

March 2023

canola DIGEST

The Source for Canada's
Canola Growers

Innovations in action

We asked our farmer panelists to describe the best innovation they thought of themselves or recently adopted. Josh Heidt of Kerrobert, Saskatchewan chose his Redekop weed seed destroyers.

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Biocontrol organisms reduce
cutworms in canola /pg 34



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CANOLA WEEK 2022 HIGHLIGHTS

The Canola Council of Canada co-hosted Canola Week, December 6-9, in Saskatoon, with an agenda full of canola industry updates, discovery, innovation and research.

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Market diversification

The Canola Industry Meeting on day one featured a few presentations on canola market development, including the \$25 billion goal for Protein Industries Canada, canola meal potential as fish food and massive growth in renewable fuels.

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Fix or set aside unprofitable acres?

On day two, the Canola Discovery Forum had a session on unprofitable acres. Should farmers make a substantial investment to fix their unprofitable acres. Or cut farm losses and set them aside?

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Technology that excites

Bonnie Mandziak, Christian Hansen and Garth Donald participated in a Canola Discovery Forum panel on precision agriculture technology. They described upcoming technology that most excites them. Answers included hyperspectral imaging and a plant stress indicator called Innerplant.

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Canola AgriScience Cluster – turning research into knowledge

The CAP Canola Cluster Wrap-Up on day four featured short reports on 16 research projects from the Canola AgriScience Cluster.

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Farmers want canola-friendly weather

The Canola Council of Canada surveyed growers in late 2022 to check in on adoption of best practices, agronomy priorities and risks to canola production. Weather is the biggest risk factor. Flea beetles are the most costly pest. And of the CCC agronomy priorities, harvest management had the top score for impact on yield.



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Nasty weeds get an R rating

Weeds are turning. Herbicide resistance built up slowly and has finally hit a critical point where observation must become action. We need to turn down the R rating on weeds – more Mister Rogers and less Larry Flynt. This article explains how.



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Farm practices that are good economically are often also good for the environment. Optical spot spraying is one such technology, and is likely to be a common feature on sprayers of the future. This case study describes how one farm uses optical spot spraying technology.

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Canola Digest asked its six farmer panelists to describe the best innovation they thought of themselves or recently adopted on the farm. Farmers are innovating or applying innovations all the time, trying to find better ways to solve problems. They may not even realize they're doing it.



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Advocacy teams for the Canola Council of Canada and Canadian Canola Growers Association work together to represent the interests of canola farmers and the canola industry value chain in Ottawa. Here is a look back at some of the advocacy priorities and milestones from both organizations in 2022.

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Agriculture can be a major part of the solution to reduce greenhouse gases in the atmosphere. In this article, Farm Management Canada provides a snapshot of carbon farming – using agriculture practices to capture carbon – and questions that require answers before it becomes common practice.



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CANADIAN CROPS CONVENTION
March 7-9 | Ottawa, Ontario
canadiancrops.ca



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Alberta Canola welcomes four new directors to the board, Christi Friesen from Brownvale, Paula Law from Lacombe, Jeannette Andraszewski from Two Hills and Cheryl Westman from Vermilion. At its Annual General Meeting in January, Alberta Canola members approved new commission bylaws.

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Manitoba Canola Growers present the 2023 Canola Award of Excellence to Michael Eskin, distinguished professor and occasional food science rapper. Results from year one of the Canola On-Farm Research Program are published at canolagrowers.com, with in-depth management details and agronomic data.



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THE EDITOR'S DESK



Saving forests

“**I**nnovation is the reason one quarter of all forests exist.” Jack Bobo made this statement during a presentation at the Grow Canada conference at the end of November. “There are 3.6 billion hectares of forest left on the planet,” he says. “If we farmed today the way we did in the 1960s, we would need to remove another one billion hectares of forest to produce the same amount of food.”

Bobo is The Nature Conservancy's director for global food and water policy. The Nature Conservancy* is a Washington-based non-government organization (NGO) with many environmental priorities – tackling climate change, protecting oceans, land and freshwater, and providing food and water sustainably.

Farmers, in general, have not warmly embraced the priorities of environmental NGOs, but here is Jack Bobo hailing the productivity-enhancing and forest-saving innovations of modern agriculture.

Continuing to produce more per unit of land can help preserve the forests we have left and rest soils that need a break from annual crops. The next forest-saving innovations ready for implementation include gene-editing tools that can advance complex traits like water and nitrogen efficiency, to give just two examples. They are waiting for regulatory approval.

“Every innovation that will scale by 2030 is available today,” Bobo says, “but I’m a regulatory pessimist. I’m not sure we’ll be allowed to use them.”

CropLife Canada, a partner in the Grow Canada conference, represents the developers, manufacturers and distributors of plant science innovations, including pesticides and biotechnology. Pierre Petelle is the president and CEO of CropLife Canada. “We need smart regulation to make sure environment and human health are ensured,” Petelle says. Beyond that, he and CropLife have asked, for years, for a regulatory system that enables, not deters, innovation.

People like Jack Bobo, who see how modern farming practices can co-exist with the environmental movement, may help show regulators a science-based path forward. “When we look at coalitions in agriculture, we are always looking for other groups to show how ag can help achieve environmental and social goals,” Petelle says.

When environmental NGOs like The Nature

Conservancy support the environmental benefits of modern agriculture innovations, perhaps the general public will, too. The Canadian Centre for Food Integrity does an annual survey of public trust in the food system. When the 2022 survey asked Canadians to rate their trust in specific groups, farmers ranked highest. Forty-two per cent of people scored farmers eight or higher, out of 10, for trust, about the same as 2021. However, trust in Canadian agriculture overall was 28 per cent, down a statistically significant three percentage points from 2021. In its report on the 2022 survey, the Canadian Centre for Food Integrity wrote, “A sustainable food system, one that meets the needs of all food system stakeholders, while preserving our environment, must be trusted. Building a trusted and sustainable food system is a journey of continuous improvement best achieved through open cooperation across the entirety of the food system.”

Ertharin Cousin, who also spoke at the Grow Canada conference, is the founder and CEO for Food Systems for the Future, a global organization with a mission to support “agriculture enterprises to sustainably, measurably and profitably improve nutrition outcomes” with a focus on underserved communities. She calls NGOs like The Nature Conservancy “new partners.”

“It’s no secret that the climate and agriculture communities have not always shared a symbiotic agenda, but that’s changing,” Cousin says.

Cousin tells me she recently spoke with Darci Vetter, global head of policy and government relations with The Nature Conservancy, for a podcast. “Darci underscored the reality that we’ve come a long way in the last decade within these two communities to both acknowledge the realities of climate change and align solutions that help create more resilient sustainable agricultural practices,” Cousin says. “We won’t always agree 100 per cent of the time, but it’s encouraging how much common ground we share as we drive forward efforts to realize a modern, climate-smart food system.”

People need to know that innovative agriculture saves forests. The Nature Conservancy knows this and can help the farm sector tell that story. ✿

*The Canadian arm of The Nature Conservancy is Nature United. Nature Conservancy of Canada, though modelled on The Nature Conservancy, is a separate organization.

New Alberta Canola Board of Directors

UPDATE

Alberta Canola Bylaw Development

At Alberta Canola's Annual General Meeting on January 17, Alberta's canola growers voted to approve the new draft bylaws as presented. Alberta Canola would like to thank Marketing Council staff for their guidance during this process.

The next steps before the bylaws and new marketing plan regulation come into effect are to gain approval from the Marketing Council board and the Minister of Agriculture and Irrigation.

Visit albertacanola.com/bylaws to view the draft bylaws.



Alberta Canola's board of directors. Back row (L-R) Christi Friesen, Charles Simoneau, Jeannette Andraszewski, Paula Law. Wayne Schneider, Christine McKee, Justin Nanninga, Alan Hampton. Front Row (seated L-R) Andre Harpe, Roger Chevrax, Ian Chitwood. Absent: Cheryl Westman

Alberta Canola is pleased to welcome four new directors to the board, Christi Friesen from Brownvale, Paula Law from Lacombe, Jeannette Andraszewski from Two Hills and Cheryl Westman from Vermilion. Friesen will represent Region 1, Law Region 7, Andraszewski Region 4 and Westman region 10.

Following the 33rd Annual General Meeting held on January 17, 2023 in Lethbridge, at the first annual Alberta Canola Conference, the board re-elected both Roger Chevrax of Killam as the chair and Ian Chitwood of Airdrie as the vice chair.

"Alberta Canola would like to thank outgoing directors Dan Doll, John Mayko, Mike Ammeter and Cale Staden for all their hard work over the last six years. Representing Alberta's canola growers and the different needs of their regions helped the board exercise good judgement and make sound decisions," Chevrax says.

"The board is grateful for their contributions and diverse perspectives."

—Roger Chevrax



Tax Credit for the 2022 Tax Year Available to Canola Farmers in Alberta

Canola growers in Alberta who do not request a refund of their check-off from the Alberta Canola Producers Commission qualify for a tax credit for the 2022 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 a check-off on canola,” says Alan Hampton a farmer from Rowley, Alberta and chair of Alberta Canola’s research committee. “Farmers are funding research looking for ways to better grow canola. This includes research into agronomic issues such as blackleg and clubroot disease management, and the monitoring of insect pests for susceptibility and resistance to insecticides. 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 2022 is 20.93 per cent.

For example, for an individual grower who paid \$1,000.00 in check off to Alberta Canola in 2022, \$209.30 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 three 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.

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SaskCanola Embarks on an Indigenous Recipe Project

Take a moment to think about the foods that are traditional to Canadians. What comes to mind? Is it poutine? Nanaimo bars? Ketchup chips? As it turns out, there is an entire category of traditional foods all around us that many Canadians have yet to discover.

Indeed, many of our seasonal favourites – like beans, corn, potatoes, squash and tomatoes – were originally cultivated by Indigenous people. For centuries Indigenous people have used these foods, and many others, to create delicious meals that are unique to their cultures.

Aiming to make these recipes more mainstream, SaskCanola's market development manager Lynn Weaver dove further into Indigenous recipes with a project that highlights ingredients grown right here in Saskatchewan. SaskCanola received project funding through the Government of Saskatchewan Agriculture Awareness Initiative Program (AAIP) under the Canadian Agricultural Partnership.

Weaver worked with an Indigenous community advisory group in Saskatchewan so that the project is meaningful, relevant and culturally appropriate.

Indigenous people have developed their own food harvesting, farming, hunting and fishing practices that have helped sustain their health and well-being. Knowledge of traditional foods has been passed down through generations with oral teaching, storytelling and sharing experiences.

Traditional diets consist of foods that are found in the natural environment, and often include wild game, fish and edible plants. Eating more traditional foods helps Indigenous people feel connected to their cultural identity and to other members of their community.

Historically, Indigenous people also understood the physical health benefits of a more traditional diet. They knew that eating a varied diet promotes good health. The acts of harvesting, berry picking, gardening, hunting and fishing provided additional health benefits, as well as being ways of staying physically active.

Among First Nations communities, the kinds of foods incorporated into traditional diets varies based on geographical location, availability of different plants, proximity to animal migration routes, and traditional hunting and fishing practices.



All recipes, complete with nutritional information, are available on the websites canolaeatwell.com and canadianfoodfocus.org.

SaskCanola's project features recipes provided by Indigenous community members that highlight Saskatchewan ingredients (and use canola oil!).

Recipes compiled for the project include Aunt Mabel's haystack baked lentils from Métis Chef Jenni Lassard; cinnamon apple cake from Chef Jodi Robson (Okanese First Nation); cranberry, sage and puffed wild rice cookies from the māmawi cafe (a student-run food program in north central Regina); three sisters salad from Indigenous Chef Kirk Ermine; wild rice salad with maple vinaigrette from Chef Douglas Hyndford (Peepeekisis Cree Nation); and savory zucchini quiche also from Chef Robson.

The six recipes are highly nutritious, versatile and combine unique flavours. For example, beans, corn and squash – known as the Three Sisters – in combination as a salad provides a balanced (and delicious) meal.

Similarly, wild rice, which is usually added to savoury dishes, is used in a re-imagined, Indigenized chocolate chip cookie recipe with cranberry and sage. Wild rice was first introduced to the northern lakes of Saskatchewan in the 1960s. Since then, the province has become the largest producer of wild rice in Canada. The recipe also uses canola oil for the added benefit of heart-healthy omega-3 fatty acids.

Over the past decade, SaskCanola has produced an extensive collection of recipes, award-winning recipe booklets and online videos to promote canola use.



ANTHONY ELIASON



JON FEHR



MARGARET RIGETTI



ED SCHAFER



SaskCanola welcomes four new directors

The beginning of 2023 has been busy for SaskCanola's staff and stakeholders. Here is a summary of recent events and collaborations.

ANNUAL GENERAL MEETING

On January 10, SaskCanola held its Annual General Meeting (AGM) at the Western Canadian Crop Production Show in Saskatoon.

After SaskCanola's AGM, three new appointments took place. The Board of Directors elected Keith Fournier as board chair, Dean Roberts as vice chair, and Margaret Rigetti as audit and finance committee chair.

FOUR NEW DIRECTORS

2022 was an election year and SaskCanola now has four new directors. Anthony Eliason and Jon Fehr are acclaimed for four-year terms. Margaret Rigetti and Ed Schafer are appointed for two-year terms.

Eliason farms with his family near Outlook, Saskatchewan. He earned an agronomy degree from the University of Saskatchewan and a heavy-duty mechanics certificate from Olds College. Due to the availability of irrigation and a range of soils, he grows a mix of crops that includes canola, wheat, peas and flax. Eliason previously served on the board of the Irrigation Crop Diversification Corporation (ICDC).

Fehr brings both farming expertise and grain industry experience to his board role. He worked for 18 years in the grain handling industry. With a focus on maintaining farm profitability and making sound agronomic decisions, he grows canola, pulses, cereal, grains and hay with his family near Herschel, Saskatchewan. Fehr attended SaskCanola's Learn to Lead program in spring 2022.

Rigetti farms near Langbank, Saskatchewan where she grows winter wheat, spring wheat, barley and canola in partnership with her brother and cousin. Her main roles include grain marketing, risk management, finance and accounting. She earned her BSc in

agriculture from the University of Saskatchewan. Rigetti is a past director of the Western Canadian Wheat Growers Association and Grain Growers of Canada.

Schafer spent five years working in the crop protection industry prior to transitioning to full-time farming in 2002. He graduated with an agronomy degree from the University of Saskatchewan. Schafer currently grows canola, wheat, peas, barley and oats with his wife in Makwa, Saskatchewan. He previously served as president of the Canadian Canola Growers Association (CCGA).

Contact information for all SaskCanola Board members can be found saskcanola.com. Find "Board of Directors" under the About Us tab.

NEW COLLABORATION WITH SASKFLAX

Also in January, SaskCanola and the Saskatchewan Flax Development Commission (SaskFlax) announced a new management collaboration.

Operating out of one office in Saskatoon, this collaboration means efficiencies for both crop commissions and provides a full staff complement to support both Boards. Canola and flax levies will continue to be collected separately.

In addition, SaskCanola and SaskFlax will maintain individual Boards of Directors and separate governance structures.

"As 2023 begins, SaskFlax is pleased to announce new management. Finding administrative and operational efficiencies within our industry ensures that growers' levy dollars are put to the best use. Our commissions were created with similar mandates and key focus areas – research, extension and market development. We are excited about the opportunities this arrangement brings to oilseed growers," says Greg Sundquist, board chair of SaskFlax.



Another year of *excellence*

MCGA presented its 2023 Canola Award of Excellence to Michael Eskin, distinguished professor and occasional food science rapper



Michael Eskin, distinguished professor in the Department of Food and Human Nutritional Sciences at the University of Manitoba (U of M), was awarded the 2023 Canola Award of Excellence in February for his crucial role in the development of canola oil.

When Eskin joined the U of M in 1968, Baldur Stefansson and Keith Downey were cross-breeding rapeseed in the process of developing canola. “My colleague, the late professor Marion Vaisey-Genser, sensory specialist, pulled me into the research,” Eskin says. “My role was to look at the composition, stability and performance of the oil that would become canola. We were commissioned by the Canola Council of Canada to prepare the first major booklet on canola oil to promote its science and technology to health professionals and food industry people around the world.”

At the time, the group had no idea of the implications of the work they were doing. “I feel very fortunate to have been part of this remarkable development, which changed the agricultural landscape of Manitoba and Canada,” he says.

“Dr. Eskin’s involvement in canola oil research throughout his career is what made him stand out,” says Delaney Ross Burntack,

executive director, Manitoba Canola Growers Association (MCGA). “From his early involvement in the development of canola oil, to his efforts in solving problems associated with the oil over the years, to his current work with colleagues looking at some of the antioxidant and anti-cancer properties of the phenolics in canola. Dr. Eskin has a long list of accomplishments and MCGA is thrilled to recognize him with this award.”

When presented with the award, Eskin was honoured to accept and appreciated the recognition from MCGA, “the ones who produce this product, a significant contributor to the economy of Manitoba. Thank you for this honour.”

Eskin says his work on canola was collaborative, and that working with colleagues and graduate students over the years has been critical to their success.

“This was a team effort and I feel fortunate to be part of a dedicated group of scientists who worked so well together. Sadly, many have since passed away, but their impact on Manitoban and Canadian agriculture has been enormous.”

—Michael Eskin

Eskin has published over 150 research papers, 70 chapters and 17 books, including *Canola and Rapeseed: Production, Processing, Food Quality, and Nutrition* and *Canola: Chemistry, Production, Processing, and Utilization*. He has been recognized with numerous prestigious awards including the Order of Canada and the Order of Manitoba

Michael Eskin, 2023 Canola Award of Excellence recipient. One of the best parts of Eskin’s job, he says, is interacting with colleagues and students. “Collaborating makes it more fun.”

for his contributions to the development of canola oil as well as being one of the world’s leading food science writers. One of his many scientific awards, the 2020 Supelco AOCS research award, is considered the world prize in lipids. In 2022 he was the recipient of the prestigious Lifetime Achievement Award in Honour of Nicolas Appert by the Institute of Food Technologists in the United States.

In an interview, Eskin told MCGA staff that he has been on a reduced appointment since 2011, but to us, he shows no signs of slowing down. At the time of the interview (December, 2022) he was working on three books.

As he put it, “I’m no teenager, but I am an ager.” This year Eskin will be 82 and is actively supervising, teaching, writing, serving on graduate student committees, reviewing papers for journals, and of course, rapping about lipids. His debut single, ‘Lipids get a real bad rap: it’s just not fair,’ posted on YouTube, teaches listeners about good and bad fats, and his flow is unbeatable.

MCGA would like to thank Michael Eskin for his active role in the development of canola oil, his continuous work on improving the oil, and for his contributions to the sustained growth and prosperity of Manitoba’s canola industry.



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Canola On-Farm Research Program: 2022 trial results



The Manitoba Canola Growers launched a pilot on-farm research program to help canola farmers across the province fill the gap between traditional research results and the farm level experience. The program aims to provide applied, transferable research results to farmers to allow for the adoption of new and improved production practices by evaluating performance across a wide range of growing regions and farm operations in Manitoba.

The 2022 season of the Canola On-Farm Research Program results included three trial types: a nitrogen rate trial, a seeding rate

trial, and an anti-fungal bioinoculant trial. Results are published and can be found at canolagrowers.com under the Research section. Reports include individual trial reports with in-depth management details and further agronomic data.

In the 2023 season, we look forward to adding site years to each trial to gain insights. We will also add a new trial type to increase the range of canola management practices being studied on-farm.

Graduating from High School?



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The awarding of the scholarship will be based on academics, canola connection, school and community involvement, and essay submission.



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For an application form and complete details,
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Market diversification

BY JAY WHETTER

The Canola Council of Canada co-hosted Canola Week December 6-9 in Saskatoon. The Canola Industry Meeting on day one featured a few presentations on canola market development, including the big goal for Protein Industries Canada, canola meal potential as fish food and massive growth in renewable fuels.

\$25 billion goal for the protein sector

PROTEIN INDUSTRIES CANADA has a big goal for Canada. Lisa Campbell, director of programs at Protein Industries Canada (PIC), shared the goal at Canola Week: By 2035, Canada needs to grow the plant-based food, feed and ingredient sector to \$25 billion and provide 10 per cent of the world's plant-based food products.

In a report called *The Road to \$25 Billion*, PIC outlines this “once-in-a-generation opportunity” for Canada to take a lead in plant-based proteins.

“This bucket of foods today includes products from the primary plant-based protein producers, including Roquette and Merit, for example, as well as plant-based alternatives to meat, dairy and eggs,” says Bill Greuel, CEO of PIC. “Basically when crop commodities are turned into plant-based protein ingredients.”

Using this definition, the sector is worth \$2.5 billion to \$3 billion in Canada, based on estimates of business-to-business ingredient sales and domestic retail sales of

plant-based foods. PIC doesn't have a good handle on Canada's market share at this time, but Greuel estimates it at well below 10 per cent in a sector currently dominated by soy and wheat proteins.

The report outlines a long list of strategies and priorities. Two key steps relate to regulations and processing capacity.

REGULATIONS

To grow the plant-based protein industry, Canada needs a pathway to accurately identify sources of protein and bring new products to market.

To be labeled as a “source of protein” in Canada, foods have to meet certain standards for protein quality – related to the supply of indispensable amino acids and digestibility. Based on current rules in Canada, lentils – a known source of plant-based protein – cannot be labeled as a source of protein. This is where the labeling system needs an update.

Canada also needs to lead on approval of other novel protein sources. Singapore, for example, has approved cellular-based meat. This is meat tissue grown from actual animal stem cells and fed with plant-based amino acids. As written in *The Road to \$25 Billion*: “As alternative sources of

protein emerge, and we experience a convergence of evolution between plant-based, fermentation science and cellular-based meats, those jurisdictions that balance food innovation with a business-focused regulatory system will attract major ingredient and food processing companies.”

Greuel says Canada is a highly-regarded exporter “because of our regulatory system” but Canada has regulations that are holding back its growth potential. That is why PIC set up its Regulatory Centre of Excellence.

Christopher Marinangeli is the centre's director. “We are not lobbyists,” he says. “We are facilitating experimentation to help address specific challenges of the sector and generate data to make informed policy changes.”

Because government regulatory agencies don't do research themselves, organizations asking for regulatory changes have to provide scientific data and evidence to substantiate that change. Agriculture and Agri-Food Canada and Health Canada have advisory roles in the regulatory projects led by PIC's Regulatory Centre. “We want to be transparent and inclusive,” Marinangeli says. “It's not emotional. Everyone's head is in the right place.”

“If we do not act quickly to establish critical mass in crop processing and ingredient manufacturing, other jurisdictions will, and Canada will not capture our global share, nor realize the opportunity that is in front of us.”

— Protein Industries Canada,
from *The Road to \$25 Billion*



PROCESSING CAPACITY

To achieve the goal of \$25 billion, Canada needs to quickly scale-up its ingredient processing. “At an unprecedented rate, ingredient processing capacity is being built and supply chains are being established as countries race to satisfy demand,” PIC writes in the report. “If we do not act quickly to establish critical mass in crop processing and ingredient manufacturing, other jurisdictions will, and Canada will not capture our global share, nor realize the opportunity that is in front of us.”

Canada has many strengths on which to build a \$25 billion plant-based food, feed and ingredient sector by 2035. Ernst and Young, in a report PIC commissioned in 2020, listed them as market access; sustainable production practices; large agricultural land base; food safety and quality standards; and research, talent and agri-food clusters.

To give a few specifics, Canada has trade agreements with all the major markets. Canada has the third highest ratio of arable land to population, giving it the domestic supply to feed into domestic processing. And Canada has a diversity of feedstock, including canola meal, pulses and cereals, while the U.S., for example, is pushing hard on a soy-based system.

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Aquaculture opportunity for canola meal

AQUACULTURE represents a potentially large opportunity for Canadian canola meal. “The world is now farming more fish than is caught from wild stocks,” says David Dzisiak, chief operating officer for Botaneco. Data from the Food and Agriculture Organization of the United Nations show wild caught and farmed fish neck and neck in 2020, with aquaculture trending upward quickly and wild caught trending downward. Canada currently produces 5.7 million tonnes of canola meal. Once the new canola processing capacity comes on stream in the coming years, the country could produce up to 9 million tonnes of meal. “We need to find high-value homes for that meal,” says Brittany Wood, director of canola utilization for the Canola Council of Canada.

Canola meal provides a proven benefit to increase milk yield in dairy cows, and dairy

feed remains the biggest market for Canadian canola meal. However, Wood says U.S. and Canadian dairy markets may be tapped out in terms of growth potential. “Canola meal will also see an increased challenge from soybean meal,” Wood says, because the U.S. will also be processing vastly more soybeans to supply oil for its regenerative diesel facilities. That means more soybean meal, and the U.S. soybean industry will be aggressive in marketing it.

Aquaculture – fish farming – also “plays to canola meal’s strengths,” Wood says.

Carp, catfish, tilapia and salmonids are the top four farmed fish. Shrimp are also farmed in large quantities. Standard canola

meal is a great fit for tilapia and carp farms, common in China. China is, by far, the biggest fish farming country. Specialty canola meal, like the high-protein, low-fibre product from Botaneco, works for farmed salmon and shrimp.

Botaneco’s proprietary processing method starts with the removal of canola seed hulls. “The water-based process allows for separation and isolation of the major seed components like oils, fibres, carbohydrates and proteins,” Dzisiak says. “This allows us to uniquely concentrate the protein and reduce the key anti-nutritional factors down to no-effect levels in salmon.”



Global Feed Production by species grand total = 1,153MMT

Alltech Feed Outlook 2022 estimated global feed production at 1,153 million metric tonnes in 2021. At four per cent share, aquaculture is a small market compared to chicken, swine, dairy and beef, but aquaculture has projections for rapid growth and canola meal is a suitable feed ingredient for top aquaculture species.

Ag and petroleum companies partner on renewable diesel

AGT WORKING WITH FEDERATED CO-OP on a renewable diesel and canola protein meal project at Regina is just one example of new relationships forming between agriculture companies and petroleum companies.

“It is pretty amazing to see oil and ag holding hands in oilseed crushing,” says Chris Vervae, executive director with the Canadian Oilseed Processors Association.

In his Canola Week presentation, he shared three other examples from the U.S.:

- ADM and Marathon in North Dakota
- Bunge and Chevron in Louisiana and Illinois
- Shell Rock Soy Processing and P66 in Iowa

“Canola-based biofuels are a great way for farmers and others in the value chain to contribute to greenhouse gas emission reductions, while at the same time creating economic value,” Vervae says.

In December, a few days before Canola Week, the U.S. Environmental Protection Agency (EPA) delivered the final rule that canola oil-derived renewable diesel, sustainable aviation fuel and other biofuels qualify as “advanced biofuels” under the U.S. Renewable Fuels Standard program.

This opens the door for canola to participate in the massive U.S. fuel market.

The Canola Council of Canada worked with the Canadian Oilseed Processors Association on a U.S. Canola Association petition to the EPA in 2020 to approve canola oil as a feedstock for renewable diesel, jet fuel and other biofuels. Renewable diesel and renewable jet fuel are chemically similar to their petroleum equivalents, making it easy for end users to switch to these lower carbon-intensive alternatives. 🌱

“Canola-based biofuels are a great way for farmers and others in the value chain to contribute to greenhouse gas emission reductions, while at the same time creating economic value.”

—Chris Vervae



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Fix or set aside unprofitable acres?

BY JAY WHETTER

Should farmers make a substantial investment to fix their unprofitable acres? Or cut farm losses and set them aside? The Canola Discovery Forum had a session on this topic, with two presentations on fixes and one on setting acres aside.

Land is not going to fix itself, says Jason Casselman, Canola Council of Canada agronomy specialist. “With data analysis and mapping technology, farmers now have the opportunity to not only identify areas of low productivity, but also see how deep the problem is when they look at the bottom line,” Casselman says. Return on investment calculations will drive adoption of land management practices, he adds.

Fix: Moving topsoil back to hilltops

MARLA RIEKMAN SAYS NO TILL doesn’t immediately fix eroded areas like hilltops because plant growth is too low to significantly increase organic matter. An effective practice to improve productivity is to put the soil that has, over the years, eroded into low areas back to the hilltops where it came from. Then use no-till to keep it there.

Riekman, soil management specialist with Manitoba Agriculture, cites Manitoba studies showing that topsoil added to hilltops increases yields significantly, while having minimal effect on yield in low-lying areas where soil was removed (see graph). One project looking at the economics of soil-landscape restoration showed a return on investment within three to five years.

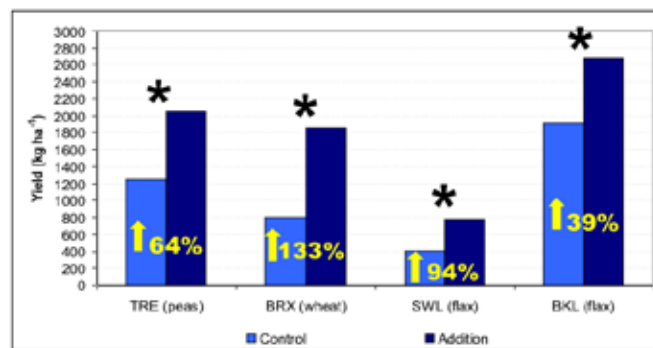
“This makes it the fastest ROI of any land management practice, including tile drainage,” Riekman says. “And that assumes the work was being done as a custom job. The ROI could be even faster if a farmer uses their own equipment and labour.”

Adding compost and manure to hilltops are also effective to increase productivity quickly, while other soil-building practices,

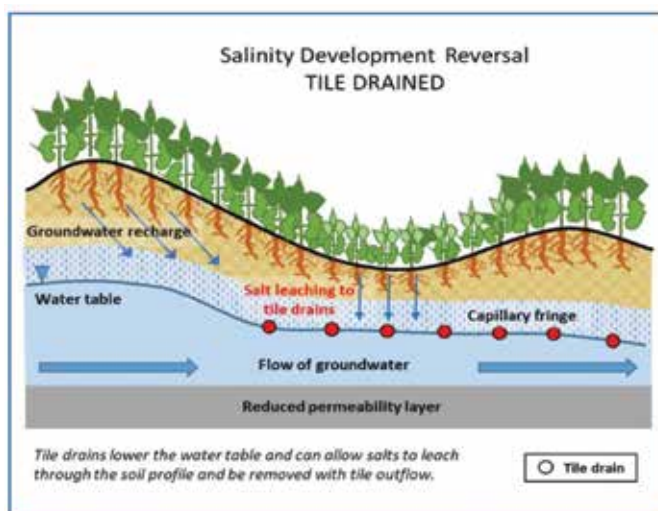
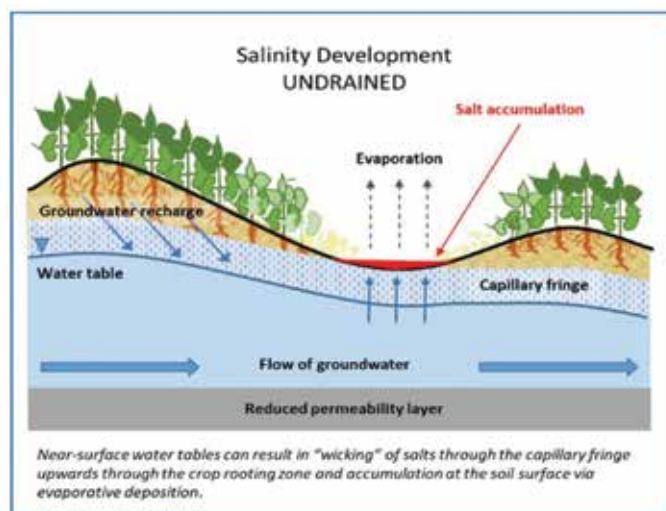
like no-till, perennials, cover crops and increased fertilizer to increase crop biomass take longer to show results. “It took 10 thousand years to get soil to where it was in the first place. You can’t expect soil to fix itself over night with these other practices.”

Riekman says both quick and long-term soil health practices will lead to improved yield and fewer nutrient deficiency symptoms. Farmers will notice other benefits, she adds, including improved drainage, darker soil colour, higher organic matter and carbon content, and improved aggregate stability.

Landscape Restoration – Soil added to knoll



These results are from a David Lobb study in Manitoba. Adding soil back to knolls increased yield significantly (indicated by the *) for various crops and locations. The three-letter code indicates different field locations.



Source: https://pami.ca/wp-content/uploads/2022/01/Soil-Management_IF-03.pdf

Strategically located tile drainage can lower the water table and reduce salinity in areas where severe salinity prevents crop growth. David Whetter shared these images in his presentation at Canola Week.

Fix: Strategic tile drainage

DAVID WHETTER, SOIL SCIENTIST and owner of AgriEarth Consulting, described the benefits of tile drainage to increase land productivity. He notes that before spending \$1,000 to \$1,500 per acre on tiles, farmers will want to look at surface drainage solutions first. “Tile drainage is complementary to surface drainage,” he says. Effective tile drainage also relies on a good municipal drainage system to move water out of the ditches. Otherwise, ditch water could possibly back up into the field through the tiles.

Tile drainage doesn’t necessarily have to cover the whole field. “I think that’s an important consideration,” says Jason Casselman, Canola Council of Canada agronomy specialist. “It may work that farmers can spend \$1,000 per acre to fix the 10 acres that cause 90 per cent of their headaches.”

Tile drainage can reduce surface salinity and improve yield in saline areas. Damaging salinity occurs when the water table is at the soil surface and evaporation of this ground water deposits salts in the topsoil. Tile drainage lowers the water table to reduce the interaction between ground water and the soil surface. Over time, these salts are flushed out through the drains. Whetter quotes noted soil scientist Les Henry, who said, “The only real reclamation for saline soils is to remove excess water from the bottom and pour additional water on top to flush

the salts out.” Tiles remove the excess water, but without irrigation to increase the flushing, it can take years to see an effective reduction in soil salinity, Whetter says.

The more immediate benefit is from rapid lowering of the water table. Tile drainage removes water that exceeds the holding capacity of the soil. This excess water impedes root function and limits field activities. By removing this water, tile drainage can improve plant health and plant uniformity and allow farmers to get on fields faster in the spring or after a big rain. In spring, tile drainage also improves infiltration of runoff once soils have thawed, and reduces peak overland flow which may reduce surface erosion and sediment loss from the field.

Tile drainage water can contain relatively high amounts of nitrogen, while phosphorus export is typically lower when compared to surface runoff losses. Whetter described a few best management practices to capture water or filter water before it leaves the field. For example, controlled-drainage valves can shut off the tiles after spring melt to stop flow through the growing season. Edge-of-field treatment options such as constructed wetlands can capture nutrients before runoff leaves the field, and collection ponds can provide water for irrigation later in the season.

Casselman knows a farmer in the Peace River region of Alberta who irrigated canola fields from dugouts using a drag line and gun sprinkler. “It was a drought year, and the farmer saw canola yields double in those areas irrigated with 1.5” of water from the dugout,” Casselman says. Tile drainage systems that include retention ponds would improve field access and crop establishment in the spring while providing water for irrigation in mid-season.



David Whetter collaborated with Bruce Shewfelt at PBS Water Engineering on tile drainage factsheets. Find them at **pami.ca**. Search for “Beneficial management practices for agricultural tile drainage in Manitoba.”

Set aside: Convert unfixable acres to grass

MARK MCCONNELL, ASSISTANT PROFESSOR and upland birds specialist at Mississippi State University, says 26 per cent of the agriculture land across 10 states from North Dakota to Ohio were classified as “stable low yield” in a recent study. These sub-field areas produce low yields, relative to the rest of the field, year after year. Farmers may not realize the magnitude of economic loss when those acres are annual-cropped. “Farmers know these areas are low yielding, but they may not know how much money they’re losing,” he says.

McConnell has field profit maps showing chronically unprofitable areas. Given the shape of these areas, it may not be practical to take them all out of production, but he says it can make sense to set aside some field edges.

The keys, he notes, are to plant these areas to grass, not trees, and to keep them maintained. This came up during the Q&A at the end of the presentation. Someone asked whether returning field areas to conservation habitat would just push the issue farther into the field? McConnell cites papers showing that grasses and forages do not push problem areas further into the field, however one paper did show some issues when cropland was replaced with trees. Even with grass, which is the more natural prairie habitat, some maintenance is required. Farmers don’t want these areas to be kochia patches.

Programs are available to help farmers convert cropland to perennial habitat. Check with local grassland, watershed or conservation organizations.

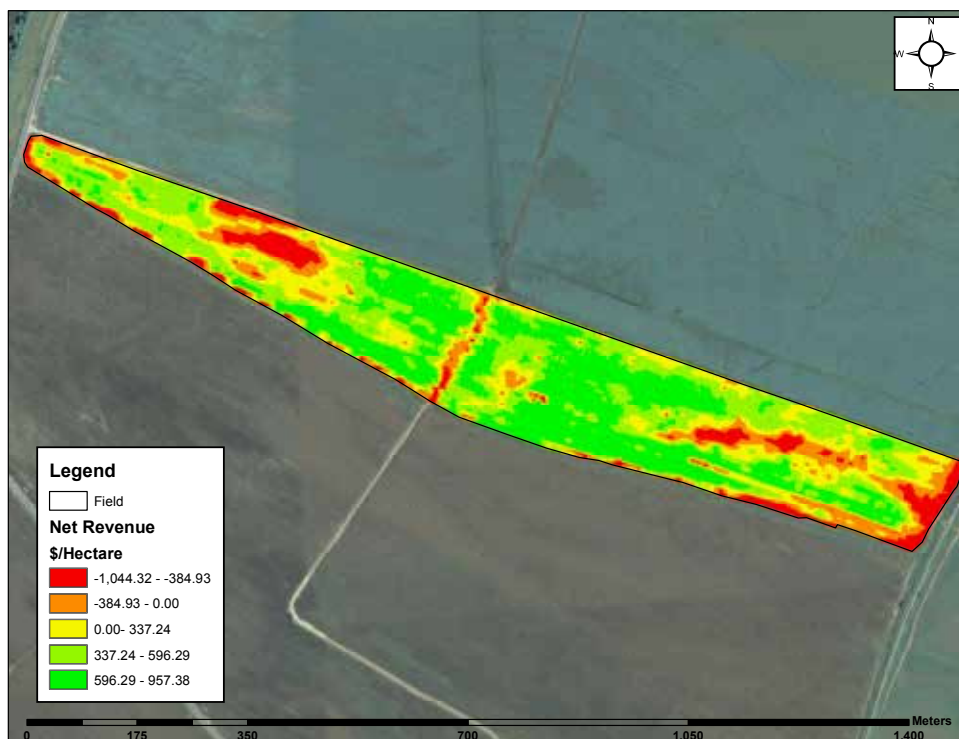
Mark McConnell, assistant professor and upland birds specialist at Mississippi State University, calls bobwhite quail (below) the “canary on the prairie.” While he’d like more unprofitable areas returned to grass for the good of the birds, he knows that economics have to drive these decisions.

McConnell has spent his entire career studying bobwhite quail, which he calls the “canary on the prairie.” If bobwhites are in trouble, this is a sign of bigger issues. While he’d like more unprofitable areas returned to grass for the good of the birds, he knows that economics have to drive these decisions.

In a published research paper, McConnell wrote: “I suggest targeted conservation be defined as the application of conservation practices only where they increase profitability to the producer.”

During the presentation, he added the following paraphrase: “If it doesn’t make money, it doesn’t make sense.” 🌻

—Jay Whetter is editor of *Canola Digest*.



Mark McConnell provided this sample profit map. Areas in red are chronically unprofitable. He says it could make economic sense to revert some of them back to grassland habitat.



Mark McConnell calls bobwhite quail the “canary on the prairie.”

Photo credit: Mark McConnell



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Technology that excites

BY JAY WHETTER

Bonnie Mandziak, Christian Hansen and Garth Donald participated in a Canola Discovery Forum panel on precision agriculture technology. They described upcoming technology that most excites them. Answers included hyperspectral imaging and a plant stress indicator called Innerplant.



JOY AGNEW moderated a Canola Discovery Forum panel on precision agriculture technology. Agnew is associate vice president, applied research, at Olds College of Agriculture & Technology in Olds, Alberta. Here are two questions she asked of her three panelists, and the panelists' responses.

WHAT UPCOMING TECHNOLOGY MOST EXCITES YOU?

Bonnie Mandziak, product marketing manager with Climate FieldView: "As an agronomist, it can be a difficult decision to tell a client whether to spray a fungicide. We will usually say yes because we don't want them to have a wreck. If we can use data and digital tools to help farmers answer spray questions – Do I spray? When should I spray? Where should I spray? – we can help them make better more informed decisions. Smarter spraying will unlock yield potential and better agronomic practices such as 4R."

Christian Hansen, small grains corporate agronomist with John Deere: "I'm excited for Innerplant, which is a company inserting fluorescent proteins into plants that can make them signal certain stressors throughout their life cycle. While Innerplant is at a very early stage, the commercial application of this tech is limitless to help agronomists and growers make proactive decisions on their farms. It could be used to signal fields that are at high risk for disease infection, insect infestations, nutrient deficiencies or even water stress."

Hansen fills a new role at John Deere. While local dealerships have had agronomists, he is the first corporate agronomist for Western Canada. "My job is to help bring agronomic knowledge into the design process of new hardware and software solution concepts," Hansen says. "For example, if Deere is working on new seeding technology, it would be my role to ensure that the engineering team is aware of all the agronomic factors such as rate, soil types and nutrient requirements that the machine will encounter so that they can design the solution appropriately."

Garth Donald, manager of agronomy with Decisive Farming by Telus Agriculture: "Hyperspectral imaging. With this technology, one will be able to identify plant diseases before the human eye can see them. That way one can be more proactive than reactive."

Hyperspectral imaging captures wavelengths beyond visible light to show things the eye can't see. Low earth orbit satellites, once launched, will capture these high-resolution images at a broad regional scale.

FOR CANOLA GROWERS JUST DIPPING THEIR TOE INTO PRECISION SOLUTIONS, WHAT'S THE TECHNOLOGY YOU'D RECOMMEND?

Garth Donald: "Variable-rate application. An issue with variable-rate (VR) canola seeding is that the seed flows very easily. Can your drill adjust rates effectively? If not, VR seeding for canola is not practical. In general, with any discussion about precision tools, we don't ask enough questions of the grower, to find out their objectives and find a system that meets the ROI they're looking for."

Christian Hansen: "Pulse-width modulation. If we think about the most utilized piece of equipment on the farm, the answer is the sprayer. A sprayer with the latest tech is a sound investment to ensure we are applying the intended target rate and water volume while also minimizing overlap or misses. Pulse width modulation provides product control down to the nozzle level by utilizing solenoid valves that rapidly turn themselves off and on at different frequencies to hit a target application rate. The systems are smart enough to determine the amount of pulses per second required to deliver a target rate based on nozzle size, machine speed, and pump pressure. Some systems can compensate rate when turns are made because the inner boom is moving slower than an outer boom. The system, when coupled with section

Continued on page 22. >



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Canola AgriScience Cluster – turning research into knowledge

BY BETH IRELAND

The CAP Canola Cluster Wrap-Up on day four of Canola Week featured short reports on 16 research projects from the Canola AgriScience Cluster.



CAP Canola Cluster Wrap-Up presentations are available to view on the Canola Council of Canada YouTube channel at youtube.com/canolacouncil. Look for the Canola Week 2022 playlist.

THE CANOLA AGRISCIENCE CLUSTER is a five-year research program funded through Agriculture and Agri-Food Canada's (AAFC) Canadian Agricultural Partnership (CAP) and our canola industry. On December 9, the last day of Canola Week in Saskatoon, stakeholders heard about 16 cluster research projects spanning seven themes.

Since 2018, the cluster has invested more than \$20 million in research funding to advance two canola industry priorities: a) to increase production and quality characteristics sustainably and profitably, and b) to differentiate and demonstrate the quality of canola products to meet new and existing customer requirements at a competitive price.

The cluster was amended in 2019 to include research into two diseases – blackleg and verticillium stripe – with funding from Alberta Canola and SaskCanola.

During the wrap-up, researchers from AAFC, InnoTech Alberta, the University of Manitoba and the University of Saskatchewan shared their findings.

Joyce Boye, director general of AAFC's Science and Technology Branch – Prairie Region, noted in her opening remarks that this research took place during COVID-19 with all the challenges that go with field and lab research during a pandemic.

In the morning, presentations focused on multiple themes. Canola Research Hub guru Taryn Dickson,

resource manager with the Canola Council of Canada, spoke about Theme 6 – activities to increase the value of cluster research by sharing findings with growers and other stakeholders.

For Theme 1, which is about food processing, Martin Scanlon, University of Manitoba, spoke about green alternatives for extracting oil and antioxidants from canola seed. Scanlon's research concluded that the two alternatives are not economically viable at this time.

Canola meal usage took centre stage with Theme 2. Chaouki Benchaar, AAFC, presented his research on the benefits of incorporating canola meal into the diets of dairy cattle. Spoiler alert, dairy cows release less methane, produce more milk and perform better overall with canola meal in their diets.

Bogdan Slominski, University of Manitoba, then discussed upcycling canola fibre into bioactive and beneficial prebiotic components, using enzyme technology, as an alternative to antibiotics. His research focus is the diets of broiler chickens and laying hens.

Rob Duncan and James House, both from the University of Manitoba, outlined their Theme 3 research into advancing the functional, nutritional and economic value of canola protein. Their research focused on *Brassica napus* varieties with enhanced protein-related traits, as well as how processing methods can impact protein content and quality.

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Sally Vail, AAFC, spoke about selecting against the secondary dormancy trait to reduce amounts of volunteer canola. She described the challenge given that it's a complex genetic trait. Vail's objective is to develop molecular breeding tools to eventually be used in commercial breeding programs to reduce secondary dormancy.

Theme 4 revolves around improving nutrient and water use efficiency. Rosalind Bueckert, University of Saskatchewan, focused her research on answering the question – where is the nitrogen in the canola plant? Bueckert broke her research into the categories of infancy to old age; famine to feast; and heirloom (historic cultivars) to hybrid.

Continuing the nitrogen focus, Melissa Arcand, University of Saskatchewan, presented virtually about taking a soil perspective on canola nitrogen use efficiency (NUE). This can give a fuller picture of canola NUE to advance ongoing plant-based canola NUE research.

After lunch, attention shifted to canola diseases and pests like sclerotinia stem rot, flea beetles, clubroot and cabbage seedpod weevil. These projects fall under Theme 5: sustainability and climate change – integrated pest management.

The audience was keen to hear about the development and field deployment of a biosensor for sclerotinia stem rot forecasting from Susie Li, InnoTech Alberta. The sensor would notify farmers, via cellphone, when a disease outbreak is at a high-risk potential.

Dwayne Hegedus, AAFC, presented on genetic resources for flea beetle resistance, in particular hairy canola. These hairs, or trichomes, deter flea beetle feeding. This project investigates the complexity of the hairy trait to hopefully provide breeders with lines and associated genetic markers to introduce into canola varieties.

Gary Peng, AAFC, talked about developing novel resistance resources and strategies to address the threat of clubroot in canola production. His study explores a protocol to measure quantitative resistance to blackleg.

Taking a different perspective, Bruce Gossen, AAFC, spoke about learning to live with clubroot. The explosion of new, virulent clubroot pathotypes in Alberta crops indicates that producers need options for situations where no single source of genetic resistance is available to effectively manage all pathotypes.

Héctor Cárcamo, AAFC, described the biological control of cabbage seedpod weevil. His research assesses efficacy of the parasitoid wasp *Trichomalus perfectus* in managing seedpod weevil in Quebec and Eastern Canada. Cárcamo is documenting the species of weevils and parasitoids in different habitats, with the option of introducing these parasitoid wasps into the Prairies in mind.

The day ended with three presentations from Theme 7 on blackleg and verticillium stripe. Hossein Borhan, AAFC, spoke about verticillium as a soil-borne disease. The best control measures are deployment of verticillium-resistant cultivars and monitoring the pathogen spread using specific molecular markers. Gary Peng outlined his studies into the relative importance of cotyledons versus lower true leaves for blackleg infection. Finally, Dilantha Fernando, University of Manitoba, spoke about monitoring blackleg incidence and severity in selected commercial fields with different R-gene rotations. 🌻

control and the ability to vary rate based on prescription maps, simplifies the application process and ensures products are accurately and sustainably applied across the entire farming operation."



Bonnie Mandziak

Bonnie Mandziak: "On our farm the past few years we've moved to VR seed and fertilizer, and we've seen a major improvement in crop uniformity. It's not necessarily about spending more or less, it's about placing the nutrients where they are needed. Growers can also make use of the sprayers to reduce costs. For example, a sprayer that has individual nozzle control and VR capability connected to a digital platform can be utilized to create an on-off map for fungicide based on canola biomass. This is a really good way to reduce costs of sclerotinia stem rot management."

For Joy Agnew, the highlight of the panel was the acknowledgment that return on investment for precision technology will differ from farmer to farmer. "This means that precision ag providers have a tough job: providing a product or service that may be used or viewed differently by each customer," Agnew says. "Helping producers determine or calculate the potential return on investment of adopting a precision ag tech will be that much more challenging."

Spraying with drones

THE TOPIC OF FIELD SPRAYING and spot spraying with drones came up during the precision agriculture technology panel discussion. "Can we just extend the label for products approved for aerial application? We don't know," says Agnew, associate vice president, applied research, at Olds College of Agriculture & Technology. Someone in the audience at Canola Week referenced Tom Wolf, owner and sprayer specialist with Agrimetrix Research & Training. Canola Digest checked in with Wolf. Agrimetrix has not initiated its own research but has been watching results from industry trials. Wolf shared the following observations:

“ At this stage, it appears that drone spraying is unique and different from both traditional fixed wing and rotary wing spraying. It has to do with the speed of the machine. The slower drones are in a transition between free flight and hover, meaning their prop downwash contributes to spray deposition. This can be both good and bad – downwash can be like air assistance helping penetrate dense canopies, more than traditional aircraft. But too much downwash and the spray cloud bounces off the surface and creates drift potential. Downwash strength depends on speed, height, and payload. As a result, the operator's decisions are critical.

The potential for spot sprays is starting to be evaluated. A spot spray of a larger wet area in a field is, of course, a slam dunk for drones. But small spot sprays, such as weed targets, are more difficult because a drone's aerodynamics create a relatively large footprint of deposition, even with a short spray burst.

The PMRA has requested new product efficacy and drift information for drones prior to issuing a registration on a label, even if that label already has an aerial use allowed. So they are, at this stage, still treating drones as unique. It's possible they will eventually agree that performance isn't that different and allow a grandfathering of aerial labels, but it still depends on the registrants' willingness to support this new use. 🌻



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Two years to pay off optical spot spray system

This case study describes how one farm uses optical spot spraying technology.



NAME: CARL DECONINCK SMITH

Location: Fiske, Saskatchewan

Soil zone: Brown

Crops: Canola, peas, lentils, wheat, barley, durum and flax

Carl deConinck Smith's farm is 12,000 acres, of which 9,000 are seeded each year and 3,000 are rested as chemfallow.

Their spraying program each year includes in-crop spraying, pre-seed burnoff and fall weed control. For the applications on brown (non-crop) ground – pre-seed, fall and chemfallow – deConinck Smith uses the green-on-brown optical spot spraying technology currently on the market.

Their R4045 John Deere sprayer is the only sprayer in the world, deConinck Smith says, with the combination of direct injection and optical spot spray. With direct injection, he can inject glyphosate directly into the spray booms as needed and at variable rates, providing a tank mix addition to the product in the main tank. The direct injection system keeps glyphosate in its own 800-gallon tank separate from the main tank.

The optical spot spray system is from Weed-It. It comes with a 120-foot boom, and cost deConinck Smith around \$290,000.

Tom Wolf described Weed-It in a detailed Canola Digest article from 2019. For a quick summary of Wolf's article, Weed-It spray booms have sensors at one metre



“With our system, we average a quarter litre of glyphosate over the whole field, but put up to 1.25 litres per acre on each weed. Our typical savings are 30 to 90 per cent, depending on how many weeds are present on the field.”

— Carl deConinck Smith

intervals. These scan the ground ahead of the boom, identify the presence of plants, and trigger the nozzle in line with the plant. A travel speed of up to 15 mph is possible.

John Deere also offers See & Spray optical spraying technology. “If you’re buying a new sprayer, this add-on is a no brainer,” deConinck Smith says.

His sprayer set-up gives him various options. He can apply full coverage across the field – the current standard practice. He can spot spray. Or he can opt for dual mode, which applies a low background rate across the field to capture small weeds that Weed-It can't see and a higher spot-spray rate to larger weeds it can see.

“You need to understand what these systems are good at and not good at when you buy them,” deConinck Smith says. “Weed-It is good at seeing weeds with a broad leaf and in patches, but not good at seeing a newly-emerged wild oat. If you see lots of wild oats coming up, maybe that's when you opt for the dual rate.”

“With our system, we average a quarter litre of glyphosate over the whole field, but put up to 1.25 litres per acre on each weed,” deConinck Smith says. “Our typical savings are 30 to 90 per cent, depending on how many weeds are present on the field.”

He adds that these gains are only possible if the farm already has a sound weed management program. If fields are full of weeds, spot spraying will not be worth it.

What deConinck Smith likes about spot spraying is that it provides “real time” variable rate application. “We don't need to map weeds ahead of time.”



Weed-It at Olds College

Olds College of Agriculture & Technology wrapped up a two-year study of Weed-It. Project lead Shabeg Briar presented the results at Alberta Agronomy Update in January.

The two-year study used Weed-It for pre-seed burnoff in three spray modes: full spray, spot spray and dual mode. Dual mode included a blanket spray at a lower rate plus a spot spray application when optical sensors detected weeds. The study compared these three modes to a check that did not receive a pre-seed application. Strips were spread over two fields each year.

Year one was canola, year two was barley. Ahead of canola, researchers sprayed a mix of glyphosate (group 9) and Conquer II (group 14 pyraflufen-ethyl and group 6 bromoxynil). Ahead of barley they sprayed glyphosate and Paradigm (group 2 florasulam and group 4 haluxifen). All treatment plots, including the untreated plots, also received two in-season, full rate, blanket spray applications. Researchers collected data on weed counts, application rate and harvest yield.

Weed counts were generally lower for treated versus untreated, and for full and dual treatments versus spot-sprayed plots. However, the spot-sprayed plots used 82 and 97 per cent less herbicide in the two canola fields and 88 and 98 per cent less in the two barley fields.

As for yield, this study showed no negative impact on yield with or without pre-seed herbicide application. "The need for pre-seed spray application depends on many factors, including prevailing weather conditions at the time of pre-seed spray application, weed pressure, weed size and weed management practices on a farm-by-farm basis," Briar says. "Since conditions vary from year to year, farmers may need to keep this in mind before deciding to purchase optical spot spraying technology."

Olds College plans to continue the research. Briar hopes to compare pre-seed spot spraying without any in-season spray application to in-season full spray without a pre-seed spot spray application. The study could also include comparisons to non-chemical weed control technologies, like chaff lining or mulching crop residue, and additional fall weed management. Another study could evaluated spot spray for chemfallow.

This leads to greater profitability. "With the investments we've made, it's a two-year payback," he says. By his calculations, an 8,000-acre farm can pay off the technology in two years. As glyphosate costs increase, the return on investment can occur that much faster.

"We've had zero reliability issues in five years with the system," deConinck Smith says. Chemfallow is a good litmus test. "Chemfallow doesn't lie. You can't fake chemfallow."

CCC ANALYSIS OF THE PRACTICE

What do you like about optical spot spraying?

What details about deConinck Smith's set up should farmers consider when calculating profitability?

Shawn Senko, Canola Council of Canada agronomy specialist: Optical spot spraying in dual mode allows farmers to hit larger weeds with a higher rate when they may not be able to justify the high rate across an entire field. This reduces costs and, with a kill rate on the large weeds, prevents them from surviving and setting seed. Carl deConinck Smith has 3,000 acres of chemfallow each year, which is a major green-on-brown opportunity to help make the system pay. In working out the profit potential of this system, farmers will have to calculate their own opportunities to use it. As deConinck Smith says, fields also have to be fairly clean before spot spraying becomes effective.

How does the average farmer access this technology?

Shawn Senko: It may be a challenge to find a custom sprayer operator with this technology. Plus, if they've invested in the technology, will they be able to pass savings on to the farmer? In most situations, farmers will have to buy the technology themselves if they want to use optical spot spraying.

What is the sustainability message?

Shawn Senko: It should mean farms can achieve their weed management goals with lower overall rates of herbicide. ✖

Olds College of Agriculture & Technology ran a two-year trial with this research-sized version of the Weed-It optical spray technology. The close up shows the Weed-It optical sensor that spots green weeds on a brown (no crop) background.

Credit Olds College of Agriculture & Technology

Innovations IN ACTION

Canola Digest asked its six farmer panelists to describe the best innovation they thought of themselves or recently adopted on the farm. Farmers are innovating or applying innovations all the time, trying to find better ways to solve problems. They may not even realize they're doing it.



BY JAY WHETTER



FIONA JOCHUM
ST. FRANCOIS XAVIER,
MANITOBA

When Fiona Jochum came back to the farm, she started from ground zero when

learning how to maintain and operate the farm's fleet of machinery, keep financial records, and all other steps to farm management. So she took "notes like crazy" along with photos to create standard operating procedures for everything – she calls them "cheat sheets" – and put them together into her Farm Domination Notebook.

"I came up with this on my own, but later realized that many other farms are also doing this," she says.

In succession planning talks, presenters would often ask, what is your plan to run the business if the main manager is suddenly not available? Jochum's standard operating procedures are her answer. They're helpful for anyone new, like her cousins who have joined the farm. Detailed procedures are also helpful for her, despite having a few years of experience, to remember all the things needed to get the seeder ready for the season, for example.

The seeder file includes photos with arrows showing where to find all the grease zerks, photos and notes showing how to set the monitors and calibrate rates, the order to plug in hydraulic hoses, and so much more. "When I encounter something that hasn't happened before, I write down what we did and add it to the document," she says. "It makes these jobs so much faster the next time we do them."

"When I encounter something that hasn't happened before, I write down what we did and add it to the document. It makes these jobs so much faster the next time we do them."

—Fiona Jochum

"I know where my trucks are at all times. This time of year, I can tell if they're stuck in a line up at the elevator. At harvest, I can see if they're on their way back to the field. I don't have to call and ask, 'Where are you?'"

—Ryan Sawatsky



RYAN SAWATSKY
KILLARNEY,
MANITOBA

Ryan Sawatsky describes two steps of innovation: First, we have to recognize the

problem. "This in itself is hard enough," he says. Second, we have to solve the problem.

"I do not put myself in the category of inventor or innovator," he says. "Every time I try to fix something, I always seem to think of the hardest way to go about it. Then my wife comes along and says, 'Why not try that?'"

One innovation he uses quite a bit is the My Operation app from John Deere. It tracks machinery locations and logs numerous data points for each machine. He also has an app called Razor Tracking that piggybacks on My Operation to add other machinery, like his trucks, to the same John Deere interface. "I know where my trucks are at all times," he says. "This time of year, I can tell if they're stuck in a line up at the elevator. At harvest, I can see if they're on their way back to the field. I don't have to call and ask, 'Where are you?'"

Razor Tracking plugs into the truck's wiring harness to give him fluid levels as well as location. "I'm surprised how much I look at that thing," he says.

Sawatsky also gets new ideas from a very old invention – books. He just read *Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets* by Nassim Nicholas Taleb. "I value ideas that get me out of my bubble of farming," Sawatsky says.

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JOSH HEIDT KERROBERT, SASKATCHEWAN

Josh Heidt has Redekop Seed Control Units on two combines to destroy

weed seeds in the chaff. Herbicide-resistant wild oats and kochia “drew me in” to buy them, he says.

Two years ago, Heidt mounted the weed seed destroyer at the back end of one combine. That combine would do all opening rounds, headlands and weed problem areas while the other four combines worked the rest of the field. At least that was the plan. “With that one combine, I couldn’t keep up to what I wanted to get done,” he says, so this past fall he equipped a second combine.

Heidt is a regular driver on these weed-destroyer combines and he says it doesn’t change the way the combine operates, but it burns more fuel and “you have to be more conscious of what you put through the combine.” In one unfortunate situation, a rock knocked a steel finger off the pickup reel. That finger when through the combine, entered the weed seed destroyer and “blew it apart”.

Heidt now has magnets to capture anything metal before it enters the fast-moving mills. “These magnets pick up an incredible amount of stuff,” he says. It’s amazing how many rusty bits of old barbed wire go through the combine.

With herbicide-resistant weeds a bigger problem, Heidt needed to take action. “This is probably just going to get worse,” he says. “If herbicides are not going to work, we need to bring alternative methods to the table.”

“If herbicides are not going to work, we need to bring alternative methods to the table.”

—Josh Heidt



MURRAY LEWIS CLEARDALE, ALBERTA

Murray Lewis follows two innovative practices to protect his “low till, high

clay, fragile soils.” These are no-till and controlled-traffic farming.

“It is shocking how much tillage is happening in my area again,” he says. “No-till is innovative again.”

Lewis adopted controlled-traffic farming in 2014 to create a better root environment for his plants. “We have heavy, poorly drained soil, and I started controlled traffic to improve infiltration and aeration,” he says. “If we had three feet of black clay loam, I probably wouldn’t bother.”

He has a 40-foot drill, 40-foot combine header and 120-foot sprayer to use the same tracks, or tramlines, over and over. This creates highly compacted tramlines but avoids traffic in all other field areas. Increased productivity in non-traveled areas should more than make up for lost productivity from the tram lines – but it can take a while to see results.

“This is a long-term project,” Lewis says. The effects of compaction can last years, which is why he’d recommend yield comparison trials after 10 years. Results the first few years may not be that obvious.

Lewis says the biggest issue with the tramlines is rutting with the sprayer, especially when he uses it to apply fertilizer top ups. If soil moisture justifies extra nutrient, it also means the soils can be a little greasy. He shares a tramline renovator with another farmer, using it to fill ruts and smooth the tracks for the combine and grain cart.

Keeping all traffic to tramlines forced Lewis to make one notable adaptation to his grain cart. He rigged a conveyor, which he made from a MacDon draper, to the top of his cart. It stretches toward the combine. The combine unloads onto the conveyor, which moves grain into the cart. “Far nicer ones are built in Australia,” he says, but his home-made version does the trick. With it, the cart can stay on the tramlines.

“We have heavy, poorly drained soil, and I started controlled traffic to improve infiltration and aeration. If we had three feet of black clay loam, I probably wouldn’t bother.”

—Murray Lewis

The Redekop Seed Control Unit, which destroys seeds in the chaff, mounts underneath the straw chopper. Josh Heidt has them on two of his combines.

Photo credit: Redekop



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**MELISSA DAMIANI
BLUFFTON,
ALBERTA**

The Damianis each work off farm, and they try to use ideas gathered from their

day jobs to solve problems on the farm. Melissa Damiani is an agronomist and branch manager for the Nutrien location in Rimbey. Her husband, Jason, is a pipe fitter with his own company.

“Working with old equipment requires special problem-solving skills,” she says.

Farming in evenings and weekends and with little kids also means labour challenges. One of her customers solved one labour challenge in a unique way. Farms often need extra people when moving machinery from field to field. They need someone to pick them up and take them back to get the truck, for example. This farmer bought an electric off-road scooter. It fits in the cab and he can use it to zip home along the back roads. “I love the idea but I don’t really see us doing that. My husband is too much of a Cummins man,” Damiani says.

However, one labour-saver that could help a lot of farms, even if it doesn’t seem that innovative, is to hire an agronomist if they don’t have time to scout. “If agronomy wasn’t my passion, I would probably hire someone to do that for us,” Damiani says. Farmers feel like they’re expected to know about all the things going on in their fields, she says, so there’s a stigma about hiring an agronomist. “There shouldn’t be,” she says. “I see a big need for it.”

Farmers feel like they’re expected to know about all the things going on in their fields, she says, so there’s a stigma about hiring an agronomist. “There shouldn’t be. I see a big need for it.”

—Melissa Damiani



“Looking at the vegetative difference part way through the season, I thought this was a game changer. But at harvest there was no yield difference.”

—Bryce Moore



**BREANN AND
BRYCE MOORE
LEROY, SASKATCHEWAN**

Bryce Moore, through his agronomy job, has clients who do farm trials every year, and

these clients tend to be the best producing farmers. They use strip trials to gather intelligence on new farm practices. “That way they’re not guessing about what works,” Bryce says. If results don’t support continued use of the practice, they scrap it.

This inspired Bryce and Breann to take their data management to the next level. They bought a cart with a scale so they could verify combine yield monitor maps. They subscribed to Climate FieldView to get normalized difference vegetation index (NDVI) satellite imagery that shows crop biomass at various stages throughout the season. And for 2023, they ordered a drone, which they’ll use to provide closer-to-ground images for problem areas identified through the satellite NDVI images.

In 2022, the Moores ran trials on some new land near the Quill Lakes. The land is higher in salinity and sodium, and they tried a few soil enhancement products to see if they could improve yields. They had six treatments in strips 60-feet wide and replicated three times each. Results showed no statistical differences between treatments, but the Moores noted a short-coming with NDVI. “NDVI was not fine enough to identify individual strips,” Bryce says, so they’ll use the drone in 2023 to zoom in a little closer.

Multiple sources of data are important for decision-making, he adds. In another trial, he worked with a farmer client to compare strips given an extra fertilizer treatment of potassium and boron. “Looking at the vegetative difference part way through the season, I thought this was a game changer,” Bryce says. “But at harvest there was no yield difference.”

At mid-season, Moore was ready to adopt this practice on his own farm, but with that extra layer of harvest data analysis, he’s no longer convinced. That is why critical analysis of multiple sources of data is so important. Farmers can’t afford to adopt practices that don’t work. ✿

—Jay Whetter is editor of *Canola Digest*.

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Canola advocacy month by month

Advocacy teams for the Canola Council of Canada and Canadian Canola Growers Association work together to represent the interests of canola farmers and the canola industry value chain in Ottawa. Here is a look back on some of the advocacy priorities and milestones from both organizations in 2022.

BY TENESHA LAWSON AND TROY SHERMAN

Did you know? Both Canadian Canola Growers Association (CCGA) and the Canola Council of Canada (CCC) were recognized as top lobbyist organizations in 2022 by the Lobby Monitor and POLITICO.

Combined, CCGA and CCC registered over 300 meetings with Members of Parliament, Senators and senior political and departmental staff in the federal lobbyist registry, participated in government consultations, and represented farmers and the canola industry on several government panels, advisory committees and working groups.

Government advocacy and policy development often take months and years and include many moving pieces. Here is a look back on the advocacy priorities and milestones from both organizations for 2022.

MARCH

CCC launches innovation strategy. After significant engagement with members and other stakeholders, the CCC released an updated Innovation Strategy that provides a value chain vision for innovation on behalf of the industry. Since its release, the CCC has met with government officials to outline the industry's innovation and research priorities and identify opportunities for government funding to advance these priorities.

MAY

China removes restrictions for canola exporters.

On behalf of the canola sector, the CCC and CCGA welcomed China's removal of restrictions on Canadian canola seed exports. Restored access is integral to the competitiveness of canola farmers and the broader industry, and the reinstatement of licenses for Richardson and Viterra was a welcome development.

Health Canada guidance supports seed innovation

for canola farmers. Health Canada's guidance relating to the Novel Food Regulations and plant breeding innovation provides a predictable risk-based approach for new breeding techniques while maintaining food safety and transparency for Canadians. The guidance from Health Canada aligns with Canada's trading partners and helps to place Canada on a level playing field. Guidance from the Canadian Food Inspection Agency (CFIA) is anticipated soon, which is required to complete the establishment of a predictable plant breeding innovation regulatory framework in Canada.

JULY

Clean Fuel Regulations published. After five-plus years of development, CCGA and the CCC were pleased to see the final published Clean Fuel Regulations (CFR). The regulations, which come into effect on July 1, 2023, will provide the certainty that all parts of the biofuel supply chain, from farmers to renewable fuel producers, need to prepare for future market opportunities. CCGA and the CCC are currently working with Environment and Climate Change Canada and industry stakeholders to clarify detailed compliance requirements of the Land Use and Biodiversity Criteria, which take effect on January 1, 2024.

AUGUST

Response to fertilizer emissions reduction

consultation. The organizations submitted a joint response to Agriculture and Agri-Food Canada's (AAFC) consultation on the fertilizer emissions reduction target to reduce fertilizer emissions by 30 per cent below 2020 levels by 2030. The submission highlights how canola farmers are leaders in sustainability and urges the government to keep the target voluntary and based on

Janelle Whitley, CCGA's senior manager, trade and marketing policy, moderated a panel discussion at COP15 in Montreal in December. The panel explored what's happening at the farm level to advance biodiversity in Canadian agriculture.

Photo credit: UN Biodiversity



emissions intensity - not absolute emissions reductions. As farmers and industry are focused on increasing production to meet domestic and global demands, government should recognize the importance of fertilizer use to increase yields and profitability while producing high-quality crops. CCGA and the CCC await AAFC's 'What We Heard' report from the consultation.

NOVEMBER

Lobby Day returns. After more than two years of virtual lobbying, canola returned in person to Parliament Hill on November 15 to meet with parliamentarians and senior staff to advocate for Canada's canola farmers and the canola industry at-large. On the day, CCGA's advocacy efforts highlighted tools for sustainable growth, including increased transparency and confidence in Canada's railways, access to crop protection products and fertilizer, and access to working capital. The CCC's priorities included fertilizer and sustainability, international trade and market access, and a competitive and innovative regulatory environment. The lobby day ended with a co-hosted parliamentary reception.

"Federal advocacy is a core part of our function at the Canola Council of Canada. As a value chain organization, we work to speak with a unified voice to advance the canola industry's public policy priorities in Ottawa. It's a full agenda and one that is critical to continued growth and success."

—Chris Davison, CCC vice president, stakeholder & industry relations

"The Ottawa advocacy space has never been busier than the last two years, as agricultural policy continues to be impacted by an increasing number of government departments and voices. CCGA strives to amplify canola farmers' voices and put forward united policy asks to federal decision-makers to help farmers succeed."

—Dave Carey, CCGA vice president, government & industry relations



Chris Davison, CCC vice president, stakeholder & industry relations. Photo credit: Cynthia Münster

Canada announces Indo-Pacific Agriculture and Agri-Food Office.

The Prime Minister announced approximately \$32 million over five years for the creation of a new Indo-Pacific Agriculture and Agri-Food Office as part of the federal government's new Indo-Pacific Strategy. The CCC, along with other industry partners, led the advocacy on this important investment and will continue to work closely with the federal government on its implementation.

Bill C-234 to extend farm fuel exemption. Bill C-234, An act to amend the *Greenhouse Gas Pollution Pricing Act*, passed committee stage in the House of Commons. Bill C-234 seeks to exempt the on-farm use of natural gas and propane from carbon pricing, for necessary practices like grain drying, freeing up working capital to make investments on farm. CCGA continues to support and encourage Members of Parliament to pass the Bill.

DECEMBER

AAFC consults on Sustainable Agriculture Strategy.

AAFC launched consultations on a Sustainable Agriculture Strategy with the stated intent of providing and integrated approach to the sector's environmental performance, building on the successes achieved to date. Both CCC and CCGA have been invited to participate on the Sustainable Agriculture Strategy - Advisory Committee (SAS-AC) which will continue throughout 2023.

CCGA speaks at COP15. CCGA participated in COP15, the 15th Conference of the Parties to the UN Convention on Biological Diversity, to advance canola's sustainability story regarding biodiversity, engage with Government of Canada negotiators and understand the global discourse and next steps. 🌻

—Tenesha Lawson is manager of stakeholder communications for Canadian Canola Growers Association.

Troy Sherman is director of government relations for the Canola Council of Canada.



Biocontrol organisms reduce cutworms in canola

The Canola Research Hub recently highlighted three research studies that investigated nematodes, parasitoids and other insect pest predators that impact cutworms in canola. These biocontrol organisms may be currently providing pest management assistance or could provide optional biocontrol in the coming years.

BY TARYN DICKSON

Pre-season is a good opportunity to familiarize yourself with a few biocontrol organisms that might be in your canola field or could be biocontrol options in the coming years. Three research studies were highlighted in a Canola Research Hub blog investigating nematodes, parasitoids and other insect pest predators that impact cutworm (and other insect pest) populations in canola crops.

QUANTIFYING BIOCONTROL EFFICACY WITH PREDATORY NEMATODES

One potential biocontrol option is entomopathogenic nematodes (or EPNs). These predatory nematodes are soil-dwelling round worms that specialize in parasitizing insects, including canola pest species. With limited research on EPNs, Paul Tiege and Shabeg Briar investigated their feasibility as biocontrol agents.

In general, mortality rates of most insects increased with increasing nematode concentrations and results of diamondback moth larvae, lygus bugs cabbage root maggots and black cutworm mortality assessed after 72 hours of exposure to the nematodes were encouraging.

Laboratory tests prove that the parasitic wasp (Cotesia vanessae) has potential to parasitize 34 species of caterpillars, including many cutworm species that affect Canadian crops. The wasp shown here is from the same superfamily (Ichneumonoidea) as the parasitic wasp mentioned.

Photo credit: Shelley Barkley



For more detail on these projects, please read the blog post titled, "Active and emerging biocontrol organisms to watch for in canola," at canolaresearch.ca

BIOCONTROL OF CANOLA CUTWORMS BY PARASITIDS

Barb Sharanowski and Yvonne Lawley's research observed sixteen species of parasitic wasps that attack cutworms in the Prairies. Though levels were often too low to reduce cutworms below economic levels, parasitism rates of three to 26 per cent were recorded.

An additional study within this project assessed the efficacy of environmentally-friendly, naturally occurring pest control agents called entomopathogenic fungi (EPF) as biocontrol agents of cutworms. Though future research on this topic is needed to assess their suitability other Prairie provinces, the 2012-14 cutworm data in Manitoba reported that EPF caused greater mortality to cutworms than parasitic wasps, suggesting good promise for this biocontrol option.

CUTWORM IDENTIFICATION AND PARASITOID DISCOVERY

During Kevin Floate's five-year project, a European species of parasitic wasp (*Cotesia vanessae*) was discovered in North America for the first time. Laboratory tests proved the wasp has potential to parasitize 34 species of caterpillars, including many cutworm species that affect Canadian crops.

The entomology research conducted throughout this project also yielded a well-illustrated, publicly-available field guide called 'Cutworm Pests of Crops on the Canadian Prairies, which provides identification and control information of 20 cutworm pest species. 🌻

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

Table. Mortality percentage and lethal concentrations to 50 per cent (LC₅₀) of black cutworms (*Agrotis ipsilon*) larvae exposed to different entomopathogenic nematode (EPN) sp. at four concentrations of infective juveniles (IJs)/cm² in sand cup bioassays.

*EPN sp.	5 IJs	10 IJs	20 IJs	50 IJs	LC ₅₀ ±SE	95% CI ¹
	Mortality rates % (Mean ± SE)					Lower - Upper
HB	20 ± 9.1	30 ± 10.5	55 ± 11.4	95 ± 5.0	14 ± 1.2	11 - 20
SC	70 ± 10.5	95 ± 5.0	100 ± 0.0	100 ± 0.0	4 ± 1.2	3 - 6
SF	10 ± 6.8	70 ± 10.5	95 ± 5.0	95 ± 5.0	9 ± 1.1	7 - 10
SK	80 ± 9.1	85 ± 8.2	85 ± 8.1	100 ± 0.0	3 ± 1.3	2 - 6

*HB: *Heterorhabditis bacteriophora*; SB: *Steinernema carpocapsae*; SF: *S. feltiae*; SK: *S. krausse*.
CI¹: Confidence Interval; LC values calculated using Probit Analysis.

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The Canola Council of Canada surveyed growers in late 2022 to check in on adoption of best practices, agronomy priorities and risks to canola production. Weather is the biggest risk factor. Flea beetles are the most costly pest. And of the CCC agronomy priorities, harvest management had the top score for impact on yield.

FARMERS WANT CANOLA-FRIENDLY WEATHER

BY JAY WHETTER

The Canola Council of Canada grower survey of late 2022 asked growers to identify one change that could make the biggest improvement in their canola yield. Weather was the most common response, with 38 per cent of the answers mentioning cooler and rainier summers, less spring moisture and other meteorological conditions. While weather was well out in front in Alberta and Saskatchewan, Manitoba growers had an almost even split between weather (25 per cent mentioned this) and flea beetles (21 per cent mentioned this, compared to only four per cent in Saskatchewan and one per cent in Alberta.) Down the list, 15 per cent of answers related to seed choice, and 10 per cent were on the theme of fertilizer rates.

When asked to name the biggest threat to canola production on their farm, again the most common answers had to do with drought specifically or weather in general. Disease and insects were next, mostly unspecified. The most common pests named specifically in the open-end responses were flea beetles, mentioned by 23 per cent of Manitoba farmers, and clubroot, mentioned by eight per cent of Alberta farmers.

CANOLA YIELDS AND ACRES

The 2022 survey asked a few of the same questions asked in a 2020 survey, giving the CCC a chance to compare results on yield, production risks and agronomy practices.

Canola yield for 2022, based on self-reporting for those surveyed,

averaged 38 bu./ac. It was 41 bu./ac. in the 2020 survey. These results are in line with StatCan figures, which have average canola yields of 37.7 bu./ac. for 2022 and 41.8 for 2020. Five year average yields also dropped, with survey respondents estimating the average at 40 bu./ac. in 2022 and 43 bu./ac. in 2020.

Canola, as a percentage of seeded acres, increased from 38 per cent in 2020 to 40 per cent in 2022. By province, Saskatchewan and Alberta are each up three per cent, Manitoba is down one per cent. These are not statistically significant differences. Also note, this is among farmers who grow at least 160 acres of canola each year. This is not the percentage of canola among all annual crop acres in each province.

Eighty-two per cent of surveyed growers expect to grow about the same percentage of canola in 2025 (compared to 80 per cent in 2020), while 11 per cent expect to grow a lower percentage and four per cent expect to grow a higher percentage.

PROGRESS ON BEST PRACTICES

To track progress on a few specific agronomy practices, the 2022 survey checked in on three common practices that CCC agronomy specialists felt could be improved based on results from 2020.

Know the fertility needs of each field. Farmers were asked to choose which practice “best describes” their fertilizer program for canola. In 2020, 54 per cent of respondents said their fertilizer rates were exactly the same for all canola fields, 36 per cent adjusted on a

Growers rank CCC agronomy priorities

The survey asked respondents to score the Canola Council of Canada agronomy priorities based on “ease of application” and “impact on yield.” Scores were based on a five-point scale, with a score of five indicating that practices within each priority were easy to apply and had a high impact on yield.

Agronomy priority	Do you support this priority? (% yes)	Do you actively promote this priority? (% yes)	Is the priority easy for farms to apply? (5 is easy, 1 is difficult)	What is the priority's impact on yield? (5 is high, 1 is low)
Use 4R Nutrient Management	76	71	3.6	4.0
Choose the best canola seed traits for each field	73	74	3.9	3.9
Achieve a uniform 5 to 8 plants per square foot	73	78	3.7	4.0
Identify and manage the top yield robbers in each field	76	80	3.7	4.3
Harvest all seeds and deliver them at No.1 grade	69	49	3.3	4.0

field by field basis and 10 per cent used a variable rate based on zones within each field. Results for 2022 showed a positive shift. Adjusted on a field by field basis increased to 40 per cent and variable rate increased to 14 per cent. Variable rate was 19 per cent among larger farms.

The survey also asked about soil sampling. In 2020, 31 per cent of growers said they soil sampled every field every year. That increased to 40 per cent in 2022.

Focus on the top yield robbers. Canola faces a lot of insect and disease pressure from stand establishment through to seed maturity. Pests of greatest concern to canola production, according to survey responses, are flea beetles followed by sclerotinia stem rot – although herbicide-resistant weeds took second spot in the Brown soil zone.

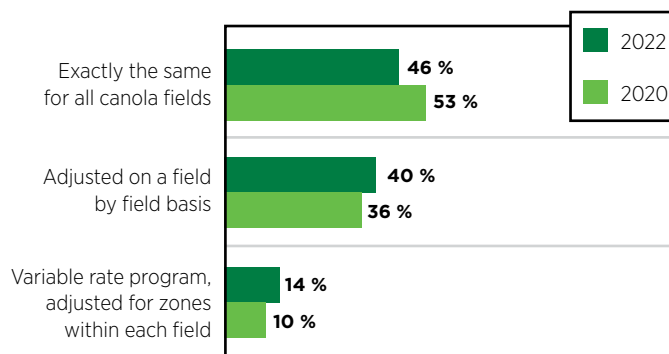
Good pest management requires good scouting. When asked how often they scouted canola, respondents were consistent between years with 48 per cent in 2020 and 49 per cent in 2022 choosing “weekly or more often.” Everyone else scouted less frequently. Manitoba farmers are more likely than Alberta and Saskatchewan farmers to scout weekly.

Cut later for higher yield. Canola swathed at 60 per cent, or more, seed colour change on the main stem is more likely to reach its yield potential than canola cut earlier. Yet, the 2020 survey showed that of the 80 per cent of farmers who swathed all or some of their canola, about half targeted earlier swath times. The CCC agronomists put an emphasis on harvest timing in 2021 and 2022, encouraging farmers to cut later. The 2022 showed that 32 per cent of farmers now straight cut all of their canola, and only 68 per cent swath all or some of their canola. Among the growers who swath canola, 46 per cent still target seed colour change on the early side of 60 per cent.

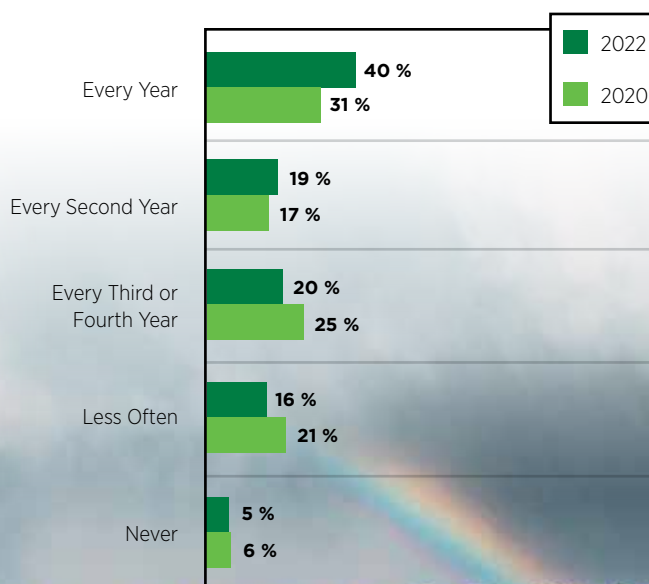
The straight cutting trend is reflected in seed trait decisions. When asked to rank their top three canola seed traits, 91 per cent of farmers put yield in their top three and 48 per cent had it number one. Second was pod-shatter resistance, with 79 per cent putting it in the top three. 🌻

—Jay Whetter is editor of *Canola Digest*.

Farmers were asked to choose which of these three practices best describes their fertilizer program for canola. Comparing 2020 and 2022 survey results, more farmers are adjusting rates on a field by field basis and more have switched to variable rates based on zones within each field.



The surveys asked canola growers how often they do soil analysis tests for each field. In 2020, 31 per cent of growers said they soil sampled every field every year. That increased to 40 per cent in 2022.



Weeds are turning. Herbicide resistance built up slowly and has finally hit a critical point where observation must become action. We need to turn down the R-rating on weeds – more Mister Rogers and less Larry Flynt. This article explains how.

NASTY WEEDS GET AN R RATING

BY JAY WHETTER

Weeds have become sexy, unfortunately, joining flea beetles, sclerotinia stem rot and clubroot on the naughty list. Weed management used to be fairly easy – back when herbicides worked without fail. This veil of decency has dropped, with R ratings becoming all too common. In these red-lighted alleys, “R” stands for resistant.

The Prairies have 23 weed species with confirmed herbicide resistance, as listed in the Saskatchewan and Manitoba crop protection guides. Of those, many have various resistant biotypes. A biotype is a weed species with a specific form of resistance. Wild oats with group 1 resistance and wild oats with group 2 resistance count as two biotypes. Manitoba has wild oat biotypes with stacked resistance to four groups – 1, 2, 14 and 15. Group 9 resistant weeds confirmed on the Prairies include kochia, downy brome and water hemp. Montana has Group 9 resistant Russian thistle.

In a Canola Council of Canada (CCC) survey of agronomy providers in August 2022, respondents ranked herbicide-resistant weeds number one when asked what canola agronomic risk factors are likely to be the greatest concerns for their farmer customers over the coming five years.

The threat also ranks high for farmers. A 2022 CCC survey of growers asked participants to name pests that present the greatest economic risk to their canola production. Herbicide-resistant weeds ranked third overall, behind flea beetles and sclerotinia stem rot, and second in the Brown soil zone.

Agriculture and Agri-Food Canada (AAFC) research scientists have done extensive weed surveys across the Prairies four times over the past 20 years. Surveys from 2014-17 found at least one herbicide-resistant weed biotype in 59 per cent of randomly sampled fields, up from 37 per cent in 2007-09 surveys and 16 per cent in 2001-03. In Saskatchewan in 2019 and 2020 surveys, 72 per cent of fields had a least one herbicide-resistant weed biotype.

Charles Geddes, weed research scientist with AAFC in Lethbridge, Alberta, just published a paper called “Potential spring canola yield losses due to weeds in Canada and the United States.” The report compiled 89 yield-loss estimates from studies across the Prairies and North Dakota from 2003 to 2020. When weeds are not controlled, average canola yield loss was 30 per cent for Canada, the results show.

A 30 per cent drop in canola yields, based on 40 bu./ac. potential yield and \$20 per bushel, would be \$240 per acre. That is the cost of losing herbicide efficacy entirely. While complete loss is unlikely, it underlines the “critical need for canola farmers to diversify resistance selection pressures by implementing proactive integrated weed management programs,” Geddes concludes. What does a farmer do?

TIPS TO SOFTEN R RATINGS

How can the farmer-weed relationship return to beautiful days in the neighbourhood?

Shawn Senko, Canola Council of Canada agronomy specialist, says to start with scouting for problem patches. If a patch raises suspicions, consider asking an agronomist for a second opinion on identification and action, he says. The suite of actions include:

Make crops more competitive. Crops that achieve complete ground cover quickly can suppress weeds. For this objective, consider a combination of taller crops, narrow row spacing, shallow seeding depth, higher seeding rates and varied seeding dates.



Canola Watch has a more detailed version of these weed management practices. For the full article, read “Integrated weed management: Best practices” in the weeds section at canolawatch.org/fundamentals.

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Are those weeds resistant? | Escapes have a number of potential causes:

- The sprayer missed a patch. Clue: The patch includes many species of weeds and has a shape like a sprayer miss.
- The herbicide applied has limited activity on a particular weed. Double-check the product label for weeds listed as controlled.
- Herbicide rates and/or water volumes were too low to provide control on a particular weed. Clue: Escapes show up all across a field.
- Weeds were already too large for label rates. Clue: Escapes show some leaf damage but not enough to kill the plant.
- Weeds emerged after the herbicide application. Clue: Escapes are small, suggesting they emerged recently.
- Weeds are resistant. Clue: Most plants of that species were killed but an odd-shaped patch or a few random plants were not.

On dates, weeds like green foxtail, lamb's-quarters, redroot pigweed and Russian thistle require more growing degree days to germinate and emerge, so an early-seeded canola crop could have an advantage over these weeds. However, cool season weeds like wild oats, quackgrass, wild mustard and stinkweed may present a problem with early seeding. Later seeding may be used to give more time for pre-seed burnoff, and it makes for a faster-emerging more competitive crop.

Tank mix herbicides from different groups. Hitting weeds with two or more modes of action effective on each weed reduces the risk of herbicide resistant weeds escaping and setting seed. If a weed is resistant to (or not controlled by) a Group 2 herbicide, a tank mix of Group 2 and Group 9 is not an effective tank mix. Geddes says canola cultivars with stacked resistance to glyphosate and glufosinate may offer growers an opportunity to manage kochia plants that survive glyphosate by following up with a rescue application of glufosinate.

Take steps to improve herbicide efficacy. Follow herbicide labels for timing, rates and water volumes as well as weather restrictions (frost, rain, heat) that may reduce efficacy. Early control is an important step, as herbicides are more effective on small weeds.

Take a whole rotation approach. A diverse crop rotation allows for different in-crop herbicide options. Consider crops that are more competitive, grow taller, have winter or perennial seasons, and allow for different harvest times.

Scout each field before and after herbicide application.

A pre-application scout will identify the weeds present and their stage. This will determine what tank mix to use, and the herbicide rate required. Two weeks after spraying, check the field again to identify escapes or next flushes. (See the sidebar with tips to identify whether escapes could be resistant.)

Consider spot tillage. No-tillage is a valuable practice on the Canadian Prairies, and it depends on effective herbicides. In some cases, spot tillage or strategic tillage in some fields may be required to protect the usefulness of those herbicides essential to a no-till or reduced-tillage system.

Keep records. What weeds are in each field? What products were sprayed and other techniques used? Keep track of agronomy practices that may influence weed management and crop competition.

Use harvest weed seed control mechanisms. Combine weed destroyers, for example, can destroy almost all weed seeds that enter the combine. When Canola Digest asked its farmer panelists to share the best innovation they recently adopted on their farm, Josh Heidt from Kerrobert, Saskatchewan chose the Redekop weed seed destroyer. (Read the panel on page 26.) The combine-mounted mills pulverize chaff and the weed seeds within. "If herbicides are not going to work, we need to bring alternative methods to the table," Heidt says.

That is how farmers will turn around these R ratings. 🌻

—Jay Whetter is editor of Canola Digest.

What does a farmer do if they have a major flush of resistant wild oats emerging at the same time as their canola crop?

Shawn Senko, CCC agronomy specialist, says, "If it's Roundup Ready canola just stick with the glyphosate and watch those areas in case there are some escapes that need a second application. If LibertyLink canola and the field has a Group 1 resistant wild oat issue, money might be better spent upping the Liberty to the high rate instead of tank mixing in the Group 1 herbicide. Also, use the high water rate to ensure good coverage of the grassy weeds." Charles Geddes, AAFC weed scientist adds: "We usually see much lower resistance to clethodim in wild oat compared with the other Group 1s. This means that the herbicide options should be good in either or LibertyLink or Roundup Ready canola. Higher rates are recommended especially if the wild oat are ahead of the canola."





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Canola use can benefit Canadians in times of economic strain

Through 2023 Canola Eat Well will show Canadians that choosing canola oil gives them a range of health benefits compared to other cooking oils, costs them pennies per serving and helps them support 207,000 Canadian jobs in the canola industry.

BY JENNIFER DYCK

Food prices and inflation are top of mind for Canadian consumers, according to the 2022 Canadian Centre for Food Integrity's Public Trust Research. The survey asked respondents to score their level of concern for a whole range of life and food system issues. Cost of food was the top concern in 2022, with 69 per cent scoring it at least eight out of 10 – or “extremely concerned”. Inflation was next, with 66 per cent scoring it at least eight out of 10. Keep healthy food affordable and the Canadian economy, in general, were among the top five concerns. Canola Eat Well will continue to highlight canola oil attributes to Canadian audiences on the benefits of eating local and supporting Canadian-made products.

We want Canadians to understand the impact of their everyday choices at the grocery store. Their decisions could not only help lighten the load on their wallets, but support Canadian farmers, the Canadian economy and help to create a system of support through times of economic strain.

We know that canola is an essential part of the agriculture system and overall economy in Canada. By recognizing this and educating consumers on how using canola products in their home can benefit them and other Canadians, we can help bolster sales and consumption for Canadian goods.

While Canadians will be looking to reduce spending during times of economic downturn, it will also be important to consider spending more consciously. Agriculture and the agri-food system is a vital part of the Canadian economy, providing one in nine jobs and generating \$134.9 billion of Canada's GDP in 2021, according to Agriculture and Agri-Food Canada's sector overview.

Knowing that groceries and feeding our families will still be a necessity throughout any recession, making active choices to choose locally grown and Canadian products could make a tangible impact in supporting our economy, while also supporting Canadian farmers and their families.

Consumers switching to canola oil will support Canadian farmers



Download the Canadian Centre for Food Integrity's 2022 Public Trust research report at foodintegrity.ca. Find it under the “Research” tab.

and the economy, while saving money and retaining access to healthy and affordable foods. Canola is the number one source of revenue for farmers in Canada, making up nearly one quarter of crop sales in Canada. The canola industry supports 207,000 Canadian jobs.

Canola Eat Well will show Canadians that canola oil, which is low in saturated fat with the highest source of plant-based omega-3 fats among all cooking oils, is one of the easiest switches to make. Not only does it offer Canadian households a range of health benefits compared to other cooking oils, it's also pennies per serving. This versatile oil can be used for frying, baking, sautéing, deep-frying, salad dressings and more, and can be re-used, allowing it to stretch much further than other oils for even more cost savings. For households looking to save on their grocery bills, making a simple change in items we use daily can make a big difference in the long run.

Canadians have so many ways to use canola products and Canola Eat Well is always looking for new recipes and ideas to inspire people to use canola oil. Canola Eat Well recognizes now is an important time to help educate consumers on the value of supporting Canadian canola. If more Canadians are able to understand the financial and economic benefits of using canola products now, when food prices are top of mind, additional awareness can also be built around the health benefits and broader positive impacts to the agriculture industry to bring longer lasting adoption and usage.

With the collaboration of Alberta Canola, Manitoba Canola Growers and SaskCanola, Canola Eat Well works to provide resources to Canadians to build a stronger understanding and awareness of the benefits of using canola products. They help share stories about our farmers and bridge the gap of understanding from farm to table. To learn more about the benefits of canola products, the industry, or to get inspired with the many recipes and ways you can utilize canola at home, visit canolaeatwell.com. 🌻

—Jennifer Dyck is the market development director at Manitoba Canola Growers and program co-lead with Canola Eat Well.



TIP#

5

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Carbon farming: The way of the future?

Agriculture can be a major part of the solution to reduce greenhouse gases in the atmosphere. In this article, Farm Management Canada provides a snapshot of carbon farming – using agriculture practices to capture carbon – and questions that require answers before it becomes common practice.

BY RYAN JOHNSON AND BERTRAND MONTEL



Suppliers, processors, financial institutions, and government bodies are making carbon commitments. These commitments will impact farmers by presenting opportunities such as novel income streams, but also by presenting new requirements for on-farm management practices.

The urgent need for a reduction of greenhouse gas emissions has increased the pressure on businesses and governments across the globe. Agriculture is among those sectors most affected. At close to four billion acres, cropland accounts for half the world's habitable land, according to Our World in Data. Building on the expertise of farmers to optimize agriculture for carbon sequestration could make a substantial dent in global emissions. This effort has come to be known as "carbon farming".

The Government of Canada, in February 2022, announced funding for organizations to partner with farmers and support them in the effort to reduce emissions and make their farms more resilient to a changing climate. Similar policies are emerging around world, including in the European Union and the United States. Global alignment is important for efficiency, trade opportunities and geopolitical relations.

Carbon farming is connected to the emerging carbon market where carbon offset credits are traded. Carbon credits are intangible assets that allow an entity to emit a set amount of carbon. They encourage a reduction of carbon emissions and reward initiatives for doing so. (Read "What are carbon markets and why are they important?" at climatepromise.undp.org.)

WHAT ARE THE RISKS OF CARBON FARMING?

Financial risk to carbon farming include the potential for increased costs related to, for example, measuring and tracking data on an on-going basis. Will there be sufficient return on investment to justify investment into data collection?

Related to the above risk is that the methodologies behind carbon accounting are not, as yet, mature. This is related to the collection and quality of data to assess real performance and highlights the lack of an institutional guarantee that a strong market with accompanying standards and rules is in place.

Debate continues on what carbon farming practices and technologies should be prioritized on farms. At the political scale, different jurisdictions may have differing opinions on the pace and degree of climate change policy implementation, creating issues in international markets and leading to disruption and uncertainty for farmers.

Less visible but equally important is the risk surrounding governance of data. Who owns the data? And who stands to benefit

the most from these changes? This relates to a broader concern regarding the ability of farmers to make their own decisions.

WHAT DOES IT MEAN FOR FARMERS?

Suppliers, processors, financial institutions, and government bodies are making carbon commitments. These commitments will impact farmers by presenting opportunities such as novel income streams, but also new requirements for on-farm management practices.

Some practices, such as cover cropping or rotational grazing, may become requirements for schemes that could financially compensate farmers for "ecosystem services."

Farmers will be required to adopt information systems to capture agronomic datapoints, and to consider how their management decisions impact the carbon performance of their operations. In real terms, farms will need new skills to retain autonomy over their farms and may need technical experts to support them in carbon management and accounting.

As the pressure to reduce carbon increases and the global financial system begins to require the adoption of certain practices, Canadian financial institutions will likely give preference to borrowers who can demonstrate commitment to lowering carbon footprints and increasing resilience to climate change risks. Equipment and input suppliers and purchasers of agricultural products may also exert pressure on farms to adopt practices associated with carbon farming.

It will become increasingly important for farmers to learn about the strengths, weaknesses, opportunities and threats associated with carbon farming and the carbon market. Farmers are encouraged to assess what carbon farming practices may be most appropriate for their ecological contexts and farm type, and should seek partnership with organizations that may advise them on risks and benefits.

Through training and education, farmers can benefit from the current momentum in this area while simultaneously improving the performance and resilience of their operations. 🌱

—Ryan Johnson and Bertrand Montel are with Farm Management Canada (FMC). Contact the authors and FMC by email at info@fmc-gac.com. Through its AgriResponse website, FMC provides a forum to ask questions about risk management in agriculture and publishes articles on emerging risks and management strategies. Read the full version of this article at agriresponse.ca.



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