ALBERTA CANOLA
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Manitoba Canola Growers
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September 2022

canola DIGEST

The Source for Canada's Canola Growers

CULTIVAR CONVERSATIONS

Our farmer panelists, including Breann and Bryce Moore from LeRoy, Saskatchewan, describe how they make their canola seed decisions. / page 10

INSIDE:

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WHAT CAN CORN TEACH CANOLA ABOUT CULTIVAR SELECTION?

Choosing the best canola seed traits for each field could be made easier if canola took inspiration from corn. Corn seed companies offer a long list of traits for each cultivar, helping farmers choose seed to suit growing conditions and farm goals for each field.

DEPARTMENTS

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CALENDAR

OCTOBER 14, 2022
Nomination deadline for growers to run for SaskCanola's board of directors
saskcanola.com/governance-regulations

OCTOBER 31, 2022
Nomination deadline for growers to run for Alberta Canola's board of directors
albertacanola.com/nominations

DECEMBER 6-8, 2022
Canola Week 2022
Saskatoon, SK – Live and online
canolacouncil.org/event/canola-week

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BPA WORLDWIDE

Community of Practice

David Rourke wants to farm better. He always has. When he started farming 40 years ago at Minto, Manitoba, he also started a research business, AgQuest, to test farm practices. The family business now includes 6,000 acres, and his daughter Dana runs the research company. In his mid 60s, Rourke has a new objective: Farming for the health of the planet.

Rourke wants to provide Canadian agriculture with effective best practices to vastly reduce fossil fuel use and sequester more carbon in the soil. During the pandemic, he wrote a book called *A Road to Fossil Fuel Free Farming* and started a PhD with the thesis, "Zero Till Plus – the next evolution in climate-friendly farming". Zero till plus, he says, relies on cover crops, among other practices, to build soil organic carbon levels deep into the soil and across all areas of fields, including hill tops.

Rourke wants a triple win: A farm that can provide a good living, feed a lot of people and keep going indefinitely.

He repeats often that profits are essential. "We need to be rewarded for the risk and investment we make," he says. "Profit is a necessary component to build resiliency and opportunity for the next generation."

To achieve this triple win, Rourke will research cover crops, which are an essential step but a challenge, currently, for the Canadian Prairies with short shoulder seasons and limited rainfall. He will experiment with intercropping – growing two or more grain crops in the same field at the same time. He wants more pulses in the rotation and to use effective nitrogen-fixing microbes.

When I asked if canola fit into his vision for Western Canadian farming, he answered, "I absolutely see canola in the future. Can we do it more sustainably? We have to!"

Rourke draws inspiration from Elmer Stobbe, who was his master's advisor at the University of Manitoba. Stobbe has been called the grandfather of zero-till crop production on the Prairies. When Stobbe first started his mission, glyphosate was not an option and when it did come along, it was $25 per litre. Equipment for seeding into stubble was not common or practical. "Zero till made sense, but nobody wanted to do it," Rourke says. Stobbe persevered. For Stobbe, it was not "if" farmers will adopt zero tillage, but "how," and he looked for influential farmers to try it.

Curtis Rempel, vice president of the Canola Council of Canada, was present a lot of the meetings where Stobbe made his pitch. Rempel was with Monsanto at that time. "What I remember is the number of personal attacks Elmer received at farm meetings," Rempel says. "It was challenging for Elmer because he dared to talk about change and had data to support what he was proposing, but commercial scale equipment was not available. It's a case of Field of Dreams – 'build it and they will come'. Elmer persevered and here we are today."

Zero till is now a fairly common practice across the Prairies, a beacon for what farmers can do to improve the planet and profits at the same time. These early days for cover crops are like the early days of zero tillage, Rourke says. For his PhD, Rourke will use Stobbe's technique of finding influential farmers to work on the "how," not the "if," of farming to produce food and profits while also sequestering more carbon than the farm uses. He will put together a group of leading farmers who share his concerns and goals. Rourke uses the term "community of practice." This community will interact on an ongoing basis, sharing innovations, alternatives, challenges and successes, to come up with best practices. They will then share these Prairies-proven, farmer-developed practices with the whole farming community.

Rourke's message to all farmers is this: Climate change is real, and we have to be open to being part of the solution.

"I have nine grandkids," he says, "and I want them to have a life as good as mine."

Farmer representation needed in four Alberta Canola regions

Alberta Canola's director nomination cycle is open in regions 1, 4, 7 and 10 until October 31, 2022.

It is vital that all 12 of Alberta Canola's regions have farmer representation during board discussions. Decisions on government policy and regulation, research funding, and other issues that impact the long-term success of canola farmers in Alberta should consider the perspective of canola growers from each region.

Incoming director terms will start following the Annual General Meeting in January 2023.

To learn more about the regions, the roles of directors and the nomination process please visit albertacanola.com/nominations or contact the Alberta Canola office at 780-454-0844.

The current directors representing these regions are completing their eligible terms, and we thank them for their service.

WHO CAN BECOME A DIRECTOR?

An eligible producer is defined as any producer who has grown canola in Alberta or is entitled to a share of canola grown in Alberta under a crop share arrangement, and who has paid or submitted a service charge (levy) to the commission on canola sold since August 1, 2020.

Nominations for the position of director must be filed at the Alberta Canola office on or before October 31, 2022 at 4:00 p.m.

For complete details on Alberta Canola's regions, the roles of directors or to obtain a nomination package, visit albertacanola.com/nominations or contact Alberta Canola's Executive Director Karla Bergstrom at 780-454-0844.

Four outgoing directors

Contact them if you have questions about being a director.

DAN DOLL

Region 1
780-835-8418

JOHN MAYKO

Region 4
780-632-8838

MIKE AMMETER

Region 7
403-350-4473

CALE STADEN

Region 10
780-581-7888

Alberta Canola welcomes Karla Bergstrom as new Executive Director

The Alberta Canola Producers Commission welcomed Karla Bergstrom as the next leader of Alberta Canola in her new role as executive director on May 16, 2022.

"Karla's significant policy development and government relations expertise, internal knowledge, commitment to excellence, and relationships within our organization and the canola family make her an exceptional individual for the role of executive director. We are confident in her leadership skills and vision that will contribute to the continued success of Alberta Canola," says Roger Chevraux, chair of Alberta Canola.

Bergstrom has over 10 years of experience leading Alberta Canola in its legislative duty to advise governments on issues affecting canola farmers, which the Board feels will be an important skill for our ED to have going forward with the increasing importance of government regulations in agriculture. She will build on key relationships with the canola family and Team Alberta to amplify the farmers' voice that advances the crop sector and contributes to the long-term success of canola farmers in Alberta.

"I am extremely proud to be the new executive director of Alberta Canola because it is the perfect combination of being able to lead such an incredibly talented team, manage the business of one of the greatest commissions in our province, and work for farmers who grow one of the most successful crops in Canada," says Bergstrom.

Thank You Ward

On May 31, 2022, Ward Toma retired after 23 years as the general manager of Alberta Canola.

Alberta Canola is very grateful for the dedication and leadership that Ward provided as he guided the commission since March 1, 1999. Ward played a pivotal leadership role in the Canadian canola industry, extending far beyond the borders of Alberta.

The board and staff of Alberta Canola wish Ward all the best in this next exciting phase of his life.

Crush capacity expansion in Saskatchewan

Tracy Broughton (left), executive director of SaskCanola, and Jennifer Marchand, Cargill's government and industry relations leader, attended the ground-breaking ceremony for Cargill's new canola processing facility at Regina. Marchand is also chair of the Canola Council of Canada board.

Based on 2020 numbers, Saskatchewan produces approximately 11 million tonnes of canola each year with 4.3 million tonnes of that amount processed in the province.

The Canadian canola industry's strategic goal is to achieve 26 million tonnes of canola production nationally by 2025 and to increase the average yield to 52 bushels per acre through better agronomy, breeding programs and grower management practices.

In spring 2021, several companies released plans to substantially increase Saskatchewan's canola crush capacity with goal dates for completion in 2024. Richardson International announced that it will double the crush capacity at its Yorkton facility to 2.2 million tonnes of canola seed annually. Cargill announced it will build a new plant in Regina with the capacity to crush one million tonnes a year. And Viterra shared plans for a canola crush facility in Regina to create another 2.5 million tonnes of capacity.

These three announcements equate an additional 5.7 million tonnes of crush capacity a year. In addition, these announcements change the canola landscape for growers throughout land-locked Saskatchewan. The Prairie province has traditionally been underrepresented when it comes to canola processing capacity, combined with its geographic location far away from ports.

In January 2022, Federated Co-operative Limited (FCL) announced a joint venture with AGT Food and Ingredients Inc. to construct a canola crush facility to supply approximately 50 per cent of the feedstock required for a 15,000-barrel-per-day renewable diesel plant in the Regina area.

In June 2022, Ceres Global Ag Corp. cancelled its plans to build a crush plant due to rising interest rates and other economic factors. The Ceres plant was projected to process 1.1 million tonnes of canola annually in Northgate (south of Regina and very close to the U.S. border).

"The renewable fuel market is the biggest driver of this planned increase in crush capacity and supports value-added investments in our province. Producing more canola oil allows Saskatchewan to focus on more stable domestic markets, in comparison to export markets that buy more seed. That said, there continues to be strong demand for canola as food and feed around the world, especially with cooking oil shortages as a result of the war in Ukraine," says Dale Leftwich, SaskCanola's policy manager.

The city of Regina is an appealing location to build canola crush facilities for two main reasons – one reason is that Saskatchewan is the biggest canola producing province in Canada. The other reason is the transportation access provided by an intersection of CN and CP rail lines.

Canada's Clean Fuel Standard increases demand for low carbon intensity fuels, including biofuels derived from canola. In Saskatchewan, the province's Renewable Diesel Act requires fuel distributors to include two per cent renewable diesel content.

"The federal government is committed to the Clean Fuel Standard and to reducing carbon emissions from all fuels by 30 million tonnes in 2030. Along with the environmental benefits, using more canola oil domestically is a big opportunity to increase value-added processing and diversify the markets that we sell to. The larger crush capacity will benefit canola farmers located furthest away from ports most," concludes Leftwich.

Call for Board nominations

On July 4, SaskCanola opened nominations to fill four positions on our eight-member Board of Directors. The successful candidates are elected by Saskatchewan's levy-paying canola producers. Four-year board terms begin in January 2023.

We encourage Saskatchewan canola producers to consider this opportunity to guide investments in research, influence government policy, inform consumers and expand our markets. Ideally, a board nominee is one of the primary decision-makers on a Saskatchewan farm.

A board nominee must be a registered producer – a producer who has sold canola in either of the previous two crop years (August 1, 2020 to July 31, 2022) and who has not requested a levy refund in the past year. An individual appointed to represent a corporation is considered an eligible producer. Other requirements include submitting a biography and supporting signatures from five registered canola producers.

SaskCanola advocates for producers on issues related to market access and development, as well as initiatives that improve your ability to operate effectively and profitably. Collaboration with other canola organizations enables SaskCanola to represent growers' interests on national and international issues, and on policies that impact overall farm production in Canada.

If you would like to play an important role in the canola industry, now is the time to get involved. Directors' responsibilities include five board meetings each year, appointments to external industry-related boards as well as other opportunities to represent SaskCanola. Directors receive a per diem to compensate for their time, and travel expenses for meetings and events are reimbursed.

A nomination package is available to download at **saskcanola.com/governance-regulations** or by calling SaskCanola at 306-975-0262 to request a package. All applications must be received no later than 12:00 noon on Friday October 14, 2022.

Watch for our weekly Canola Market Outlook

SaskCanola provides a weekly update on domestic and global influences impacting the canola market.

Available on the saskcanola.com homepage, Canola Market Outlook is prepared by market analyst Marlene Boersch of Mercantile Consulting Venture Inc. Boersch has been working in the agriculture industry since earning her master's degree in agricultural economics from the University of Saskatchewan. She has traded and exported Canadian crops internationally for 20 years.

Each Canola Market Outlook highlights key points for the week, the oilseed market backdrop, the current market situation and other topics of interest. Keep up-to-date with domestic and global markets so you can make informed decisions when marketing your crop.

Canola Research Camp

This summer, Manitoba Canola Growers set out to help build connections between researchers and farmers across Manitoba with the launch of Canola Research Camp. Research camp was designed to encourage the highest quality of research, focused on providing farm-level value to growers across the province.

RESEARCHERS TO FARMERS

Over the span of two days, MCGA took eight researchers to six different farms across the province from Portage la Prairie to Basswood to Cypress River. Researchers got the chance to see first hand the challenges of the current growing season, and discuss with farmers the range and variability in production practices across Manitoba. Canola-specific content included seeding methods and fertility concerns and considerations, flea beetles, canola diseases, and harvest methods and optimization. Discussions included topics not limited to canola: whole-farm issues such as managing field variability, crop-livestock integration, crop rotations, soil health, farm management and transition planning.

Valuable questions around how on-farm decisions are made directed conversations toward how farmers use research results and what research topics have potential to make the largest impact. Researchers and farmers also discussed how to share research results in a way that enables farmers to adopt new and improved production practices.

RESEARCHERS TO RESEARCHERS

Another goal of Camp was to create a community of researchers that can build off each other's expertise and experience to form valuable collaborations for future research projects. By bringing together researchers from different institutions and fields of research, such as soil fertility, plant pathology, ag economics and precision agronomy, MCGA hopes to facilitate multidiscipline projects that provide maximum value for our growers funding investments.

RESEARCHERS TO MCGA

Lastly, MCGA put a focus on informing researchers about how the association functions and its main priorities. MCGA explained how farmer check-off dollars are used to fund research, and how final funding decisions are made through the board of directors, often in collaboration with other funding organizations through specific canola-specific and whole-farm funding programs.

MCGA plans to make Canola Research Camp an annual event, hosting new researchers each year to build on the success of 2022 and continue to grow our research community.

"My realization...we can't have solutions without our farmers. They live the land, work the land, feel the land, taste the land. No solutions without them. They know their lands in and out, they re-work technologies and techniques to suit their land and operations. They do what works for their land. Right out custom-tailored."

—Afua Mante, assistant professor, soil physical properties, University of Manitoba.

Scholarship Winners

Manitoba Canola Growers are proud to announce the 2022 high school scholarship winners. $1,000 scholarships have been awarded to five deserving students from across Manitoba. This year's winners are:

BROOKLYN MCRAE
St. Andrews, MB

Brooklyn will be attending the University of British Columbia in the fall studying Applied Science (Engineering).

JANIK GRENIER
Notre Dame de Lourdes, MB

Janik will be attending the University of Manitoba in the fall and studying in the Faculty of Science.

KATE-LEIGH HEAPY
Oak River, MB

Kate-Leigh will be attending Assiniboine Community College and studying Business Administration Accounting.

LINDSAY WYTINCK
Glenboro, MB

Lindsay is attending Assiniboine Community College and studying Agribusiness.

SYDNEY GERELUS
Shoal Lake, MB

Sydney is attending the University of Saskatchewan and studying in the Faculty of Animal Bioscience.

The $1,000 scholarships are available to students who are from an MCGA-member farm and are planning to attend post-secondary education in any field within two years of graduating. Students submitted their applications and were judged by an independent panel based on academic standing, canola connection, references, essay submission and school and community involvement.

Congratulations to this year's winners! We wish you the best of luck as you pursue your chosen careers.

The Canola Council of Canada encourages growers to choose the best seed traits for each field. This could be easier if canola took inspiration from corn. Corn seed companies offer a long list of traits for each cultivar, giving farmers the information needed to choose cultivars that suit growing conditions and farm goals for each field.

WHAT CAN CORN TEACH CANOLA ABOUT CULTIVAR SELECTION?

BY JAY WHETTER

The corn comparison table in the NK Seed Guide booklet at syngenta.ca could make a canola grower drool. It compares cultivars based on over 30 agronomic traits, making it easy for corn growers to zero in on traits that matter most for the farm and for each field.

Relative maturity for the 15 hybrids on NK's Eastern Canada list ranges from 78 to 104. You want early? They got it. You want long season? They have that, too. The table also shows relative maturity to silk and blacklayer stages which, for canola, would compare to first flower and maximum seed fill.

A small Canola Council of Canada (CCC) comparison in 2021 showed that canola yielded more when the crop had more days in reproductive development – from bolting to 60 per cent seed colour change. Do some canola cultivars spend more time than others in reproductive development than in emergence and vegetative growth stages? Lead Nate Ort says the study raised more questions than answers, but these are the cultivar details – relative time from bolting to 60 per cent seed colour change – that could help farmers make better seed decisions.

Moving left to right across the NK corn table, next are ratings for nine agronomic characteristics, including vigour, height, test weight and stalk strength. Each cultivar also has a suggested seeding rate range, ratings on adaptation to soil types and yield environments, and tolerance to five different diseases. The table rates each cultivar for "corn on corn response" to indicate suitability for fields with very tight rotations.

NK is just one of many corn seed brands that provide similar comparisons. Some, including WinField United Canada's Croplan corn seed chart, provides a response-to-nitrogen (RTN) score.

The corn seed industry in Canada rides on the shoulders of the U.S. juggernaut, so it has advantages of size and history. But what can seed companies do to help farmers make more strategic canola cultivar decisions?

Dave Harwood with Pioneer Hi-Bred has been encouraging farmers for 35 years to "plant a package". He'd like growers to select a mix of genotypes – a few different cultivars – and then scout to see how they perform. Scouting is a key step toward better seed decisions. "If you're not scouting to see how different genotypes perform in your conditions, then you're not taking advantage of that diversity you're planting."

Harwood is the technical services manager based in Chatham, Ontario, which is corn country, and he worked on the canola end of the business for 10 years in the 1980s and '90s.

"The most distinct difference between corn and canola is genetic variability for maturity," Harwood says. Corn offers a wide range of maturities, which helps farms make meaningful decisions based on seed date and harvest date, and to select hybrids that provide some true variability to spread out harvest and reduce risk. "For canola, 80 per cent of hybrids are in the mid range, and the difference between mid and late season is pretty subtle," he says.

NK is just one of many corn seed brands that provide comparisons. Some, including WinField United Canada's Croplan corn seed chart, provides a response-to-nitrogen (RTN) score.

When it comes to planting a package, Harwood gives the example of disease resistance. Cultivar A has one type of resistance and Cultivar B has another type. If a farm grows both and Cultivar A has lower disease and higher yield than Cultivar B, then the farm may want to grow more of Cultivar A. The following year, the farm may want to compare Cultivar A with Cultivars C and D. This keeps rolling year after year, the farm constantly challenging its favourite cultivars to achieve steady improvement.

The CCC encourages growers to choose the best seed traits for each field. "We encourage farms to test one or two new cultivars each year, choosing traits that may help the farm, like a specific blackleg

resistance or an early maturity," says Clint Jurke, agronomy director with the CCC. "We see potential yield and quality benefits when farms try cultivars with these targeted traits on fields that have blackleg problems or are often seeded late because of drainage issues."

Scouting provides the field knowledge – especially when it comes to disease, yield potential and harvestability – that will help select the traits appropriate for each field. Another important factor is economics. What traits pencil out best for high production versus low production areas?

RACEHORSES AND WORKHORSES

"In corn, we have racehorses and workhorses," says David Van Dam, director of business development with WinField United Canada. "Racehorses are for high performance soil and for growers who will give them a high level of management." They will respond to higher and higher rates of nitrogen, and benefit from timely in-season nitrogen applications, he says. "Workhorses are for tough acres or for fields that may not be as well managed. They don't have the top-end yield potential, and are cheaper based on this."

Harwood says not many seed companies actually target workhorses when bringing hybrids to market. "We're looking for elite genotypes," he says. Corn workhorses tend to be older hybrids that have stayed on the market because they are proven to be stable, with "a reduced incidence of lower end performance," he says. Because most cultivars don't stay on the market for much more than five years, it can be a challenge to identify those situational differences. For this reason, Harwood recommends that growers talk with local seed suppliers to see which cultivars are best for their situations.

Van Dam would like to see canola seed get to a point where growers have the tools to make more refined decisions. "For canola, we often see the same hybrids grown from the Peace to the Red River Valley," he says. "How do we start thinking about canola a little better and get more regionally specific? And why are growers using the same seed on top-end fields as they use on fields with lower yield potential?"

A new WinField United research facility outside of Minot, North Dakota will look at canola, sunflowers, wheat and peas "in a deeper agronomic way than we have in the past," Van Dam says. Once data starts rolling out of that facility, WinField United will have more information to drive more sophisticated seed decisions for these important Western Canadian crops.

START WITH WHAT WE'VE GOT

Growers do not need more canola choices to at least get started on planting a package. Cultivars have differences in blackleg genes and clubroot resistance that could influence which ones are right for a field. Days to maturity will hint at season length. Yield and lodging scores could influence an appropriate nitrogen rate. Pod shatter ratings indicate an appropriate harvest method or harvest timing.

Growers can challenge seed suppliers to provide the information

"For canola, we often see the same hybrids grown from the Peace to the Red River Valley. How do we start thinking about canola a little better and get more regionally specific? And why are growers using the same seed on top-end fields as they use on fields with lower yield potential?"

—David Van Dam, director of business development with WinField United Canada

needed to make seed decisions based on yield goals, disease risks, farm location and field characteristics. "If their seed supplier can't help them with those decisions, find one who will," Harwood says.

Elizabeth Simpson, canola market development manager for Bayer Canada, says the company has divided the Prairies into various canola production zones based on soil types, common crops in the region, typical rainfall and temperature, latitude and altitude. With that information, Bayer can make sure it has Dekalb canola cultivars to match each zone, and can help growers choose cultivars that work best in their zone. While the information is not available in a slick table like those found in corn seed guides, Simpson encourages growers to talk through their canola cultivar needs with Dekalb field agronomists who will have this information.

As tools improve to help growers with canola cultivar decisions, Simpson expects the focus will be more about risk management than maximum yield. For example, she sees a time fairly soon when cultivars could be sold based on enhanced tolerance to Brown Soil Zone growing conditions, for example. She would also like to provide maturity details specific to production zones. General days to maturity ratings on cultivars are usually too short for the Peace region and too long for southern Manitoba. "Weed control matters, too," Simpson adds. If a farmer identifies the problem weeds in each specific field, an advanced canola cultivar selection program could show which herbicide-tolerance system is most effective on those weeds.

The goal is to make it easier for canola growers to select a package of canola cultivars right for their growing conditions, and then to target cultivars based on the disease and weed situations, and harvest objectives, for each field.

"Canola has not been around as long as corn, but canola is the most valuable crop to Canadian agriculture. Continuing to increase that value will mean taking cultivar selection to a new level," Jurke says. "Canola needs to take a few pages from the corn book."

—Jay Whetter is the editor of Canola Digest.

canola 2020 PERFORMANCE TRIALS

Grower-funded **Canola Performance Trials** (CPTs) will help with cultivar decisions. CPTs provide canola growers with independent field data on leading and newly introduced cultivars.

Visit **canolaperformancetrials.ca** to download the annual results booklet or to use the online comparison tool. With the tool, users filter results based on herbicide-tolerance system, province, season zone, and year. It provides a quick way to analyze and compare cultivar performance over a number of years and locations.

"Bayer Canada has divided the Prairies into various canola production zones based on soil types, common crops in the region, typical rainfall and temperature, latitude and altitude."

—Elizabeth Simpson, canola market development manager, Bayer Canada,

WCC/RRC maintains quality control

All canola seed sold in Western Canada passes through the Western Canada Canola/Rapeseed Recommending Committee. It coordinates trials at dozens of sites across the Prairies each year to check new candidate cultivars to make sure they meet canola standards for oil quality. It has a pathology subcommittee that, for example, introduces protocols for the blackleg major gene labeling system. And it supports the new pod shatter rating system.

The recommending committee has 14 members, including four from industry, one breeder, one pathology representative, and three growers (one from each provincial grower organization), three commercial representatives, one seed grower and one animal nutrition representative.

Trials provide objective comparisons on oil content, meal protein content, glucosinolates, saturates, erucic acid, blackleg resistance and other criteria. Standardized check cultivars are used, and all comparisons are based on head-to-head data. A summary package is prepared, according to WCC/RRC procedures, and the committee uses this to evaluate candidate cultivars for variety recommendation.

Two Saskatoon-based Canola Council of Canada (CCC) staff keep the process moving at WCC/RRC. Raymond Gadoua recently retired as WCC/RRC coordinator and secretary after 24 years on the job. Cheryl Kiefer is the administrative assistant and oilseed technician.

Curtis Rempel, CCC vice president for crop production and innovation, says Gadoua has worked with industry and academic partners to develop and evolve an industry-led variety registration system that has served the canola value chain extremely effectively. "Under Raymond's stewardship and supervision, growers to end-users can be assured that every cultivar registered and grown in Canada meets the quality and disease standards that define canola," Rempel says. "This is key to an internationally recognized brand and a foundation of a nearly $30 billion dollar Canadian industry."

The CCC thanks Raymond Gadoua for 24 years of dedicated service to Western Canada Canola/Rapeseed Recommending Committee.

HOW DO YOU CHOOSE YOUR CANOLA HYBRIDS?

Canola Digest farmer panelists describe what cultivars they grew in 2022 and how they make their canola seed decisions.

BY JAY WHETTER

BREANN AND BRYCE MOORE LEROY, SASKATCHEWAN

Breann and Bryce Moore operate Green Ash Acres and work off-farm jobs. Breann is a retail agronomist at Midway Co-op in LeRoy and Bryce is a professional agronomy consultant with Western Ag.

Canola represents about 40 per cent of the acres on their farm. Wheat, barley and oats account for most of the rest, with some acres dedicated to peas, fababeans, canaryseed or flax.

Their canola cultivars for 2022 are InVigor L340PC, InVigor L233P, P505MSL and P508MCL.

P508MCL from Pioneer Hi-Bred is a Clearfield cultivar they'll sell into Bunge's non-GMO program. "We like to have a little specialty canola on the farm," Bryce says. The Clearfield cultivar, sprayed with Group-2 Ares, also gives them a different mode of action for fields that have Group-1 resistant wild oats. Group-1 clethodim, tank mixed with Liberty to enhance grassy weed, won't work on the resistant wild oats.

The Moores normally like to rotate between canola systems, but couldn't get the Roundup Ready hybrid they wanted from their Pioneer Hi-Bred seed retailer this year, so they opted for P505MSL, another Liberty Link.

They choose hybrids with pod-shatter tolerance and blackleg resistance. "I would like the blackleg resistance group marked on seed bags a little more clearly," Bryce says. "We're getting better as an industry, but there is still more work to do on rotating blackleg genes."

The Moores use Canola Performance Trial results (canolaperformancetrials.ca) to help with seed decisions.

"I would like the blackleg resistance group marked on seed bags a little more clearly. We're getting better as an industry, but there is still more work to do on rotating blackleg genes."

—Bryce Moore

Breann, through her retail experience, also gathers information on hybrid performance from the seed companies and from other farmers she talks to.

Why do they grow four cultivars? They do their homework on cultivar selection because "we don't want to put in a dud," Bryce says. And they want to keep trying what's new. L233P, an earlier-maturity cultivar, is their go-to, he says, but they choose a couple of others each year to gain "real on-farm experience."

While the Moores don't have clubroot confirmed on the farm, they will choose new cultivars with clubroot resistance because they are also high performers. P505MSL, for example, has clubroot, blackleg and sclerotinia resistance.

"At the end of the day, yield is the main driver," Bryce says.

MELISSA DAMIANI BLUFFTON, ALBERTA

Melissa Damiani farms in a short-season area within sight of the Rocky Mountains in central Alberta. "Maturity is one of the most important things on my list. You can have the best yielding variety out there, but if it doesn't mature in time, what good is that?" Damiani says, adding, "It is hard to find maturity that is short enough." She says she mentions this fact to seed company representatives at every field day she attends.

Their canola seed decisions usually start with herbicide tolerance. "We like to switch between Roundup and Liberty traits to help control volunteers and switch up genetics," she says. She particularly likes the Roundup Ready TruFlex system because the higher allowed

glyphosate rates take care of problem perennials like quackgrass and thistles. They grew DKTF98CR this year.

She says clubroot resistance is a must. "We are lucky we haven't seen clubroot in our fields, and I would like to keep it that way," she says. "I know it's around."

They also look for cultivars with good standability and harvestability, as well as pod integrity. "Anything to make things go quicker and smoother during that busy time of year is worth a lot," Damiani says. Although they swath canola, pod integrity is still valuable because they can "feel better about pushing that swath date back a bit to capture that extra yield or if the weather isn't cooperating."

In addition to farming and parenting, Damiani is the branch manager for Nutrien in nearby Rimbey. "The job gives me a huge network, including agronomists, growers and seed reps, who I can talk to about what they liked and didn't like about a variety. I also get to look at lot of different fields, and get a first look at a lot of stuff," she says. "I take it all in. I love it."

"Maturity is one of the most important things on my list. You can have the best yielding variety out there, but if it doesn't mature in time, what good is that?"

—Melissa Damiani

Growers can learn a lot about cultivar performance at the local level by building relationships with retails, grain buyers and agronomists, she says.

"I believe it's important to switch up our genetics to prevent resistance issues and keep things working and improving," Damiani says. "It can feel stressful trying new varieties, especially when you find something you currently like, but if you do the research and see how they have performed in fields or areas similar to yours, you can feel pretty good about taking the leap and trying something new."

FIONA JOCHUM ST. FRANÇOIS XAVIER, MANITOBA

Fiona Jochum says harvestability is the most important trait for their canola seed. "We straight cut all of our canola, so it is paramount that a hybrid have good pod shatter tolerance, and stand up as well," Jochum says. "That makes harvest go so much smoother."

This could be particularly important for 2022 after excess moisture delayed the season. "Seeding was so rushed," she says. Crops were seeded within a narrow window, which means they could all be ready to harvest around the same time. "The pod shatter trait will protect those crops that have to stand and wait."

For 2022, the Jochums grew InVigor L233P, InVigor L340PC, InVigor L356PC and DKLL83SC. All are Liberty Link.

"Herbicide system is the next most important trait after harvestability," Jochum says. They grow Roundup Ready soybeans, so with Liberty Link canola they can rotate with different herbicide groups.

L233P has "always been a performer," Jochum says. "We'll keep growing it until something else can knock it out of the park or until the seed company stops selling it."

L340PC, which is comparable to L233P, she says, gets a lot of acres "because we don't want to put the whole farm to one variety." It also has clubroot resistance, which isn't a "make or break" selling feature for them at this time. "Although it's coming for all of us," she adds.

The farm put a few acres into L356PC and DKLL83SC. "It's good to always try something new, otherwise you don't know what you might be missing," Jochum says. The InVigor retailer encouraged them to try a few acres of L356PC, and a local Bayer rep promoted DKL83SC as a high yielder with improved pod shatter tolerance. So they tried a couple of bags, putting it up against L340PC.

JOSH HEIDT KERROBERT, SASKATCHEWAN

The Heidt farm grew four canola cultivars in 2022 – InVigor L356PC, InVigor L345PC, PV581GC and PV781TCM. "We decide what cultivar goes on what field based on the history of weed pressure," says Josh Heidt. For example, the glyphosate-resistant cultivars will go on field with Group-1 resistant wild oats.

In general, about a quarter of their canola acres will get a glyphosate-resistant cultivar and the other three quarters are glufosinate-resistant cultivars. All will have clubroot resistance.

"It's good to always try something new, otherwise you don't know what you might be missing."

—Fiona Jochum

"If a field gets Roundup Ready canola the first time, then it gets Liberty Link the next time."

—Murray Lewis

"We don't have any confirmed cases of clubroot, but we don't have to go far up the road to find it. We want to stay ahead of the game on that because it's important that we protect canola. I'm happy to sacrifice a bushel or two of yield if it means we protect the farm from clubroot."

—Josh Heidt

"We don't have any confirmed cases of clubroot, but we don't have to go far up the road to find it," Heidt says. "We want to stay ahead of the game on that because it's important that we protect canola. I'm happy to sacrifice a bushel or two of yield if it means we protect the farm from clubroot."

The Heidts use the grower-funded independent Canola Performance Trials when making seed decisions. "I'm always looking at how an individual variety will work on our farm," he says. Each year, they'll grow one or two they like and add one or two new ones.

PV581GC is an older cultivar from Nutrien, which is the main retailer in Kerrobert. "It's a swathed variety that grows tall, so it has the stubble to hold on to the swaths," he says. They usually swath their glyphosate-resistant cultivars and straight cut their InVigors, spraying them with a combination of glyphosate and Heat for uniform dry down.

MURRAY LEWIS CLEARDALE, ALBERTA

Murray Lewis planned to seed four canola cultivars in 2022 – DKTFLL 21 SC from Dekalb, 44H44 from Pioneer Hi-Bred, InVigor L345PC from BASF, and InVigor L233P from BASF.

"But there can be a difference between what you plan to seed and what you actually get seeded," Lewis says. With excess spring rainfall, he only seeded about two thirds of his acres. He didn't get his Dekalb and Pioneer Hi-Bred canola cultivars in the ground.

Lewis usually has a three-year break between canola crops, using a rotation of canola-cereals-peas-cereals. Cereals are mostly wheat, but sometimes malt barley or oats. He will often alternate between canola herbicide systems. "If a field gets Roundup Ready canola the first time, then it gets Liberty Link the next time," he says.

InVigor L233P has been a good cultivar for the farm, Lewis says. "L345PC is newer, carrying off of L233P, which I really like, so I tried a couple of bags last year," he says. This year one third of his InVigor acres were L345PC. The newer cultivar also has clubroot resistance, though that is "not a big deal yet" on his farm, he says.

Lewis straight combines all canola, so pod shatter tolerance is a trait he looks for.

Maturity factors somewhat into the canola seed decision. "I wouldn't try anything long season," Lewis says. He has "run out of season" on some cultivars, but rather than select the earliest cultivars, Lewis tries to choose ones that are less likely to regrow if they get a shot of moisture late in the season. Regrowth ratings are not available, so Lewis relies on farmer experience – which is why he likes to stick with cultivars that work well for him. "With L233P, when it's done, it's done," he says.

—Jay Whetter is the editor of Canola Digest.

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CHOOSE THE BEST CANOLA SEED TRAITS FOR EACH FIELD

Canola Council of Canada (CCC) would like to see more farmers make canola seed decisions based on the best traits for each field. CCC agronomy specialists encourage growers to know the blackleg and clubroot scenario in each field and use that to select an appropriate source of resistance. Farms can also rotate herbicide tolerance (HT) systems based on the field's weed situation, and use days to maturity and pod-shatter ratings to reduce harvest risk. Finally, by trying one or two new cultivars each year, growers can stay on top of trait improvements.

This case study describes the canola seed trait decisions for one farm and provides input from CCC agronomy specialists.

NAME: GREG MCCORMICK, MCCORMICK BROTHERS FARM

Location: Lloydminster, Saskatchewan (one third of acres are in Alberta)
Soil zone: Black
Crops: Mostly canola and wheat, with some peas and barley

What canola cultivars did you grow in 2022 and 2021?

In 2022, we grew:

- InVigor L345PC – Liberty Link, slightly longer maturity, R to blackleg and clubroot (first gen), Patented Pod Shatter Reduction technology
- InVigor L255PC – Liberty Link, mid-season maturity, R to blackleg and clubroot (first gen), Patented Pod Shatter Reduction technology
- Pioneer Hi-Bred P505MSL – Liberty Link, mid-season maturity, "S" for sclerotinia resistance, R for blackleg, R for clubroot (pathotypes 2F, 3H, 5I, 6M and 8N, CR1), HarvestMax for flexible harvest timing
- Pioneer Hi-Bred P612L – Liberty Link, slightly longer maturity, R for blackleg, R for clubroot (pathotypes 2F, 3H, 5I, 6M, 8N, 2B, 3A, 3D (CR4)

In 2021, we grew:

- Pioneer Hi-Bred P506ML – Liberty Link, mid-season maturity, R for blackleg, R for clubroot (pathotypes 2F, 3H, 5I, 6M and 8N - CR1), HarvestMax for flexible harvest timing
- Pioneer Hi-Bred P505MSL – See 2022 list
- InVigor L255PC – See 2022 list
- InVigor L345PC – See 2022 list

What is the strategy for growing that many cultivars?

A lot has to do with timing. We try to seed 1,200 acres in four days, but we don't want them all ready to harvest at the same time. We had a rain delay this year, with 1.5 to two inches of rain shutting us down for three days, so it took longer than planned. Days to maturity for L345 is a bit earlier – 1.5 days – and we try to seed it first to make sure the difference is more pronounced by harvest.

We do straight cut, but it depends on the year. If canola is running late, we'll swath. We generally don't have a lot of wind problems, so it's OK to swath. We will pick fields suitable for straight combining and desiccate them with a pre-harvest application.

We do not use Roundup Ready canola so we can keep glyphosate for other uses. Fields are pretty clean. Probably half the acres get two passes of Liberty, as needed.

All of our canola is clubroot resistant (CR) in 2022. This is new for us. Two years ago, we grew a little, but now all the canola around here is CR. The trait doesn't mean you can go back to a 50-50 canola-wheat rotation. We have 1,200 acres of canola out of 3,600 total this year, up from 950 in 2021.

All Pioneer Hi-Bred canola seed comes with Lumiderm seed treatment, and it didn't seem to help much last year with flea beetles. We definitely do see a higher probability of spraying fields for flea beetles when the rotation is canola-wheat than when the break between canola crops is longer.

TIP#4

STORE YOUR CROP PROPERLY

Visit keepitclean.ca for all 5 Simple Tips.

KEEP MALATHION OUT OF CANOLA BINS

Any bin that has been treated with malathion this growing season should not be used for canola storage this fall.

Malathion can linger in bins for months and the residue can be picked up by canola seed, making it unacceptable for export.

Protect your investment and help support market access for all by keeping canola malathion-free.

Keep it Clean! Resources to Grow Market-Ready Crops

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How does the farm decide where to put each cultivar?

We don't assign a specific hybrid to a specific field. It depends more on where we're seeding. We try not to move the seeder around too much.

How does the farm measure the benefits of this strategy?

We assess each hybrid based on how the fall turns out. We were pretty happy with P505MSL last year, so switched quite a few acres to 505 in 2022. We try to grow a new one every year. This year we tried 30 acres of P612L. We usually try a quarter with each new one, but seed was limited.

What are the challenges with growing multiple cultivars?

Growing four versus one is not much of a challenge. The only difference is at seeding. We put in four bags of seed to calibrate the drill to make sure the seeding rate is where we want it. This takes some time, but this step is also required if you have different lots and seed sizes from the same hybrid.

CCC ANALYSIS OF THIS PRACTICE

As part of our new case study approach, two CCC agronomy specialist will dissect Greg McCormick's canola cultivar plan.

What do we like about McCormick's canola cultivar plan?

Clint Jurke, CCC agronomy director, Lloydminster, Saskatchewan: I like what the McCormick brothers are doing. Growing CR across the farm is smart given one does not know if the clubroot pathogen is already present somewhere on the farm. Growing different cultivars also helps ensure that one is not likely to be using a single blackleg resistance trait. Using some sclerotinia stem rot resistance on their farm also helps manage sclerotinia risk.

Jason Casselman, CCC agronomy specialist, Cleardale, Alberta: Growing several canola cultivars on the farm is a good strategy for spreading some of the risk on cultivar selection, knowing that we can't predict what the growing season is going to give us. I like the idea of a farm growing a new canola cultivar every year. Take it for a test drive on land that is familiar to them and see how it performs against the rest of the cultivars in their lineup. McCormick makes an excellent point about calibrating the drill every time you change cultivars, but also when they get a different seed lot from the same hybrid. In a head-to-head race you want all the plants to have a fair chance at winning by getting them all to the starting line at the same time. Keeping track of some of the key performance indicators like disease resistance, stress tolerance, harvestability and of course yield, and comparing them on your own farm only builds confidence in cultivar selection for next season. Good scouting records and yield monitor data is invaluable when reviewing information at seed order timing. Seed companies are always trying to bring the best products to market that show value on the farm, so we do get to see a few new ones every year as the older products are replaced. It makes sense to know what is available and not get too committed to an old favourite that isn't going to be around forever.

How could McCormick brothers take it to the next level?

Jurke: To get to the next blackleg level, selecting resistance for individual fields will help reduce blackleg risk even more. Testing for the presence of L. maculans races in the field and selecting cultivars with major "R" genes that will control the races will help ensure the risk remains low. The current use of cultivars without "R" gene identification means that it is a bit of a gamble if the resistance will match the pathogen in the field.

For clubroot, I do not think they can improve their strategy at the moment – they are at the highest level. For sclerotinia stem rot, using resistant cultivars on more acres can help reduce risk of this disease.

Casselman: Canola seed companies are always looking for co-operators to help with local demonstration plots. Some of these plots might include the newest genetics that are going to be on the market the following year. Hosting plots is a great opportunity to get an advance look at products further along the pipeline to see how they perform locally. Relationships that a farm has with local suppliers is built on trust and past performance, but I do see value in maybe trying a few bags of canola seed from a new supplier and to learn about some of the other products in the marketplace.

Clint Jurke says McCormick can "get to the next blackleg level" by selecting an appropriate resistance source for individual fields. This requires testing for the presence of L. maculans races in the field and selecting cultivars with major "R" genes that will control those races. For details, go to the Blackleg chapter in the Diseases section at **canolaencyclopedia.ca**. Look for the "Genetic resistance" heading.

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13 tips from Combine College

Manitoba Canola Growers co-hosted Combine Colleges at Dauphin and Portage la Prairie in July. Here are few key messages from a general presentation on how to prevent and measure loss, and brand specific presentations from Case IH, John Deere and New Holland.

BY JAY WHETTER

Combines have settings based on harvest strategies, such as "Limited loss" and "Maximum capacity". This display is from a New Holland combine.

1 Calibrate concave and sieve settings before harvest. For the sieves, set the monitor to what is the right starter setting for canola. Then go to the sieves and check. If the top and bottom sieves settings are 5/16″, for example, use a 5/16″ bolt or feeler gauge and make sure it slides snuggly between the grooves. If not, follow instructions in the user manual to calibrate. Do the same with the concave. Comments from instructors at Combine College suggest that differences can be significant, even for new machines.

2 Not all losses occur out the back of the combine. Header loss can occur if the reel hits canola pods and seeds fall to the ground, not on the header. Keep the reel as slow as possible. Specialty headers with knives that stick out in front of the reel can reduce these losses in canola. Crop dividers can also increase loss. A PAMI study on straight cut headers included a comparison of crop dividers. It concluded that vertical knife and fixed dividers had lower losses than the rotary knife divider. Other header considerations: Keep the knives sharp. Add an after-market shield (Crop Catcher from Michel's) over the feederhouse to keep canola seeds in the combine. Losses can also occur in the middle of the combine. Murray Skayman, owner of MAD Concaves, says: "If you walk around the combine and see canola, it's coming out somewhere." Caulk or tape over holes.

3 Aim to have 90 per cent of canola threshed out at the concave. Skayman would run the rotor faster and the concave tighter to get that quick early threshing. As a concave specialist, he would also recommend removing a few bars to open up the front of the concave.

4 Keep top and bottom sieves open about the same distance for canola. Check the manual for recommendations. This will provide the airflow essential to lift the chaff and straw. This lifting separates the seeds. "Sieves are never the problem, unless they're too tight," Skayman says.

5 A clean sample might point to higher losses. "If the sample is really clean, I'm starting to worry," Skayman says.

6 When using a drop pan, the ideal is to lift the spreader out of the way and drop straw and chaff. This concentrates the loss and gives a more accurate reading. However, operators will want to check again a couple of times after the spreader is re-engaged. The wind action of the spreader creates a vacuum that can suck material out of the combine faster, and could increase losses. Brendan Kamieniecki, agriculture equipment technician with Rocky Mountain Equipment, recommends a Case IH spreader speed of no more than 550 rpm with canola. Any higher and it starts to disrupt airflow. He also recommends punching out another hole on the spreader drop tray to lower it a notch. This gap reduces the vacuum effect at the back end.

7 Perform a kill stall. This will be in the manual and is a monitor setting on some combines. If not clear how to do it, check with combine dealer. A kill stall stops the combine dead to provide a snapshot of potential issues with settings. Open up the hatches and look for too much chaff on the sieves, too much load in the return elevator, full unthreaded pods, uneven loading on the sieves.

8 Don't assume anything. Sometimes automated systems on modern combines will make adjustments that are the exact opposite of what the operator would have expected. Combines have settings based on harvest strategies, such as "Limited loss" and "Maximum capacity". The goal with the limit loss setting, based on comments from the New Holland station, is to keep canola losses to under 0.5 bu./ac.

9 Get help from your combine dealership. For example, John Deere has an "Equipment Plus" app to provide baseline settings based on combine model, crop, estimated yield, and straw and seed moisture. It gives a start point for settings.

[1]Discount available on select John Deere combine and combine equipment from participating John Deere dealers. Subject to availability and may be changed or discontinued without notice at any time. Some restrictions apply; ask a participating dealer for details and complete list of qualifying products.

*Internal John Deere test of X9 1100 Combine, based on field conditions.

**PAMI independent comparison between X9 1100 and Claas 8800 Combines.

†Internal John Deere test comparing X9 1100 and S790 Combines, based on field conditions, per unit harvested.

Murray Skayman, owner of MAD Concaves, aims to have 90 per cent of canola threshed out at the concave. Skayman would run the rotor faster and the concave tighter to get that quick early threshing. As a concave specialist, he would also recommend removing a few bars to open up the front of the concave.

You may also see value in paying for help. Kamieniecki had one customer who had trouble getting losses below 1.5 bu./ac. for four combines, so the farmer paid Kamieniecki to adjust them.

He got losses down to 0.3 bu./ac., and billed $1,200. The yield gain was worth over $60,000, the farmer told him.

10 Standing canola needs different combine settings compared to swathed canola. Comments from the New Holland station described three settings to use as start points for standing canola: (1) speed up rotor rpms to handle greener plant material, (2) take wires out of the concave to release canola seeds faster, and (3) pull back the rotor vanes to keep crop inside the rotor for five rotations instead of three. Check with combine dealers for recommendations for specific models.

11 A lot of losses happen at headlands when the combine is empty yet the fan is still running at full speed. Kamieniecki recommends "Headland mode", an option on some models, which slows the fan to keep small seeds like canola inside the combine.

12 High horsepower on modern combines is for tough conditions when you need that extra threshing capacity. Using horsepower to combine at eight miles per hour in good conditions can lead to heavy losses.

13 Read the manual and check out YouTube videos for tips on calibration of sieves and concaves, basics settings for each crop, kill stalls, and more. For example, a YouTube search for "Case IH 2188 sieve calibration" generated some good tips.

—Jay Whetter is the editor of Canola Digest.

Read "Minimizing grain loss during harvest" in the Harvest Management section at canolaencyclopedia.ca

Spreaders create a vacuum that could increase losses. Brendan Kamieniecki, ag optimization and technology specialist with Rocky Mountain Equipment, recommends a Case IH spreader speed of no more than 550 rpm with canola. He also recommends punching out another hole on the spreader drop tray (top) to lower it a notch. This gap reduces the vacuum effect at the back end.

Try the CCC harvest calculators

Use the Harvest Loss Calculator and Combine Optimization Tool at **canolacalculator.ca** to improve canola harvest results. The Harvest Loss Calculator will calculate the amount of seeds in the drop pan into a bu./ac. and dollar per acre loss. If the spreader is disengaged, the discharge width is equal to the sieve width at the back of the combine. If the spreader is engaged, the discharge width is the cut width (swather or header). This is important to note when measuring loss when the spreader is disengaged and then engaged. (See point 6.) The Combine Optimization Tool walks through key settings based on the objectives: Grain Loss, Grain Sample Quality or Productivity.

How to make in-bin drying more efficient

An Alberta study, with support from Alberta Canola, measured the efficiency of on-farm drying systems. The comparison of in-bin drying provided tips to improve fuel efficiency and reduce drying time and cost.

BY JAY WHETTER

Alberta farmer Jason Lenz first tried this 500,000 BTU heater, a diesel engine that drives a friction plate to create heat. A fan blows heated air through a 20" diameter flexible insulated tube, which clamps to the bin fan's air intake vent.

Credit: Jason Lenz

An Alberta study comparing in-bin drying systems found that indirect heat sources may have a slight efficiency advantage over heaters installed in-line with aeration fans. The reason could be that moist exhaust air is not included in the air supply, which keeps humidity low.

Team Alberta – Alberta Barley, Alberta Canola, Alberta Pulse Growers and the Alberta Wheat Commission – led the 2019-21 study, with funding provided in part through the Government of Canada and Alberta through the Canadian Agricultural Partnership. PAMI provided technical support while 3D Energy collected the data.

METHODOLOGY

Cooperating farmers ran their drying and storage systems as they normally would. Farmers recorded grain volume dried, initial grain moisture, final grain moisture and grain temperature.

PAMI and 3D Energy recorded thermal and electrical energy consumption, as well as supply air (plenum) temperature, ambient air temperature, and ambient relative humidity throughout the drying process.

The study analyzed in-bin aeration systems using indirect and direct heaters, and a small sample of continuous dryers. Crops were canola, barley and wheat.

On-farm "business-as-usual" operation of various drying systems created a long list of variables, including outside (ambient) temperature, supplied air humidity, grain moisture, grain type, bin size, fan size, heater type, air input screens, bin-top venting and energy source.

To work around these variables, PAMI and 3D Energy compared systems based on energy use intensity (EUI), expressed as gigaJoules of energy consumed per tonne of moisture removed (GJ/t).

KEY RESULTS FOR IN-BIN DRYING

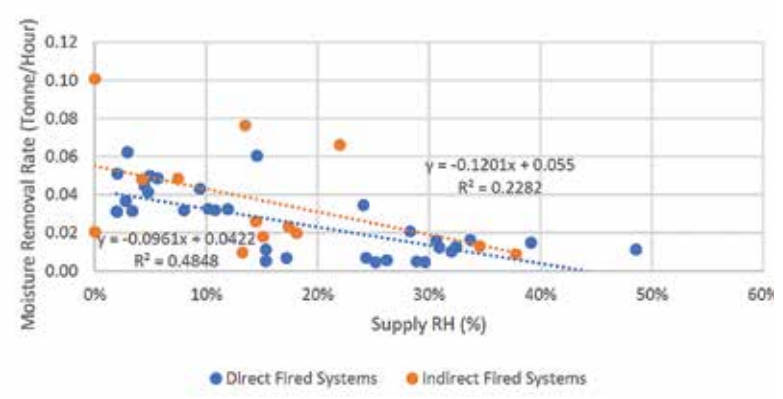
Farmers can improve grain drying efficiency with the following observations, which were included in a final report from 3D Energy.

Direct vs Indirect. In-bin systems can get supplemental heat from direct heaters mounted in-line with the fan or indirect heaters that supply heated air through a tube from an external heater. For this study, systems using indirect heat had average energy use of 4.6 GJ/t (range from 2.4 to 8.9) and systems using direct heat had an average energy use of 7.1 GJ/t (range from 3.8 to 18.5). PAMI and 3D Energy report that the sample size is too low to confirm a difference, but indirect heaters do seem to have an advantage. They say it may be due to lower relative humidity of the indirect air because moist exhaust air is not included in the air supply.

Air's capacity to dry. Air with lower relative humidity has more water holding (and therefore water removing) capacity. Adding heat lowers the relative humidity of incoming air. The report notes that increasing the temperature of the supply air by 30°C can reduce the air's relative humidity from 100 per cent down to 14-16 per cent, which "increases the drying capacity of the air exponentially." As an added observation, PAMI and 3D Energy note that relative humidity of ambient outside air is not a major factor when it comes to the efficiency of heated air drying systems.

Hotter air reduces drying time. It takes a lot more energy to heat air to 30°C than to 10°C, but the hotter air also dries grain a lot faster. The increase in fuel consumption closely matches the increase in moisture removal, so that part of the equation is fairly even in terms of energy consumption. However, faster drying means the electric fans don't have to run as long. This gives hotter air the advantage in terms of overall efficiency, the study concluded. Supply air temperatures for in-bin drying ranged from 13°C to 55°C. The report includes one caution: "Bins utilizing high supply air temperatures should be closely monitored as bins that are too dry can cause

Moisture Removal Rate vs. Supply Humidity



This figure, based on results from the Alberta study, shows that heated air with lower relative humidity will remove moisture at a much faster rate.

excessive shrinkage and reduce profitability, negating any savings." PAMI and 3D Energy add that more research on supply air temperatures for different grain types and air distribution systems is required.

Target air flow of one cubic foot per minute per bushel (cfm/bu.) Air flow for all systems in the study ranged from 0.65 to 1.20 cfm/bu., which is within sight of PAMI's recommended 1.0 cfm/bu. Therefore, for systems in this study, air temperature was more important than air flow for moisture removal. Had air flow been well below the optimal target, drying efficiency would be a lot lower. Because canola has a higher static pressure than wheat or barley, farmers can reduce the volume of canola in drying bins to increase air flow, if necessary.

Static pressure. With its smaller seeds, canola has two to 2.5 times the static pressure of barley – which means canola resists air flow to a greater degree. Aeration fans will use more electricity and be less efficient with higher static pressures, however reducing batch size to reduce static pressure will require more batches and longer overall fan run-times. As long as air flow is at around 1.0 cfm/bu., static pressure is not really relevant. Fill grain to a point where airflow is maintained at this range.

Rooftop exhaust fans. For this study, bins with rooftop exhaust fans decreased energy consumption by approximately nine per cent when compared to bins with passive venting.

Keep the burners clean. Dirt and debris within the burner orifice and faulty or inaccurate sensors can affect the air-to-fuel ratio, which reduces performance. "Optimization and proper maintenance of the burners can lead to increased performance," the report says.

Air ducting. Farmers who participated in the study had a variety of ducting systems and bin types. These included flat-bottom bins with perforated floors, hopper bottoms with rocket ducting, and hopper bottoms with side-wall ducting. The study didn't report on any major differences in performance based on bin type and ducting. More research is needed to identify differences.

KEY RESULTS FOR CONTINUOUS DRYERS

This part of the study was smaller and ran into some snags. In total, five natural gas dryers were metered for the study, but not all operated in each of the three years. Average efficiency for each model was similar, ranging from 7.25 to 7.54 GJ/t. The report concludes, "This suggests that among continuous grain driers, grain condition and environmental factors have a larger effect on drying efficiency than dryer brand or model."

ENERGY CHOICES

In all systems, natural gas was the lowest cost heating fuel based on energy used per tonne of moisture removed. Farms that anticipate large volumes of grain drying may want to inquire about a natural gas supply to the bin site. Diesel is the next best option, but it was about four times the price per bushel of grain dried. (Based on 2019 prices, average drying costs were 5¢ per bushel for natural gas systems, 21¢ for diesel and 27¢ for propane. Electricity was similar to propane.) The study concluded that "utilizing electric heating for grain drying should be avoided, as electricity has the highest operating costs and emissions, and would require a large infrastructure investment for service lines and transformers to be capable of the required demand need for grain drying." Of course electricity is still needed to run the fans.

—Jay Whetter is the editor of Canola Digest.

Government help for grain drying in Alberta

Alberta's Efficient Grain Handling Program, funded through the federal government's Canadian Agricultural Partnership (CAP), was open and accepting applications as of early August but funding was running out. **cap.alberta.ca/CAP/program/EGH**

Shannon Sereda, senior manager for government relations and policy with Alberta Barley and Alberta Wheat, says the list of eligible on-farm projects has two new items as a result of the Team Alberta grain drying study. They are:

- Pipeline to grain dryer – for costs incurred over and above those paid for by the Rural Gas Program to a maximum of $20,000 per applicant. Important: A quote must be provided by the natural gas provider.
- Indirect-fired high-efficiency portable aeration dryers.

Farmer cooperator: Roger Chevraux, Killam, Alberta

Roger Chevraux, chair of Alberta Canola, participated in the grain drying study using an in-bin system with direct heat. The 10,000-bushel flat bottom bin had an aeration floor, 10-hp Grain Guard fan and Sukup heater.

If a farmer has to dry a lot of grain, this is not the ideal system, Chevraux says. With this bin, he can dry only 4,000 bushels at a time, otherwise the statistic pressure gets too high. "With the back pressure, we could not get a clean flame," he says. "If we put more than 4,000 bushels in the bin, we'd have to take the heaters apart and clean them."

It takes about three days to dry each 4,000-bushel batch. Then the bin has to be emptied, cleaned and refilled for the next round. After the late harvest of 2018, Chevraux had to dry about 50,000 bushels. He says it felt like he was drying grain all winter.

"It was cumbersome, time consuming and labour intensive," he says.

Running the bin less than half full also presented a challenge for the study. The researchers asked him to provide moisture updates every couple of days. "It was hard to probe grain in a 10,000 bin that was less than half full," he says.

Two years ago, Chevraux set up a continuous drying system with a Neco dryer, wet bin, dry bins, and pneumatic transfer from bin to bin. It is wired to keep running automatically, based on the moisture target.

"This system is much easier, and we're not overdrying as much as we did with the in-bin system that was so difficult to probe," he says.

The Neco dryer has been especially effective for malt barley. "We can combine it four points above dry, which gets our harvest started a lot quicker and gets us going again just a day or two after rain," he says. This makes it more likely that the barley will meet malt specifications.

Chevraux's in-bin system and continuous dryer are both propane powered.

Farmer cooperator: Jason Lenz, Bentley, Alberta

Jason Lenz, vice chair of Alberta Wheat Commission, participated in the study using an in-bin drying system with indirect heat.

Lenz uses a construction flame-less heater. These are often used to heat building construction sites for winter work. A John Deere diesel engine mounted on a single-axle trailer powers a friction plate to generate the heat. The higher the RPMs, the more heat produced. Exhaust is expelled and not used as part of the heat source, but the engine and friction plate are fully enclosed to capture the heat. A fan inside the unit blows heated air through a 20" diameter flexible insulated tube, which clamps to the bin fan's air intake vent. He can move the until from one bin to another in less than 20 minutes.

"The best part of it," Lenz says, "is that the heated air has near zero humidity."

He rents the heater by the month, as needed. He tried a 500,000 BTU the first time, then switched to a 1,000,000 BTU unit, which works better, he says.

"A farmer from north of Edmonton first started using them, and word spread fast in 2016 and 2017 when we had lots of grain to dry," he says. Lenz uses the indirect heater on hopper bottom bins with horizontal aeration tubes. He dried wheat and barley in 2016, 2017 and 2019. "It's pretty easy to get 16-17 per cent moisture grain down to 13 per cent," he says.

A limitation with in-bin drying systems, Lenz says, "is that you don't get the grain evenly dried. The bottom grain dries faster, so you need to do a little bit of blending after the bottom stuff gets dry. We auger some out, and add some in as we go."

He recommends good bin probes and a good moisture tester. "You do a lot of samples to make sure it's blended right. We did dry some wheat and barley down to nine per cent the first time around," he says. "Another thing we learned is that the ambient temperature outside makes a difference. If you can dry when outside temperature is above 0°C versus minus 20°C, you'll be that much more efficient."

It's a simple system, he says, and even through diesel is more expensive than natural gas, "we were surprised how efficient it was."

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The seed pelleting technology from Syngenta makes all canola seeds uniform size to improve singulation when using a planter.

PELTA MAKES SEED UNIFORM FOR PLANTERS

BY TREENA HEIN

Pelta seed pelleting technology "helps reduce the risk and guesswork around seeding canola," according to its maker, Syngenta Canada. Pelta is the first pelleted canola product available in Canada. Its content is proprietary and patented.

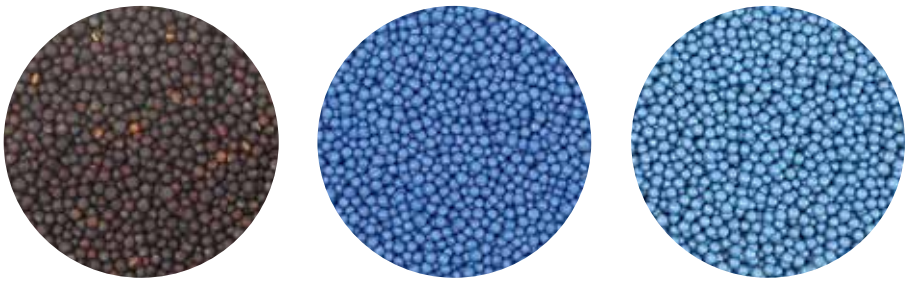
Canterra Seeds has the exclusive to offer Pelta technology on its canola seed. Local Canterra reps are the best source for pricing and availability.

Pelleting optimizes seed size and uniformity for better planter performance – more accurate seed placement – which leads to greater survivability and stronger stand establishment. Pelta can reduce issues caused by variability in seed size, such as seeding misses and double- or triple-seeded canola.

Karen Ullman, Syngenta Canada's seedcare product lead, says Syngenta is seeing a growing interest in seeding canola with singulation planters. A planter can achieve more accurate delivery of seed into the ground, allowing growers to dial in their plant population and make every seed count.

Pelta was designed especially for growers using singulation planters, says Candace Reinbold, Canterra territory manager for the Peace River region. "We have the ability to tailor the seed diameter to fit the discs they are using," she says.

Additional trials are looking at Pelta with air drills to see if there's a return on investment for Western Canada canola growers.



Untreated canola seed | **Industry standard-treatment** | **Pelta and industry-standard treatment**

All samples taken from the same seed lot. This triptych shows bare canola seed, standard seed treatment and Pelta pelletized seed.

Credit: Syngenta | Source: The Seedcare Institute - Plattsville, ON - August 2021

VÄDERSTAD TRIAL

Väderstad has project comparing Pelta and conventional canola seed treatment at Discovery Farm in Langham, Saskatchewan. This 610-acre demonstration and research site, owned by Glacier FarmMedia, is the host location for Ag In Motion. The trial will compare yield and plant survivability using a Väderstad Seed Hawk air drill. And in Alberta, near Crossfield, the company is studying how Pelta seed treatment improves the accuracy of its Tempo planter.

"Our research has shown that the Pelta seed treatment does improve planter accuracy by eliminating the smaller seeds in the bag that may cause seed meter discs to plug," says Kris Cherewyk, an agronomist at Väderstad.

Clint Jurke, agronomy director for the Canola Council of Canada (CCC) and based in Lloydminster, Saskatchewan, sees potential to improve stand establishment through the seed placement using singulation planters. Jason Casselman, CCC agronomy specialist based in Fairview, Alberta, believes Pelta will be useful for seed singulation for those canola growers using a planter. However, they both say the science needs to be done to determine if the return on investment is there.

"Time and research will tell," Jurke says. "We've known for a long time that stand establishment is one of the biggest factors and even farmers with a lot of experience can still be surprised at how good or bad a stand can turn out to be. The fact that we're still getting only up to 50 per cent emergence means there is a need for new innovation."

PART OF A PACKAGE

Pelta does not cause a delay in emergence due to its hydrophilic properties. The Syngenta trials have involved seeding into dry conditions for the past two years and there has been no impact on the germination and emergence of the canola. Syngenta says "the unique properties of Pelta allows the coating to break down with limited amounts of moisture."

Pelta is offered in combination with the "most comprehensive canola seed treatment package available," including Helix, Saltro plus Fortenza Advanced for control of flea beetles and cutworms, and protection against a broad spectrum of seedling diseases, including airborne blackleg infection.

—Treena Hein is an award-winning science writer and educational resource consultant.

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Flatten the peak for better airflow

Canola and all other grains will naturally form a peak when augered into a storage bin. Because air takes the path of least resistance, it often exits the grain mass before reaching the peak. Flattening the peak will help with uniform conditioning and drying.

BY RICHARD KAMCHEN

The cone shape that grain takes after filling a bin is an enemy to airflow and heightens the risk of spoilage.

"Peaked grain, particularly in large bins, significantly reduces the airflow through the core," says Chandra Singh, senior research chair in agricultural engineering and technology at Lethbridge College.

Singh explains that increased grain depth through the core relative to grain depth near bin walls raises airflow resistance and static pressure, thereby significantly reducing airflow.

"We can observe two to three times higher airflow rates through the sides, and poor to negligible airflow through the core," says Singh, who co-authored a recently published paper on the subject.

"Air will take the path of least resistance to move through the grain," adds Charley Sprenger, project leader and engineer-in-training at Prairie Agricultural Machinery Institute (PAMI). "Therefore, it will move to the region of lower static pressure — bin edges — more easily than the core of the bin."

Uniform airflow is required for safest storage management, but airflow is impacted by the static pressure resulting from a column of stored grain, Sprenger points out. "Static pressure is directly related to grain depth," Sprenger says. "Therefore, static pressure is greater below a peaked cone of grain where the depth is highest, versus the sides of the bin, where the vertical height of the grain is lower."

SPOILAGE RISK

Peaked grain with a negligible airflow rate in the core has a higher risk of spoilage due to inefficient drying or cooling, says Singh. With airflow rates two to three times higher near bin walls, drying and cooling will be two to three times faster near the wall.

Drying or cooling the core would require two to three times more fan time, and even that wouldn't necessarily guarantee complete conditioning of grain in the core, Singh says.

"Overall impact of peaked grain would be inefficient, slow and non-uniform drying and cooling, increased shrink, and higher fan power consumption," he says.

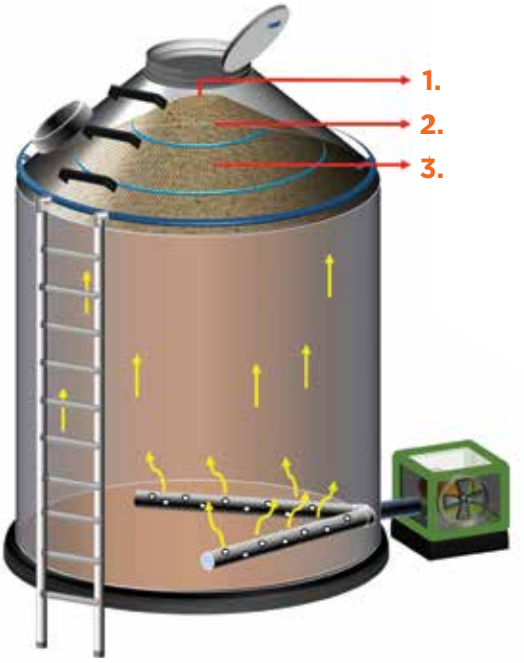
BEST SOLUTIONS

Levelling the grain is one potential fix to the airflow problem. "When the peak (or cone) of the grain is levelled, the height of grain is uniform, and so too is the static pressure," says Sprenger. "Therefore, the airflow should travel uniformly through the grain."

That may be easier said that done as levelling can be labour intensive, Singh says.

Partial unloading of a peaked grain bin would be a more practical solution to improving airflow through the core. However, Singh stresses that while partial unloading can significantly improve the airflow, it needs to be done in a way that doesn't create a large inverted cone. In this co-authored study, Singh estimated that unloading about nine per cent of the total grain volume was sufficient to improve airflow for aeration.

Sprenger concurs, explaining that by unloading some grain, the core will be removed first, thereby bringing the peak down. That removed grain can then be augured back into the top of the bin. "The grain can be placed back on top without too much peaking again as a hollow will have appeared from the core being removed," Sprenger says.



1. 0 cfm/bu (0 m3/min/t)
2. 0.04 cfm/bu (0.07 m3/min/t)
3. 0.08 cfm/bu (0.14 m3 min/t)

This graphic demonstrates results from Chandra Singh's study on airflow, which observed two to three times higher airflow rates through the sides, and poor to negligible airflow through the core. Airflow is given as cubic feet per minute per bushel (cfm/bu.)

LESS THAN IDEAL

One practice Sprenger advises against is the use of gravity spreaders during loading. What makes them less than ideal is the fact that the packing pattern of grain as it fills the bin is different versus loading. Gravity spreaders in this context will actually cause higher bulk density, leading to lower porosity, and therefore even higher airflow resistance, Sprenger says.

Stirrers are a better bet for improving airflow, but still not ideal, as they could be constrained if the bins are equipped with multiple moisture and temperature cables, Singh says.

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

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Soil test to optimize yield, profit and fertilizer efficiency

Recommendations from a six-year study on soil-test-based fertilizer decisions include: Reduce tillage intensity and utilize recommended nutrient recommendations to help improve soil aggregate stability and root characteristics.

BY TARYN DICKSON

Soil testing limits unknown and maximizes known factors to help growers and agronomists make more accurate fertilizer rate decisions. It is part of 4R Nutrient Stewardship.

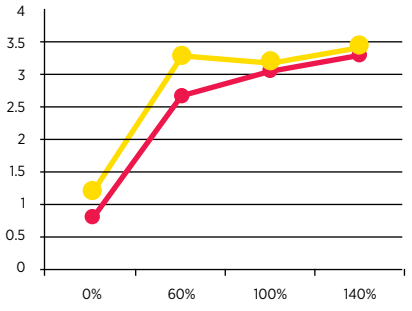
"Effective soil test-based fertilizer recommendations should consider both the current pool of available nutrients present at seeding and the potential supply of nutrients from soil during the growing season," says Kabal Singh Gill, a research consultant with SARDA Ag Research in the southeast Peace Region.

Gill led a multi-year study titled *Assessing current soil test based fertilizer recommendations for direct seeding systems to optimize crop production and contribution margin*. The study investigated the effects of different soil test-based fertilizer rates and seeding systems (direct seeding and minimum tillage) over six growing seasons (2010 to 2015). Fertilizer rates (of nitrogen, phosphorus, potassium and sulphur) were 0, 60, 100 and 140 per cent of the soil test recommendation, in a canola-cereal (wheat or barley) rotation, based on annual soil tests for depths of 0-6" and 6-12".

KEY FINDINGS AND RECOMMENDATIONS BASED ON THE RESULTS, INCLUDE:

1 Soil tests detected large differences in residual nitrate (NO_3-N) nitrogen, available phosphorus, extractable potassium and sulphate sulphur concentrations following years when below normal rainfall resulted in low crop yields (such as in 2010 and 2014), and where higher fertilizer rates were used. Soil tests can indicate these residual nutrients in each field, helping growers to to optimize fertilizer rates and potentially save costs in certain years.

2 Soil samples collected in the spring 2016 indicated increased stratification of some nutrients and soil properties from higher fertilizer rates. These trends were more evident under the direct seeding than the minimum tillage system. Organic matter content and phosphorus concentration declined with depth, while pH, calcium and magnesium increased with depth, and the change with depth tended to be greater at the 100% than 0% fertilizer rate. No change in stratification of NO_3-N and sulphate sulphur was noticed as a result of fertilizer rates. **Implications:** Fertilizer addition can result in increased stratification of some nutrients and soil properties. Attention may be needed to add liming materials when high fertilizer rates are used.



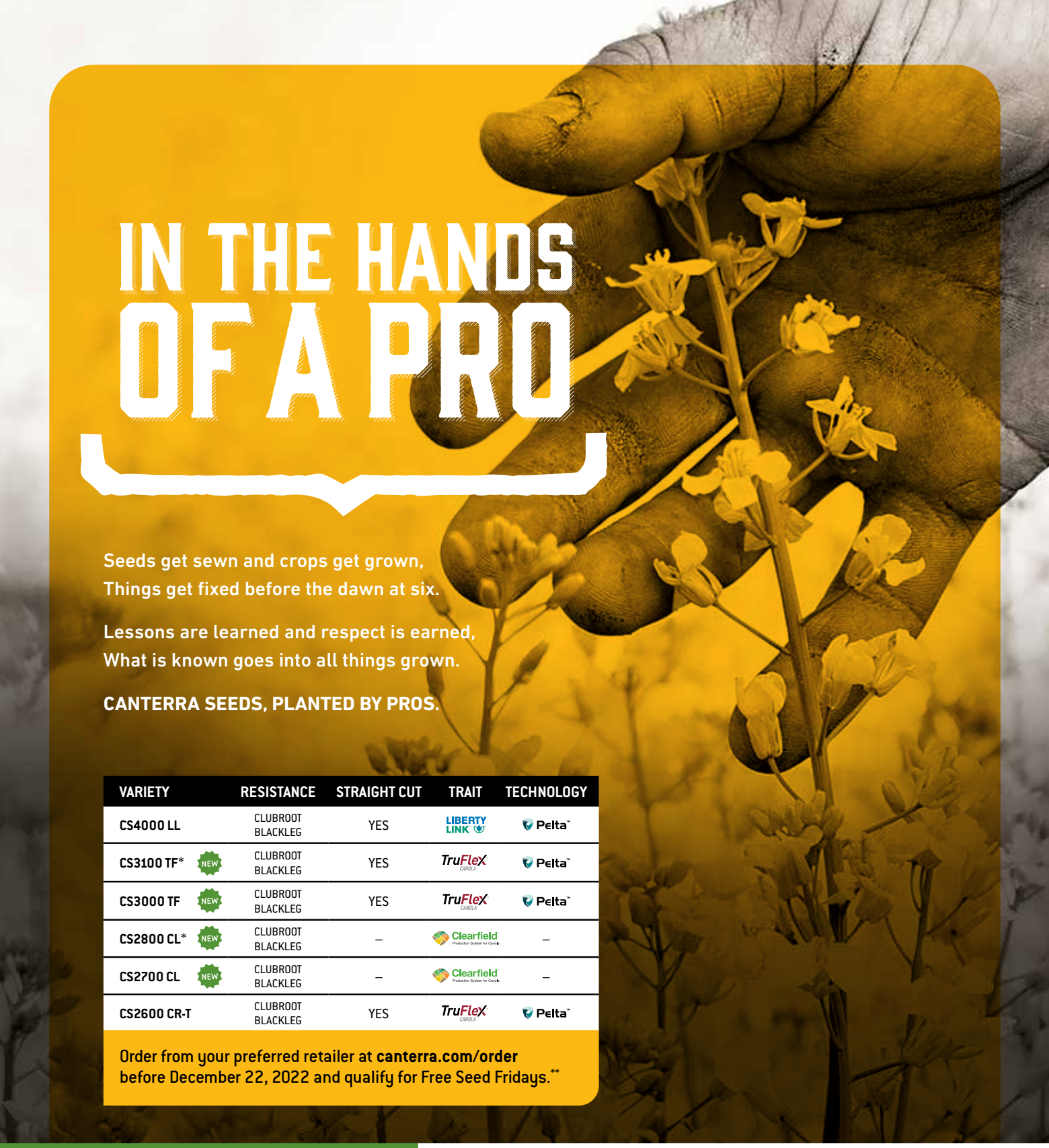
Yield of canola and cereals (tonnes per hectare) for the 0%, 60%, 100% and 140% fertilizer rates under the direct seeding (DS) and conventional tillage (CT) systems in 2015.

3 The type of seeding system did not affect residual nutrients in the 0-6" soil depth. However, the seeding system with reduced tillage intensity had a greater positive impact on soil aggregate stability than fertilizer rate. **Implications:** Reducing tillage intensity can improve soil aggregation.

4 Compared to 0 per cent fertilizer rates, the relative seed yields at 60, 100, and 140 per cent rates increased with years of fertilization. Single year fertilizer use efficiency data (for the application year only) may be underestimating fertilizer benefits, since some nutrients were recycled in the soil for subsequent crops and fertilizer effect on crop yield was enhanced with multiple years of use. **Recommendation:** Fertilizer addition not only benefits current crop, it also benefits the subsequent crops. Use long term nutrient use efficiency data (including soil test data) to provide a better estimation of soil nutrients in a field and have more accurate fertilizer rate recommendations.

For more details, see the full project summary, final report, three published journal articles and related blog at canolaresearch.ca.

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



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CANOLA IN OTTAWA: Your Voice Matters

Canadian Canola Growers Association and Canola Council of Canada advocacy teams work together to represent the interests of canola farmers and the canola industry value chain in Ottawa. Here are updates on the Pest Control Products Act review, the Indo-Pacific Strategy, Clean Fuel Regulations and fertilizer emissions reduction targets.

BY TENESHA LAWSON AND TROY SHERMAN

Farmers need to know how their national canola organizations – Canadian Canola Growers Association (CCGA) and the Canola Council of Canada (CCC) – work to represent them in Ottawa, so *Canola Digest* created this new feature. We put together the following four highlights on behalf of staff from both organizations who work to make sure canola voices are heard when the Government of Canada develops policy that will impact canola.

REVIEW OF PEST CONTROL PRODUCTS ACT

On June 30, the Government of Canada closed its consultation on a targeted review of the Pest Control Products Act (PCPA). Concern was raised about the impact that consultation outcomes could have on farmers' future access to pest control products in Canada. CCGA and CCC participated in various stakeholder meetings and submitted comments to ensure that farmers and the industry's voices were heard.

CCGA and CCC's written responses focused on three important themes: 1) the need for continued access to safe products to enhance canola's sustainability; 2) the importance of science and risk-based decision making and real-world data to farmers' ability to access innovative products; and 3) the need for more transparent communication on the regulatory framework to improve public trust in the food farmers produce.

As part of the response to the PCPA review, Advancing Agriculture, with the help of partners like CCGA and CCC, ran a digital sign-and-submit campaign for farmers and individuals within the agriculture industry. The campaign provided an easy way for individuals to express their views on the PCPA targeted review. Through the campaign, more than 4,000 submissions (2,516 ag supporters and 1,501 farmers) asked the federal government to maintain a commitment to science-based regulation when it comes to agricultural innovations recognizing that pest control products are a critical tool for farmers to grow safe, sustainable and abundant food for Canada and the world.

INDO-PACIFIC STRATEGY

As part of its platform for the 2021 federal election, the Liberal government promised to develop an Indo-Pacific Strategy given the growing significance of the region to Canada's economic, security, and development interests.

The Indo-Pacific Strategy is a unique opportunity to advance the canola industry's interests in the region and encourage the Government of Canada to increase investments that support market access and development. The idea of a new Indo-Pacific Diversification Office staffed with multidisciplinary experts (for example, plant scientists, veterinarians, regulatory experts, trade and agriculture policy officers, etc.) originally stems from efforts of the Canola Working Group, a joint industry-government body struck in response to the suspension of licenses of canola exporters by China. Such an office would ensure that Canada has an increased on the ground presence to proactively address potential market access issues and are able to mobilize quickly to respond to in-market non-tariff barriers.

To learn more about this initiative or to read a copy of the executive summary of the report, you can visit **growindopacific.ca**

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CLEAN FUEL REGULATIONS

The Government of Canada recently released its new Clean Fuel Regulations (CFR) – a series of regulations that regulate the biofuel market in Canada and create compliance credits for renewable fuel producers. As the federal government looks to achieve its climate goals, the CFR is an important tool in reducing greenhouse gas emissions, including up to 26 million tonnes in 2030.

The CFR recognizes Canadian canola as a low carbon feedstock for biofuels and will enable renewable fuel producers to generate compliance credits. The CFR provides options that would allow Canadian-grown crops to be fully accepted as sustainable and compliant with land use and biodiversity criteria. It also recognizes regenerative farm practices such as no-till and minimal till, contributing to canola's low carbon intensity and feedstock of choice in biofuel production. As demand for biofuels continues to increase, supported by new investments in canola crushing capacity in Saskatchewan, canola farmers will benefit from a new domestic market for their product.

Over the past several years, the CCC and CCGA have been working closely with the government to advocate on behalf of the industry. This included sustained advocacy with both political and civil service officials to facilitate reasonable requirements for farmer compliance with the land-use and biodiversity provisions in the CFR and ensuring that canola's low-carbon properties were properly reflected in the Life Cycle Assessment model, which determines how efficiently feedstocks generate compliance credits for renewable fuel producers. Both of these issues were resolved in the final version of the regulations published on July 6, 2022 and will come into effect in July 2023. There are still several details to confirm in fall 2022.

For more about the CFR, visit **canolacouncil.org/biofuels** and **ccga.ca/policy/pages/biofuels.aspx**.

FERTILIZER EMISSIONS REDUCTION TARGET

Agriculture and Agri-Food Canada (AAFC) sought input to guide its approach in achieving Canada's fertilizer emissions reduction target. The aspirational target strives to reduce emissions from fertilizer application by 30 per cent from 2020 levels by 2030. The CCGA and CCC's joint response to the consultation is multi-layered and focuses on several key areas:

1. This target should remain voluntary.
2. Fertilizers are essential tools farmers use to increase yields and profitability while producing high-quality crops.
3. Canola farmers continue to be strong adopters of new management practices and technology to improve environmental outcomes.
4. Farmers need flexibility and to be able to do what is best for their farm as there is no one-size-fits-all approach that will work when it comes to improving emissions from fertilizers.
5. Farmers will make investments when they are confident in the economic stability and sustainability of their operations. The government needs to work with farmers to complete economic studies on the impact of new emission-reducing practices on their return on investment.
6. Improved modelling and data will be necessary to correctly measure what farmers are asked to manage.
7. Government should not target indirect fertilizer emissions at this time.
8. Emissions reductions from fertilizer should be measured on an intensity basis as opposed to absolute amounts.
9. Incentivizing the adoption of practices, such as 4R and enhanced efficiency fertilizers, that can increase yield and quality while reducing the intensity of nitrous oxide emissions should be the focus of this voluntary target.

To read the submission, search "submissions" at **ccga.ca** or reach out to us for a copy.

—Tenesha Lawson is manager of stakeholder communications for the Canadian Canola Growers Association. Troy Sherman is director of government relations for the Canola Council of Canada.

What does the fat chart tell us?


Credit: iStock.com/Kuzmik_A

Canola oil is low in saturated fat, high in monounsaturated fat and contains omega-3 alpha-linolenic acid. What does all that really mean for the health of canola oil consumers? And how does that compare to competing oils and fats?

BY JAY WHETTER

The body needs fat, but what kind and how much? The fat chart promoted through CanolaEatWell.com and CanolaInfo.com compares canola oil to olive oil, coconut oil, butter and other fats. Canola Eat Well, CanolaInfo and canola oil processors use these comparisons to promote canola oil as a healthy and versatile choice for dressings, frying and baking.

"The chart uses information that is publicly available from government databases and is a great visual tool to show how canola oil compares to other sources of dietary fat," says Shaunda Durance-Tod, manager of CanolaInfo for the Canola Council of Canada. "We have found it to be very useful to help both promote canola oil and dispel misinformation about other oils. People are often surprised to learn, for example, that olive oil doesn't provide very much omega-3."

The human body requires a diet that includes some fat, especially omega-3 fatty acid, for brain function (the brain is 60 per cent fat), cell structure and the absorption of vitamins. The right fats can also help the body maintain healthy cholesterol levels, which is good for the heart and blood vessels.

Recommendations are to get 20 to 30 per cent of daily calories from fat. Because fat is dense in calories, this amounts to only around 50 grams a day. "Canada's Food Guide recommends that saturated fat be limited and be replaced with fats like canola oil," says Lynn Weaver, market development manager for SaskCanola. The American Heart Association goes a step further and recommends a diet where five to six per cent of calories from saturated fat. Its website, heart.org, says "if you need about 2,000 calories a day, no more than 120 of them should come from saturated fat. That's about 13 grams of saturated fat per day."

Most plant-based oils are a good way to cut back on saturated fat while still providing the fat required for health.

"The more unsaturated a fatty acid is, the better it is from a nutritional point of view," says Michael Eskin, professor in the department of food and nutritional sciences in the Faculty of Agriculture and Food at the University of Manitoba.

Health Canada, on its website, says "Unsaturated fats are good for your health. In fact, some are essential to the healthy functioning of the body."

FATS ARE MADE OF FATTY ACIDS

Canola has, on average, seven per cent saturated fat, 62 per cent monounsaturated fat and 28 per cent polyunsaturated fat. (These numbers vary slightly from hybrid to hybrid, location to location, and year to year.) Within each of these categories are specific fatty acids, which are a carbon chains with hydrogen and oxygen. Fatty acid molecules have a methyl "CH_3" at one end, a carboxyl "COOH" at the other end, and a string of CH_2s in between.

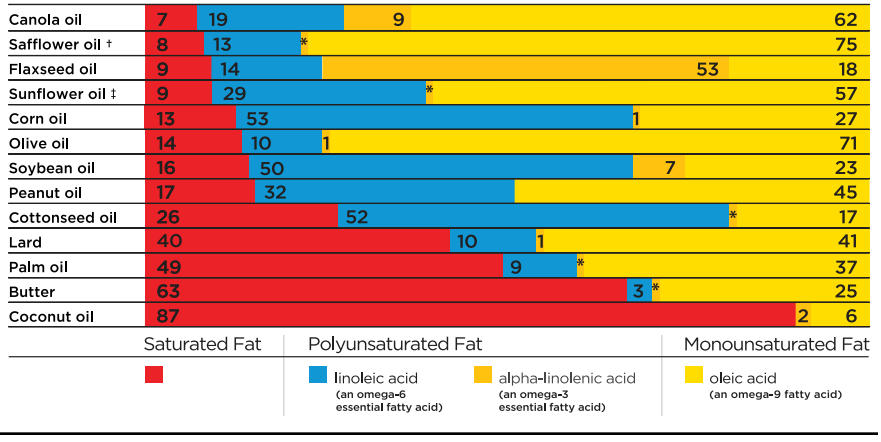
SATURATED FAT

Fatty acids with hydrogen atoms filling all available spaces along the carbon chain are "saturated". They have no carbon double bonds. Palmitic acid is the largest component of canola oil's saturated fat. It has 16 carbons in the chain and is written as C16:0 – the zero meaning no double bonds. Stearic acid, C18:0, accounts for most of the rest.

Saturated fat molecules are flat, so they stack tightly. "They cuddle up to each other and form a strong crystalline structure that is solid at room temperature," Eskin says.

Butter and coconut oil, for example, are high in saturated fat.

Comparison of Dietary Fats



MONOUNSATURATED FAT

Monounsaturated fatty acids have one carbon double bond, which creates a bend in the carbon chain. The most common monounsaturated fat in plant-based oils is omega-9 oleic acid (C18:1). Oleic acid is thought to be good for heart health. Canola oil, like olive oil, has a high content of oleic acid. The term omega, by the way, refers to the position of the first double bond relative to the methyl end of the molecule. With omega-9, the first double bond is nine carbons away from the methyl end.

POLYUNSATURATED FATTY ACIDS

Polyunsaturated fats have two or more carbon double bonds. "With a kink at each double bond, monounsaturated and polyunsaturated fatty acids don't stack up. They're more liquid," Eskin says.

Canola oil includes omega-6 linoleic fatty acid (C18:2) and omega-3 alpha-linolenic fatty acid (C18:3). The body needs to take in omega-3 fatty acid from the diet, making it an essential nutrient. The brain needs omega-3 docosahexaenoic acid (DHA). Fish oil is a good source of DHA. Canola oil's alpha-linolenic acid (ALA) is a different type of omega-3, which the liver can synthesize to DHA. A new specialty-oil canola, not yet available for production in Canada, produces a plant-based supply of DHA.

TRANS FATTY ACIDS

The more double-bonds, the higher the rate of oxidation. Oxidation breaks the triglyceride bonds (more on that below), releasing free fatty acids that form off-flavours – often called rancidity. In food service fryers and processed food, oxidation reduces the frying life and shelf life of food. Processors learned to hydrogenate plant-based oils to remove (or partially remove) the double bonds in fatty acid molecules, reducing the rate of oxidation and improving the functionality of plant-based oils.

However, hydrogenation also flipped the carbon bonds, making them "trans" versus "cis". This variation in the shape made trans fatty acids worse than saturated fats from a health perspective, Eskin says, and countries eventually banned the use of trans fats. Health Canada introduced its ban in 2018.

"Hydrogenated fats were so important for food service, they had to find a replacement," Eskin says. One pathway was to develop specialty canola oil with 75 per cent oleic acid and only three per cent alpha-linolenic acid. These specialty canola oils from Cargill and Nexera (Corteva) went into food fryers across North America, providing a plant-based oil with long frying life and no trans fats.

TRIGLYCERIDES

All oils are made up of triglycerides. Crude oil also has free fatty acids, phosphorus, chlorophyll, which are removed in the refining process to get a pure solution of triglycerides. Triglycerides have a glycerol back bone with three fatty acids attached at the carboxyl end "like tines of fork," Eskin says. Within any litre of canola oil, some triglycerides will have three oleic fatty acids, some will have combinations of fatty acids.

Breaking apart of triglycerides through oxidation will happen over time, and is accelerated with heat. Canola that heats in the bin, for example, will have higher levels of free fatty acids.

Once triglycerides are eaten, the human body has enzymes to break them apart so it can use individual fatty acids as needed.

HEALTH CLAIMS

Many plant-based oils, including canola, have qualified health claims. Health Canada approved a health claim for vegetable oils, providing approved wording for use on product packaging. Here is a sample from its website:

"Replacing saturated fats with polyunsaturated and monounsaturated fats from vegetable oils helps lower cholesterol. Two teaspoons (10 mL) of this blend of corn and canola oil contains 84 per cent less saturated fat than two teaspoons (10 g) of butter."

The U.S. Food and Drug Administration (FDA) approved in 2006 the following health claim for canola oil:

"Limited and not conclusive scientific evidence suggests that eating about one and a half tablespoons (19 grams) of canola oil daily may reduce the risk of coronary heart disease due to the unsaturated fat content in canola oil. To achieve this possible benefit, canola oil is to replace a similar amount of saturated fat and not increase the total number of calories you eat in a day."

FDA approved a soybean claim in 2017, a corn claim in 2007 and an olive claim in 2004. The olive oil health claim reads: "Limited and not conclusive scientific evidence suggests that eating about 2 tablespoons (23 grams) of olive oil daily may reduce the risk of coronary heart disease due to the monounsaturated fat in olive oil. To achieve this possible benefit, olive oil is to replace a similar amount of saturated fat and not increase the total number of calories you eat in a day."

Olive oil is a popular oil, based on the healthy perception of the Mediterranean diet. "Olive oil is high in oleic acid, higher in saturated fat, and has a lot of phenolic compounds that make it unique in taste and health benefits," Eskin says.

Canola is also high in phenolic compounds (including phytosterols), and some are powerful antioxidants, Eskin adds. Some of these are removed in the refining process, some remain. Cold-pressed canola oil, which has a different flavour than refined canola, will have more phenolic compounds, but lower general utility in food service. Refined canola oil has a mild flavour that makes it attractive for restaurants and home cooks who want the benefits of a plant-based oil without flavours that overpower the fried goods, baked goods or dressings. Refined canola oil also fries at higher temperatures before oxidation, which is essential for a long-lasting healthy frying oil.

"No question canola oil is a healthy oil," Eskin says, but it's still a fat and, though a healthy diet benefits from some fat, especially unsaturated fat, there are limits. "Everything in moderation."

—Jay Whetter is the editor of Canola Digest.

Rap on Fat

Michael Eskin started at the University of Manitoba in 1968, and was involved in the canola project from the early days. His research group looked at fatty acid composition, stability, and rate of oxidation of canola oil from a performance perspective. Other groups worked on nutrition, and breeders Baldur Stefansson and Keith Downey brought the crop into commercial production. "We had no idea what the impact of that work would be," he says. He went on to make a career out of fats and nutrition. The University of Manitoba professor even has a rap on the topic. Look up "Fatty Acids: The good, the bad and the ugly" at **news.umanitoba.ca.**

A NEW KIND OF PEST: HACKERS AND CYBERATTACKS

Farmers and agribusinesses are not immune to cyberattacks. This article describes various cyberattacks and provides tips to reduce the risk. Farms will want to look for training opportunities.

BY RYAN JOHNSON

Loss of access to critical data and systems are among the primary risks facing farmers.

Credit: iStock.com/GNDPhotography

The threat of cyberattacks on agricultural producers is increasing, along with the resulting costs for individual farmers and agri-food businesses.

More than 20 per cent of Canadian businesses were a target of a cyberattack in 2019, Statistics Canada reports. The Canadian Centre for Cyber Security puts the cost of cyberattacks on Canadian businesses in the hundreds of millions each year, although the actual amount is certainly higher as most attacks go unreported.

Cyberattacks range from simple messages aimed at duping the reader to technically complex viruses and programs that can infect a computer.

A common form of cyberattack is phishing, which is the process by which an email that appears to be from a trusted sender attempts to fool the recipient, often by enticing them to click a link which results in the automatic download of harmful software to the recipient's computer. This software is often a form of "ransomware" which essentially prevents the user from accessing their computer or accounts until a fee is paid.

Another less obvious type of cyberattack occurs when someone inside an organization allows a third-party to access the organization's data, or simply leaks it. Over the years certain activists have gone to great lengths to gain employment on specific poorly managed farms in order to record and release footage, which is then used to falsely represent an entire industry rather than address the issues of a single farm.

One type of attack especially pertinent to farmers is the issue of sensor hacking, which can lead to the improper distribution of fertilizers, water, chemicals, or to the disruption of animal welfare monitoring systems.

Certain agricultural businesses may be more subject to cyberattacks than others, such as those in the livestock sector which attracts significant attention from activist, or "hacktivist" groups. Some farmers have had their addresses leaked or even mapped by activists.

Agricultural organizations may even be targeted for intellectual property theft. For instance, certain crop varieties or technologies developed by an organization may be hijacked and used by another entity to gain advantage in today's highly competitive markets.

With the increasing frequency of cyberattacks, agriculture must shore up its digital defences, especially in light of recent research at Virginia Tech which found that many actors in the agriculture industry have received insufficient training in this area. In one U.S. study by Andrew Geil at al, about half the farmers surveyed (51 per cent) were interested in attending cybersecurity training, but only three per cent had actually attended such training. An Illinois State University survey of 1,500 beginning farmers in Illinois showing that 34 per cent of them were interested in attending cybersecurity training, and 10 per cent had actually attended such training.

FOCUS ON VERSATILITY

Agricultural production is already susceptible to unpredictable circumstances, such as weather, but as farms become more technologically complex, the potential for significant disruption due to cyberattacks is increased for all actors and stakeholders. Moreover, the risk of on-farm cyberattacks is not distributed equally within the industry, with some sectors being targeted more frequently and some farms less financially equipped to invest in appropriate safeguards.

Loss of access to critical data and systems are among the primary risks facing farmers. Data may be hijacked, erased, stolen, or manipulated. Poultry monitoring, automated milking, self-propelled tractors, watering and fertilization, or cough detection in a pork finishing barn are examples of systems which may be disrupted, leading to production and revenue losses and perhaps even food supply issues.

Through Farm Management Canada's AgriShield platform, farmers can work towards creating a comprehensive risk management plan for their farm. Go to the AgriShield website at **myagrishield.ca**

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In the case of stolen intellectual property, as mentioned above, the impacts may be even broader if the company's competitive advantage is lost.

WHAT DOES IT MEAN FOR FARMERS?

Today's farmers must include cybersecurity in their risk management plans. Ensuring proactive risk management can build resilience to cyberattacks, limiting the potential for data and production losses. Should a cyberattack take place, well-prepared farmers should know what resources are available to them in the event a data security breach or if their farming systems are compromised.

Farmers already face significant pressure to plan for and adapt to the ever-changing landscape of the agricultural industry. The topic of cybersecurity is intimidating for most people, but making time to develop the farm's resilience to cyberthreats can limit potentially significant damages and frustration.

WHAT DOES IT MEAN FOR FARMERS?

Farmers can manage cybersecurity risks by taking proactive measures to ensure the integrity of their data or by knowing to whom they should turn to resolve any issues which may occur as a result of a cyberattack. Working with industry partners to ensure that security systems are up to date should be a key first step. Farmers should also do the following:

- Never provide private financial information to an unverified entity
- Use multiple layers of authentication (such as multifactor authentication)
- Backup your documentation and data
- Advocate for greater cybersecurity protection within their own social and professional network
- Advocate for greater cybersecurity protection within their own social and professional network
- Install a combination of cybersecurity tools, antivirus and malware protection software, encryption, VPN
- Seek cybersecurity training
- Find a cybersecurity support contact
- Identify vulnerabilities in your organization
- Regularly ensure systems and software are kept up to date

Building cybersecurity into your farm business plan or risk management strategy will limit your exposure to the risk of cyberattack while also reducing the stress and confusion that may occur after such an attack has taken place. This is important not only for the farm's productivity and profitability, but also to protect the supply chain at large.

—Ryan Johnson is a contracted partner with Farm Management Canada, working on the Roots to Success project.

Through the AgriResponse website, Farm Management Canada provides a forum to ask questions about risk management in agriculture and publishes articles on emerging risks and management strategies. Go to the AgriResponse website at **agriresponse.ca**

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