures available and train all workers so they understand what to do in case of an accident (e.g., injury, spill, entrapment).
- Investigate options for disability or injury insurance, for you and your workers, and put the appropriate measures in place.
- Make sure everyone working on the farm has access to health insurance (e.g., private, provincial Workers' Compensation Board).
- Make sure everyone working on the farm has access to mental health support and counselling.
- Investigate incidents and implement corrective action (e.g., new safety measures, training, etc.) to reduce their likelihood.
- Report all accidents as soon as possible to the appropriate authorities (e.g., a farm manager, the Occupational Health and Safety Division and, if required, the Workers' Compensation Board).
- Conduct a health and safety audit of the farm on an annual basis to ensure appropriate measures are in place to maintain a safe and healthy working environment.
- Have a formal, written farm safety plan that is regularly reviewed and updated to conform with changes to the business and operations.
- Have formal, written standard operating procedures outlining safety protocols.

CASA offers an excellent template called the "Canada FarmSafe Plan", which is accessible for free. Go to the CASA website at **www.casa-acsa.ca** and search for "Canada FarmSafe Plan".

We all wish that every farm could run smoothly and safely all the time, however the statistics don't lie – accidents happen. Don't become a statistic. Create a plan to keep your farm, family and farm team safe and healthy, and to keep the farm operational if an incident does occur.

—Mathieu Lipari is a program manager with Farm Management Canada. Find out more about FMC at fmc-gac.com

CASA offers an excellent template which is accessible for free. Go to the CASA website at **www.casa-acsa.ca** and search for "Canada FarmSafe Plan".

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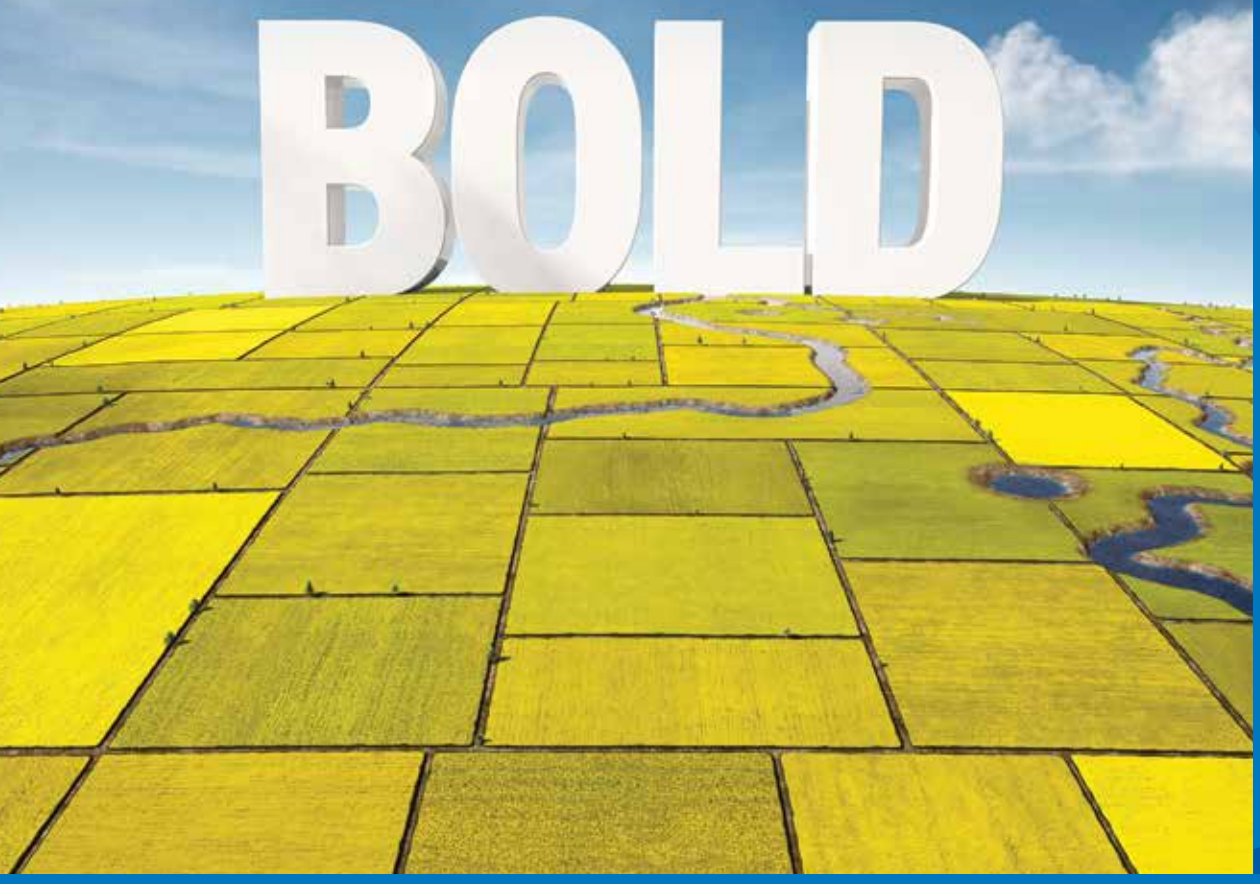

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