ALBERTA CANOLA
SaskCanola
Manitoba Canola Growers
canolacouncil OF CANADA

January 2022

canola DIGEST

The Source for Canada's **Canola Growers**

THE FUTURE

Canola Digest asks its six farmer panelists, including Lyndon Nakamura from Alberta, what trends in agriculture and food get them excited and what trends make them a little nervous?

INSIDE:

TOUGH WEEDS IN CANOLA? STRIKE BACK WITH A LITTLE 'TUDE.

Get a new mode of action pre-seed for a new level of certainty.

To help maximize your canola's yield potential, you need to put the smackdown on weeds early. New Certitude® herbicide is the pre-seed solution that provides exceptional control of challenging weeds like kochia and volunteer canola, and it sharpens glyphosate's performance on other difficult broadleaf weeds. Certitude is also the first Group 27 chemistry for canola production, making it an ideal tool for helping to ensure the sustainability of your farm. We've stepped up our game. Now it's your turn.

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canola DIGEST
January 2022

FEATURES

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GET THE MOST OUT OF EVERY SEED

With steps to improve seed survival, canola growers can stretch the seed supply to cover as many acres as possible while also achieving the target stand needed for yield potential.

12

Canola Watch winter webinar series

Mark your calendars for the remaining four webinars in the agronomy series. Dates are January 13, February 24, March 24 and April 13. CCAs can receive credits for attending. We share a few tips from the December 13 webinar on targeting seed traits to maximize hybrid potential.

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How to use technology to manage yield

Farmers have many technology options that could increase yields. This article focuses on three under-utilized precision tools – tools that have been around for a few years and are not as popular as they should be. This is the third in a four-part yield series for the Canola Digest 2021-22 season.

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When do enhanced efficiency fertilizers make sense?

Enhanced efficiency means reduced losses. Fertilizer additives to increase efficiency are most effective in high-risk scenarios – which include high moisture soils, fall application and surface application. Low soil moisture usually means minimal risk of nitrogen loss, but an EEF might help in one scenario.

Credit: iStock.com/Petmal

Continue the momentum on carbon sequestration

All people of the world have a responsibility to reduce greenhouse gas emissions. This includes farmers. The good news is that Canadian farmers have already made a great start.

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How environment influences canola growth stage timing

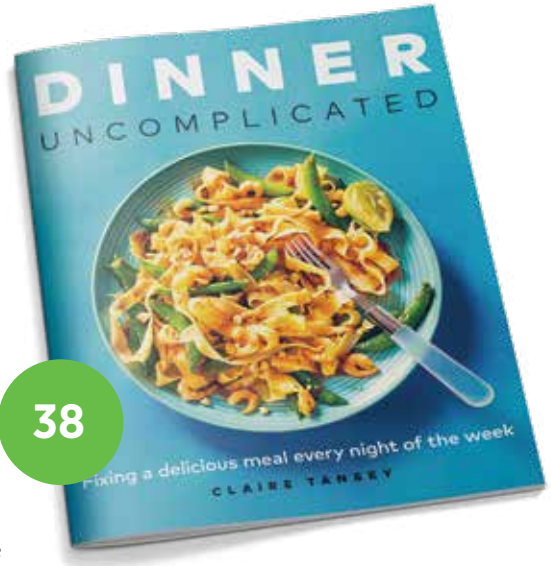
In 2021, CCC agronomy specialists tracked the same canola cultivar grown at various locations across the Prairies to measure environment-driven differences in crop phenology. Results showed a few notable trends.

33

MultispeQ spots canola with photosynthetic power

The tool provides a quick read on dozens of plant characteristics, making it handy for research. University of Alberta plant scientist Linda Gorim is using MultispeQ in a project to identify canola lines with the greatest photosynthetic capacity.

DEPARTMENTS



PROVINCIAL BULLETINS

CALENDAR

SASKCANOLA – AGM
Prairieland Park, Saskatoon, Saskatchewan
January 11, 2022, 12:30 p.m.
saskcrops.com

MANITOBA AG DAYS – CANOLA GROWERS' MORNING
January 18, 2022, 9:00-12:00
agdays.com

ALBERTA CANOLA – AGM
January 25, 10:00 a.m., online,
albertacanola.com/agm

CROPCONNECT CONFERENCE
Winnipeg, Manitoba
February 16-17, 2022
cropconnectconference.ca

MANITOBA CANOLA GROWERS – AGM
February 17, 2022, 8:00 a.m.
canolagrowers.ca

2022 CANADIAN CROPS CONVENTION
Ottawa, Ontario
March 8-10, 2022
canadiancrops.ca

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BPA WORLDWIDE

All hands

I have a guilty pleasure: House Hunters International. It's a TV show about people moving from Saskatoon or Salt Lake City to Santiago or Seville. Viewers get to see what the new city looks like, and follow the house hunters while a real estate agent shows them a few options. North Americans almost always complain about the small living quarters everywhere else in the world. Where are we going to put all of our guests? How are we going to entertain? Oh, that fridge is so small! It drives me a bit crazy because I think we need to get out of supersize mode.

We need to start building for every day use, not maximum potential use. We have a whole hospitality industry – hotels and restaurants – built for guests and entertaining. When I talk to the TV, I tell those house hunters: "Put your guests in a hotel and buy that one-bedroom, one-bathroom apartment with the small fridge. That's all you really need."

In just two generations, we've gone from "1,000 square feet is good enough for a family of eight" to "2,000 square feet is too small for the two of us". The extra building costs, the extra furniture and carpeting, the extra heating costs, the extra cooling costs all add up – and most of it is "nice" to have, but not necessary. (Disclosure: My house is 2,000 square feet.) If we built houses half the size, they would cost less and reduce the carbon footprint per person.

The Government of Canada recognized the housing efficiency issue in its December 2020 plan called *A Healthy Environment and a Healthy Economy* – which has dozens of steps organized into five pillars to reduce emissions and increase efficiency. Pillar one is about better, more efficient homes and buildings. It reads, "Together, homes and buildings account for 13 per cent of Canada's greenhouse gas emissions. Electricity use for cooling, lighting and appliances brings the total to 18 per cent."

Pillar two is about transportation and power generation. Everyone needs to get to work. Everyone needs their groceries trucked to stores. The plan is about finding efficiencies in this system. The transportation sector accounts for 25 per cent of Canada's greenhouse gas emissions.

All of these words so far have been a set up for my point: So what about agriculture?

Agriculture does not get any special mention until page 44, quite a few pages into pillar four: Building Canada's Clean Industrial Advantage. The first line under the 'Climate-smart agriculture' heading is, "Canadian farmers, ranchers and agri-food businesses are constantly innovating to improve their practices so that they are more sustainable, making greater use of inputs, developing bio-based products and increasing their energy efficiency."

A few inches later comes this now familiar action statement: "Set a national emission reduction target of 30 per cent below 2020 levels from fertilizers and work with fertilizer manufacturers, farmers, provinces and territories, to develop an approach to meet it."

A Healthy Environment and a Healthy Economy was launched just over a year ago and we've had an election in between. I checked with Environment and Climate Change Canada to see if the plan is still on the table. On November 16, a spokesperson replied, "*A Healthy Environment and a Healthy Economy* remains a key plan to support the achievement of Canada's enhanced 2030 emissions reduction target of 40-45 per cent below 2005 levels."

When I asked about the fertilizer plan, the spokesperson wrote: "The Government of Canada is striving to meet the emissions reduction target through voluntary measures, such as adopting new products, and employing beneficial management practices. Agriculture and Agri-Food Canada is committed to working with the sector and other stakeholders to find ways to improve nutrient management."

That work has begun. The point I want to make is that farmers are not being singled out for the emissions situation. The government is not putting the blame on farmers, as is clear from the comprehensive plan. Canadians are in this together. The world is in this together. We need all hands on deck...though hopefully it's a modest deck of more reasonable proportions.

Alberta Canola's 32nd Annual General Meeting – Tuesday January 25, 2022

Alberta Canola's Annual General Meeting will take place virtually on January 25, 2022. Canola growers in Alberta will be able to participate in, and vote at the AGM.

In order to ensure the integrity of the voting procedure, growers joining us online will need to register to vote. Growers attending the AGM online must tregister to vote by January 11 to ensure voting platform access at **albertacanola.com/vote**.

AGM AGENDA INCLUDES:

- a review of the activities, audited financial statements, and budget for Alberta Canola
- voting on director elections (if required)
- voting on resolutions
  - Resolutions to be presented at Alberta Canola's AGM must be received no less than 10 business days prior to the AGM (by January 11, 2022) to allow for background to be collected and resolutions to be prepared for presentation at the meeting.

REGISTERING TO VOTE ONLINE

Farmers in Alberta that have sold canola and paid a service charge on canola to Alberta Canola since August 1, 2019 are eligible canola growers and can register to vote at Alberta Canola's Annual General Meetings.

Eligible canola growers can be individuals or represent a corporation, partnership, or organization. To ensure the integrity of the voting procedure, growers will need to register to vote. This will allow Alberta Canola to verify eligible voters, and enable our third-party voting provider to provide growers with a unique access code to allow them to vote.

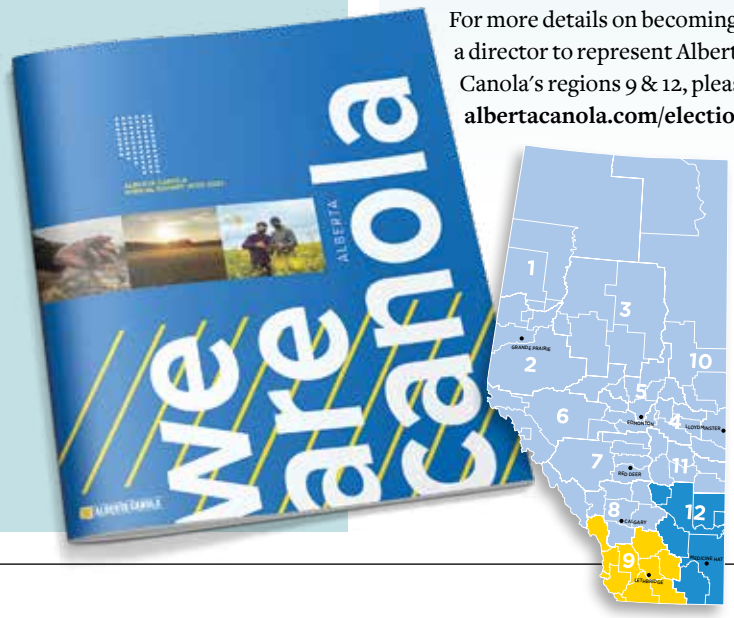
Voter registration closes January 11, 2022. For more details and to register, please visit **albertacanola.com/vote**.

ALBERTA CANOLA – WORKING FOR ALL CANOLA GROWERS IN ALBERTA

Alberta Canola focuses on four key areas:

1. Research
2. Grower Relations and Extension
3. Public Engagement and Promotion
4. Government and Industry Affairs

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



Alberta Canola Director Nomination Results

The call for nominations for farmers to serve on the Board of Directors of the Alberta Canola Producers Commission resulted in two canola farmers being acclaimed. The nomination deadline was Friday, October 29, 2021.

Charles Simoneau from Guy will serve as a director in region 3, and Wayne Schneider from Leduc will serve a second term as director for region 6.

Regions 9 and 12 failed to generate nominations. Nominations are now open for a director to represent regions 9 and 12 on Alberta Canola's Board of Directors. The three-year term begins following Alberta Canola's Annual General Meeting on January 25, 2022.

Nominations for the position of director must be:

1. Filed at the Commission Office at 14560-116 Avenue, Edmonton, Alberta, T5M 3E9 in writing on or before January 11, 2022.
2. Signed by at least 2 eligible producers from the region, and
3. Accompanied by the written consent of the eligible producer nominated as a director.

For more details on becoming a director to represent Alberta Canola's regions 9 & 12, please visit **albertacanola.com/elections**.

Getting from A to B to... Z in policy development and advocacy

BY KARLA BERGSTROM, MANAGER OF GOVERNMENT & INDUSTRY AFFAIRS

Alberta Canola works to create change on policy matters important to canola farmers. The Government and Industry Affairs Committee ensures farmer-focused input, guides and supports the organization to advance these changes, and promotes the interests of canola farmers at the local, provincial and national levels. This is no small feat for commissions with a small complement of staff; nor is it for the faint of heart considering the breadth, depth, and cyclical nature of the many issues that continuously challenge farmers and the farm groups that represent them.

Farming is one of the most noble and traditional industries dating back to the beginning of civilization and so are some of its challenges. Newer challenges of modern agriculture – stemming from global economic factors, climate change, investment, transportation, trade, technology, consumer demand, public trust and misinformation to name a few – are increasingly more complex. This is especially so these days because of social media.

Platforms like Twitter make it easy for users to ask, "What is <insert any farm organization> doing about blank?", which often elicits a firestorm of opinions and sometimes calls for refunds. It's not easy for Alberta Canola to respond about complex issues that we've been working on for days, weeks, months or years in 280 characters.

However, it is easy for your regional farmer director or staff members to respond to any questions or concerns via other means of communication as we have for over 30 years. In an attempt to make the policy development and advocacy process more transparent, the GIA section in our annual report provides insight into how Alberta Canola goes from A to B to...Z. The process to develop policy is not unlike making sausage without a recipe! The ingredient list that feeds into policy development is continually changing, and policy analysis is flavoured by a diversity of influences, uncertainty, and politics of the day. Policy wins are like achieving the coveted Blue Ribbon, but more often than not, success comes from mitigating negative outcomes from legislative or regulatory changes that could harm farming operations. This report will highlight some of the policy files that escalated in importance and urgency for Alberta Canola during the 2020-21 year based on evolving external pressures. View it at **albertacanola.com/annualreport**.

Rarely are policy files open and shut cases; policy development takes time and a lot of hurry up and wait. Commissions are in this for the long game with many calls, emails, and meetings with many people. We strategize internally with our directors in committee meetings, we reach out to other commissions, industry stakeholders and subject matter experts and then we refine and redraft key messages for backgrounders, letters, press releases, leave-behind documents, submissions and government consultations. Throughout all this, we loop back with our directors to ensure our efforts hit the mark. Only when final approvals are granted, do commissions pivot to extend communications externally to inform our farmer members and stakeholders.

Farmers represent less than 3% of the population, which correlates highly with our government representation. Unfortunately, this means fewer elected officials and public servants have ties to farms or understand the complexity of the agriculture industry. This makes it harder for commodity organizations to drive farmer priorities forward and agriculture is typically low on federal and provincial agendas. In order to progress, grower organizations have to work with the government of the day and react to align our messaging within this reality. This process is often a slow and frustrating grind that stalls or starts all over again when an election is called.

Relationships are key to many businesses. In an industry like agriculture, they are vital to amplify the collective voice of farmers. Alberta Canola collaborates with our national canola organizations, Team Alberta, and other farm organizations on broad-sector issues that impact our industry. This is because our members don't just grow canola. Collaboration allows commissions to use limited resources more effectively and leverage checkoff dollars to maximize the benefits to farmers.

Team Alberta is a great example of this. Since 2015, Alberta Canola, Alberta Pulse Growers, and the Alberta Wheat and Barley Commissions have united on shared crop sector issues under the Team Alberta brand. We are stronger and more effective in moving the needle on policy files with provincial and federal governments when we work together. Because of this collaborative success, the founding four commissions initiated an expansion and invited other crop commissions to work with us to represent more of the crop sector under Team Alberta, so stay tuned. For a detailed list of our ongoing policy files and advocacy efforts, please visit **teamalbertacrops.com**.

A full account of all of Alberta Canola's policy and advocacy work over the past year is available in our 2020-21 Annual Report. View it at **albertacanola.com/annualreport**.

Credit: Shawn Senko

Agriculture has answers to the climate change challenge

The federal government has indicated their intention to increase the carbon tax to $170 per tonne by 2030 to reduce greenhouse gas (GHG) emissions. This tax not only puts the viability of Saskatchewan farms at risk but actually taxes the solution to climate change.

TODAY'S FARM IS DIFFERENT

Modern farming practices have changed the game in terms of environmental impact. Over the last 30 years, there has been significant movement towards land management practices that have positively influenced soil quality. Most notably, these include the adoption of direct seeding, reduction in frequency of summer fallow and use of less intensive soil cultivation equipment.

THE PROOF IS IN THE RESEARCH

High soil carbon is an indicator of soil health and a measure of carbon dioxide (CO_2) removed from the atmosphere. The PSCB study found soil carbon is increasing (reducing GHG levels). Saskatchewan growers using minimum or zero till (direct seeding) are sequestering 8.75 million new tons of CO_2 every year on more than 23 million acres of farmland. This is the equivalent of taking 1.83 million cars off the road.

The research also found that soil carbon sequestration does NOT decline over time as previously thought. Instead, carbon continues to accumulate deeper into the soil year after year. This finding is significant because maintaining and increasing soil sinks that sequester large amounts of GHGs is one of the most important long-term solutions to climate change identified by the Kyoto Protocol and the Paris Agreement.

THE CONCLUSION?

The food that farmers produce is a major contributor to Canadian exports, the economy and an effective strategy for sequestering carbon and removing GHGs from the atmosphere.

In farming, profits are generally narrow with capital tied up in land, equipment and other investments. Any increase to the cost of production directly affects farmers ability to have a profitable business and provide Canadians and others around the world with food. The carbon tax is having a negative impact on farm businesses and farmers' ability to care for our environment. It significantly increases ALL costs associated with growing food including fuel costs to run equipment, energy for drying grain, costs of crop inputs – and much more.

Ultimately, the federal carbon tax will have the opposite of its intended effect and inhibit the Ag sector's ability to contribute to improving the environment by driving farms out of business. SaskCanola believes that it penalizes Saskatchewan canola producers who are part of the climate change solution – not the problem.

SaskCanola represents canola growers on issues that impact their farm businesses. Science-based data provides evidence and logic for sound policy development. Contact us at info@saskcanola.com to discuss policy-related issues you feel are important to the future of the canola industry.

SaskCanola has supported research to demonstrate the positive impact of modern agriculture on soil health and the environment. One such study is the Prairie Soil Carbon Balance Project (PSCBP), which analyzed thousands of soil samples over a 15-year period on farms across the province.

Investments in insect research

New University of Saskatchewan Insect Research Facility (USIRF) adds substantial research capacity

SaskCanola strategically invests in various areas of canola research including supporting several projects in integrated pest management, insect pests and beneficial insects. **Recently, SaskCanola invested in the new University of Saskatchewan (USask) Insect Research Facility (USIRF) along with other funding partners. The USIRF will be the first of its kind in a western Canadian university and one of only a handful of facilities in the country specifically designed to conduct research on arthropod plant pests and beneficial insects.**

"With this new facility, we will really be able to expand our research and teaching programs, and provide accessibility and flexibility for our researchers, students and industry partners," says Sean Prager, entomologist at the USask College of Agriculture and Bioresources, and head of the new facility.

The independent insect quarantine and rearing facility is also closely linked to USask's Phytotron Facility, Crop Development Centre, greenhouses and other facilities. Plants such as canola needed for insect rearing projects can be grown in the phytotron and easily transferred to the new lab. The new facility will include state-of-the-art safety equipment, specially engineered building features and specific procedures to meet biosecurity requirements to keep insects and pathogens quarantined. Some of the target pests include aster leafhoppers, swede midge, diamondback moths, beneficial insects and pathogens such as aster yellows, blackleg and others.

Prager and Tyler Wist, research scientist with Agriculture and Agri-Food Canada (AAFC), are collaborating on an aster leafhopper project to try to understand their origin and arrival. "We are trying to determine where the aster leafhoppers arrive from and to be able to predict why some years there are high levels of the aster yellows disease and not in others," adds Prager. They are researching the role of plant hosts and feeding preference in a project led by Berenice Romero, PhD student.

The design phase for the USIRF in nearing completion and construction is expected to begin in the new year. Once completed and CFIA permits are in place, Prager expects the facility to open for September 2022. Funding for the design and construction of the over $1.5 million USIRF project includes Western Grains Research Foundation, Canada Foundation for Innovation, Saskatchewan Canola Development Commission, Saskatchewan Pulse Growers and Saskatchewan Wheat Development Commission.

> The Canadian Food Inspection Agency (CFIA) Level 2 facility, located on the 6th floor of the Agriculture Building, is designed for researching insect pests and beneficial insects as well as plant pathogens. It will allow scientists to be on the lookout for potential invasive insects before they become a real problem.

SaskCanola is also funding various related projects, including:

- the effect of hairiness in brassica lines on flea beetles, diamondback moths and aster leafhoppers led by Chrystel Olivier, AAFC
- control of the pollen beetle, a new invasive canola pest, led by Christine Noronha, AAFC
- the role of natural enemies in managing diamondback moth led by Sharavari Kulkarni, University of Alberta
- canola flower midge monitoring led by Boyd Mori, University of Alberta

Hector Carcamo, AAFC, and collaborators recently completed the protocol development and threshold validation for lygus in canola for western Canada.

For more information on SaskCanola funded research, see **https://www.saskcanola.com/research/**.

RELATED RESOURCES

The Field Heroes website and resources developed by the Western Grains Research Foundation provides information about beneficial insects and their important role in pest management. A new Pests & Predators Field Guide helps identify crop pests and their management, as well as beneficial insects that help control them and should be protected. Other scouting guides, videos, podcasts and resources are available at: **https://fieldheroes.ca**.

Pest monitoring programs provide valuable information for tracking pests, supporting management decisions with tools like forecast maps and informing research priorities. Producers in Saskatchewan interested in supporting pest monitoring programs can set up their own pheromone traps during the growing season to get an idea of what's happening on their farms in exchange for reporting their numbers to the Ministry of Agriculture. Contact Carter Peru at pestsurveys@gov.sk.ca to be added to the program email list, or for more information.

The wind-blown migratory aster leafhopper (Macrosteles quadrilineatus), a major pest of canola, is one of many species of insects that will be studied in the new USRIF.

Credit: Berenice Romero, University of Saskatchewan

Manitoba canola farmers, cast your vote

The voice of farmers is an important influence in developing decisions and policies that will support progressive, profitable and forward-thinking canola production. As a farmer funded and directed association, Manitoba Canola Growers has a board of directors who are elected and empowered to make decisions that will benefit farmers and positively affect the future of canola in this province.

Every two years, the association holds an election where members elect four directors, each serving a four-year term.

This year there are five candidates vying for four director positions.

- Ballots were mailed out to all members mid-December.
- Instructions can be found on your ballot to vote digitally or by mail.
- Deadline to vote is January 15, 2022

Successful candidates will be your board representation and have the unique opportunity of representing canola farmers in Manitoba.

credit: iStock.com/loops7/biscotto87

Any questions regarding voting can be directed to the Returning Officer for the 2021 elections, Rej Vermette with Avenue 4 Communications. Email rej@avenue4.com

RUNNING ARE:

Pam Bailey
Dacotah, Manitoba

Jackie Dudgeon
Morden, Manitoba

Warren Ellis
Wawanesa, Manitoba

Charles Fossay
Starbuck, Manitoba

Fiona Jochum
Saint François Xavier, Manitoba

Manitoba Canola Growers commit $500K to U of M research facility

The Manitoba Canola Growers Association has committed $500,000 to support the construction of the Prairie Crops & Soils Research Facility at the University of Manitoba (UM). This centre will extend the capacity for crop research and strengthen the development of tomorrow's agricultural specialists and farmers.

Hybrid Annual General Meeting

The meeting will take place at the Victoria Inn Hotel and Convention Centre in Winnipeg in conjunction with the CropConnect Conference.

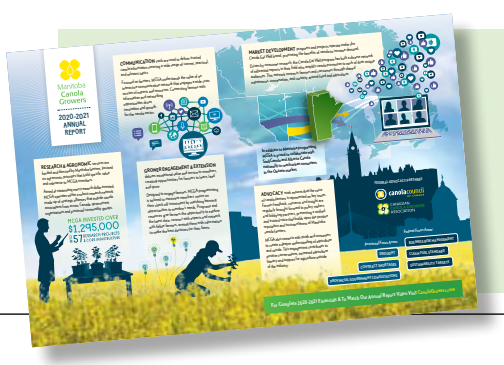
- Registration to CropConnect is not required to attend Annual General Meeting.
- The in-person event will follow current Manitoba Health Guidelines.

MARK YOUR CALENDAR
February 17, 2022
8:00 AM

Members wanting to join virtually are asked to pre-register. Confirmed members will receive log-in details allowing them engage in the meeting and vote. Non-members can also pre-register and will receive a link to watch the meeting by livestream.

Registration details can be found at **CanolaGrowers.com**

Resolution Deadline: January 24, 2022 4:00 PM CST. Please submit resolutions to delaney@canolagrowers.com



Check out our Annual Report on pages 22 & 23

Celebrate Canada Ag Day

Join us on February 22 as we celebrate Canada Ag Day. The social media hashtag is #CdnAgDay

MCGA staff and canola farmers will be out at select grocery stores to thank consumers for choosing canola oil, encourage them to celebrate Canadian agriculture by purchasing Manitoba-grown ingredients and giving them a new Manitoba Canola Growers shopping bag. (See the photo.) If you want to join us, email leanne@canolagrowers.com.

From home, you can tune in online where we will spend the day sharing how you, farmers, take pride in growing nutritious, sustainable and affordable ingredients for families. We will highlight how farmers embrace innovation that enhances the soil, a vessel for storing carbon, and how best soil management practices can reduce greenhouse gas.

Be sure to thank your community for choosing canola oil and celebrate Canada Ag Day together with us on February 22.

Power up your burnoff.

This spring, get the strongest,

Doing your spring burnoff with glyphosate alone might seem effective enough – but watch what happens when you power-up by adding Aim® EC herbicide.

When tank-mixed with glyphosate or used alone with surfactant, this fast-acting Group 14 stomps the life out of tough weeds like kochia and volunteer canola, and even controls weeds resistant to other modes of action. You can also keep your options open – Aim EC herbicide has multiple tank-mix options and can be used prior to all major crops.

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longest, hottest pre-seed weed control, with FMC.

Mark your calendars for the remaining four webinars in the agronomy series. Dates are January 13, February 24, March 24 and April 13. CCAs can receive credits for attending. We share a few tips from the December 13 webinar on targeting seed traits to maximize hybrid potential.

CANOLA WATCH WINTER WEBINAR SERIES

Canola Watch started a dozen years ago as a basic email update on agronomy issues through the growing season. The email continues to get better and the brand has expanded to include a website at **canolawatch.org**, video series, podcast, quizzes and exams, a Twitter handle and now, a webinar series.

The first ever Canola Watch winter webinar series started November 24, 2021 with a one-hour mid-day presentation on "Genetics, Environment and Management: Finding Room for Improvement". Canola Council of Canada agronomy specialist Nate Ort was one of the presenters, a lot of his talk was based on his phenology article on page 34 of this Canola Digest. The second webinar, called "Maximizing Hybrid Potential: Targeting Traits to Improve Yield and Consistency," was December 13. Both of these are posted on the Canola Council of Canada YouTube channel at youtube.com/canolacouncil and as podcasts at canolawatch.org.

The next four webinars are monthly, starting January 13. Find details and registration information for all four at canolacouncil.org/events. Topics will be on fertilizer management, pest management and more.

TARGETING TRAITS

A key message in the December 13 webinar was about choosing canola cultivars that are well-matched to the challenges for each farm – and ideally for each field. Canola Watch has this topic covered in an article "Choose the right cultivar for each field."

Here are a few strategies from the article:

Try clubroot-resistant genetics. This is a good strategy for most of the Prairies now that clubroot is fairly widespread. Fields that have used clubroot resistance at least twice may be good candidates for a new source of resistance.

Take some pressure off the sclerotinia spray decision. Hybrids with tolerance to sclerotinia stem rot will provide some peace of mind in those situations where the decision to spray is not so easy.

Address an increase in blackleg disease. A stubble test to identify the most common blackleg race in a field will allow rotation of major gene resistant germplasm using information available from many of the seed suppliers.

Provide some harvest choices. Cultivars with improved straight cut features (lodging resistance, for example) and pod-shatter tolerance are better suited to late swathing and straight combining, which could provide a little more flexibility on harvest timing and method.

Hedge bets on weather. Some hybrids may perform better or worse in certain environmental conditions. Because we can't predict growing season weather, having a few different hybrids may hedge the bet somewhat.

Rotate weed management. Herbicide rotation is always good practice, but knowing your weeds can drive more specific strategies when it comes to canola hybrid choice. For example, the Roundup Ready™ system is better for Group-1-resistant wild oats, and the Liberty Link® system is the better choice if the field has known or suspected Group-9-resistant kochia.

Expand marketing opportunities. A few fields seeded to a specialty canola variety could cover off many of the points above while also providing a different marketing angle with premiums, specified delivery dates, on-farm pick up or whatever features the contract provides.

Bottom line: If a farm grows only one canola hybrid and has an issue with performance, they may not be able to determine whether a different set of genetics might have helped in their scenario. With two or more hybrids, performance can be compared and analyzed. Through this process, farms can start to do their own "phenotyping" – which, as Nate Ort described in webinar one, is to assess genetic performance based on local growing conditions and management.

SIGN UP

Canola Watch, including the webinar series, is a service from the CCC along with Manitoba Canola Growers, SaskCanola and Alberta Canola. Please sign up for the email updates at **canolawatch.org/signup** and join us for the remaining four winter webinars.

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Farmers have many technology options that could increase yields. This article focuses on three under-utilized precision tools – tools that have been around for a few years and are not as popular as they should be.

HOW TO USE TECHNOLOGY TO MANAGE YIELD

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

BY JASON CASSELMAN AND WHITNEY DENCKLAU

Precision agriculture tools collect and fuse together field-level information to help farmers measure variability, manage operations more effectively and make on-farm decisions in real time. By measuring variability, precision tools help identify low-productivity areas so farmers can develop a plan on how to handle these areas moving forward. From weather stations to in-cab hardware, field sensors, predictive modelling and prescription maps, the precision ag toolkit is only growing. While some of these tools are staples for producers, some are not being applied to their fullest potential.

This article will detail three precision tools that currently have small uptake but can deliver big benefits to improve profitability, productivity and environmental sustainability.

TOOL ONE: SATELLITE IMAGERY TO PROVIDE EARLY INTEL ON YIELD

Satellite imagery is mainly used for direct scouting and ground-truthing efforts, ending the need to walk a "W" pattern through the field. One untapped opportunity with satellite imagery is early yield estimates.

Early-season imagery of crop growth can be a strong predictor of yield. When reviewing field health imagery of canola in late June or early July, producers and agronomists will already be able to potentially see the highest- and lowest-yielding areas within fields based on biomass shown in the imagery. After years comparing those images to yield maps at harvest time, users see how closely they match. Ongoing research into yield forecasting at the Olds College Smart Farm shows that by reviewing imagery to identify areas with higher and lower biomass and then using it as a guide to ground truth the data with in-field agronomic assessments of the crop, it shows the potential to use satellite imagery for virtual yield mapping.

If early season imagery paints a good picture of what yield maps will look like in the fall, producers can use this information to help inform grain marketing decisions.

For example, if yield potential is higher or lower than expected, producers can take early action to buy bushels – if they may be short on a contract – or consider pricing more if it looks like a year for higher yields across the board. This is how in-season satellite imagery could improve profitability.

See the two maps from the same canola crop in 2021. The first is a field health image from July 7, 2021. You'll see low vegetative areas in the bottom right and upper left corners. The second map, the yield map, shows that both of those low vegetative areas were poor yielding at harvest.

Vegetation or biomass imagery is available from several providers. Most crop input suppliers, grain

This satellite image, taken July 7, 2021, shows field health for a canola crop. Orange and red areas in the bottom right and upper left corners show low vegetative growth.

Source: Climate FieldView

For more information on precision ag, visit our new precision agriculture section in the Canola Encyclopedia at **canolaencyclopedia.ca**.

buyers and agronomists in your area are working with an imagery provider who is offering this service. It can be very accessible, with imagery uploaded to your smart phone and tablet apps on a regular basis – almost daily, depending on cloud cover. The cost for an imagery subscription can be very inexpensive, with providers offering free trials for up to a year. Farmers who are new to imagery and want to understand what the maps are telling you, ask a trusted advisor to show you what they are using and commit to looking at imagery of your own fields throughout the growing season to see what kind of insights you can learn from your crops.

TOOL TWO: WEEKLY TISSUE TESTING TO SHOW NUTRIENT SHORTAGES

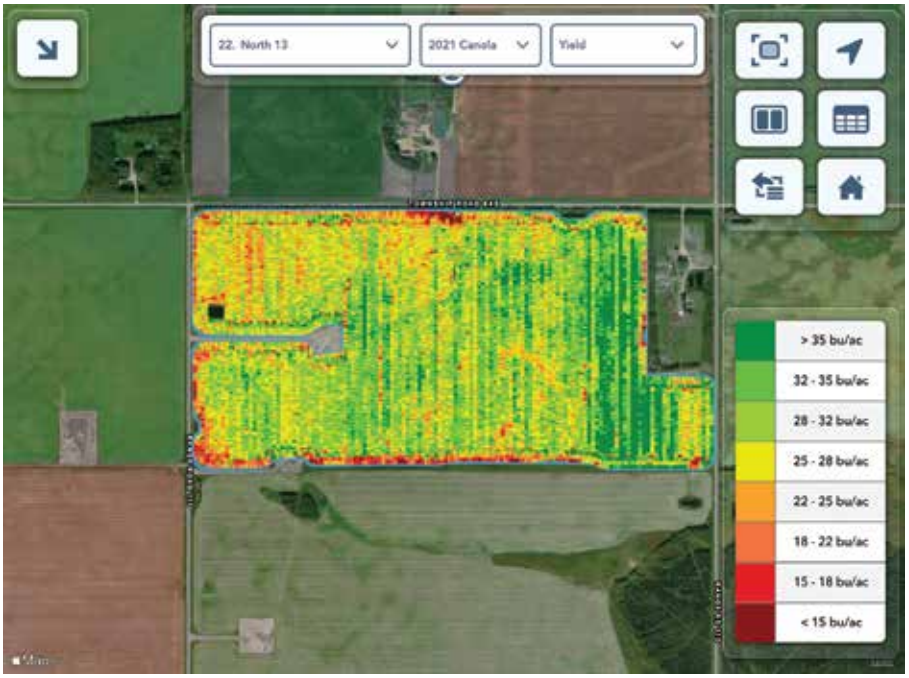
Being a student of the crop is a key part of developing strategies to improve yields. A tissue testing program can identify nutrient shortages, and point to fertilizer blends that could increase productivity in each field.

Start by collecting tissue samples regularly, weekly for example, during the growing season and sending them for testing. Results will show nutrient levels in the plants throughout the season, how they vary, and how much nutrient the crop takes up.

Evaluating the analysis of the weekly tissue samples and correlating the amounts of nutrients in the plant to accumulated growing degree days (GDDs) and crop growth stages can help establish a baseline to verify what nutrients your plants are taking up and what, if any, nutrients are possibly constraining yield.

A weekly tissue testing program starts when canola is at the two- to four-leaf stage and continues until the plant starts to senesce or dry down, so plan to take about 12 samples during the growing season. A complete plant tissue analysis is going to cost about $40, so for less than $500 you will get a complete season of information about what the levels of nutrients are in your canola plants during each growth stage. In the first year, take the samples on the same day of the week and at the same time of day to maintain consistency. You will also want to have the local accumulated GDDs for each sample time. When you take samples the following growing season, it won't be on the same day of the week but at the same GDD as the previous season. It requires a commitment to take the samples and send them to the lab every week, so work with a local agronomist who can help take the samples if you are going to be away. Start with one field the first year and add more fields after you feel comfortable with the process.

To find the Olds College research report mentioned in this article, visit **oldscollege.ca** and search "Yield Forecast, Virtual Yield Mapping and Yield Loss Assessment."



This is the yield map for the same field. Both of the low vegetative areas identified in early July were poor yielding at harvest. While yield monitors may not be 100 per cent accurate, the yield maps are helpful to show how real variability through the season can show up at harvest. With some practice, growers and agronomists can use in-season satellite images to estimate harvest yield. This can provide an early marketing advantage and help with field management planning – including variable rate fertilizer, for example – in the future. Source: Climate FieldView

Comparing these plant sample results to established sufficiency charts can show opportunities to improve crop nutrient programs and push yields. (See more on sufficiency needs in the Nutrient Management section at **canolaencyclopedia.ca**.) Harvest grain samples help pull all this information together. They show how nutrient levels provided a yield response, which will help you build your own standard numbers and plan future fertilizer applications more accurately, which is the perfect segue into our third tool.

TOOL THREE: PRECISION RATES OF FERTILIZER

Soil tests gathered from the same areas as the tissue samples will help producers and agronomists plan for the right rates of fertilizer. "Right rate" is one of the 4R nutrient stewardship practices. (Read the 4R chapter in the Nutrient Management section at **canolaencyclopedia.ca**.) The right rate means that you are using the right amount of fertilizer, based on levels shown in soil test results and canola's nutrient requirements, to achieve your yield target. Rather than fertilizing all canola fields the same, you can apply fertilizer more precisely – a practice that is not only good for the environment, but good for your bottom line.

A soil test can be seen as your fertilizer bank account. You know what you put into the account and, with yield information, you know what should have been removed. A soil test will show exactly what's remaining, without the guesswork. Fertilizer is a large investment to make based on gut instincts or what your neighbours are doing or seeing in their fields. We know that every field, and every acre, is different, so it's important to treat fields independently when planning for the right rate.

ALL ABOUT MEASUREMENT

We'll sum it up with a simple mantra that everyone has heard: "You can't manage what you don't measure." Collecting data through precision ag tools will help you measure and understand the variability between your fields, so you can better manage that variability and make informed decisions based on what the data is showing.

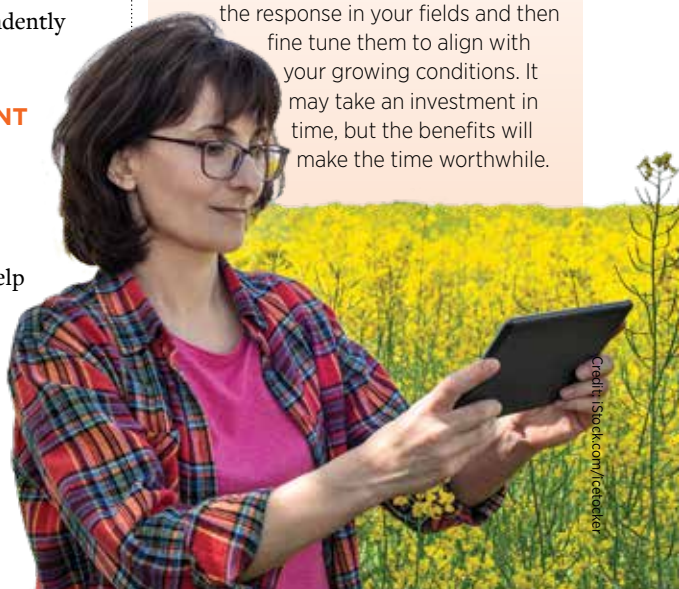
Working with precision tools can come with a bit of a learning curve. It could take a couple seasons until you really understand what the data is telling you, so you can apply it to decision making. This investment in time is an important step in adopting these tools.

Since farmers have a lot of commitments, from in-field operations, to managing contracts and other employees, to hauling grain, it can be hard to justify taking a different approach that will require more time. But spending the time reviewing farm data from an overall perspective is a great place to start – before you dive in deeper and start analyzing smaller units. Another option is to give trusted advisors, like your agronomist, for example, access to this field-level data so they can work with you to develop a strategy.

The beauty of precision ag is that it allows farmers to become their own on-farm researcher. You can take general precision ag concepts, test them to see the response in your fields and then fine tune them to align with your growing conditions. It may take an investment in time, but the benefits will make the time worthwhile. By starting to adopt these precision tools on a field basis, you'll have a better data pool for when you decide to adopt variable rate technology.

—Jason Casselman is an agronomy specialist with the Canola Council of Canada. Whitney Dencklau is a communications manager with the Canola Council of Canada.

The beauty of precision ag is that it allows farmers to become their own on-farm researcher. You can take general precision ag concepts, test them to see the response in your fields and then fine tune them to align with your growing conditions. It may take an investment in time, but the benefits will make the time worthwhile.



Credit: iStock.com/Icetocker

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With steps to improve seed survival, canola growers can stretch the seed supply to cover as many acres as possible while also achieving the target stand needed for yield potential.

Get the **most** out of EVERY SEED

credit: iStock.com/malerapaso

BY RICHARD KAMCHEN

Weather challenges in 2021 could leave canola seed in short supply for 2022, forcing farmers to up their game to get as much as possible out of what's available.

Growers who are planning to grow specific canola hybrids should make their intentions known to their canola seed retailer sooner than later to improve their chances of getting the specific canola cultivar they wish to seed on the farm, says Canola Council of Canada (CCC) agronomy specialist Jason Casselman.

MAXIMIZE SEED EMERGENCE

More than usual, growers also need to key in on how to improve seed emergence, which is typically only 50 to 60 per cent. The CCC has these recommendations:

Avoid tight canola rotations.
Fields without at least a two-year break between canola crops can result in heightened seed and seedling diseases that may prevent emergence or weaken young plants.

Seed shallow.
Seed depth of half an inch to one inch below the packer furrow reduces both emergence time and the energy that seeds expend to emerge.

Seed at a consistent depth.
Variable depths can result in highly variable emergence dates and an uneven field. Casselman says a field with plants at different growth stages can create yield and quality losses simply due to inability to time applications that align with all the plants. CCC recommends following the operator's manual to level the drill, ensure openers are in good shape, and inflate tires to the same pressure.

Seed slower.
Rear openers tend to throw more soil over the front rows at higher speeds, causing those seeds to emerge slower. Higher speeds also result in the seeding tool cutting less smoothly, including seed rows.

Walter Gross, farm manager with Greenwood Colony at Fort MacLeod, Alberta, has achieved 80-plus per cent

Walter Gross of Fort MacLeod, Alberta, found a 2.5-bushel difference from reducing speeds by just one mile per hour. "You need to find the right speed for your field for your equipment, and that will vary from one field to the other."

credit: Justine Cornelson

Canola seed placed at a consistent depth of half an inch to one inch below the packer furrow tend to have reduced emergence time, more uniform emergence, more vigour and longer protection from seed treatments.

canola seed emergence for the past few years.

In his own yield trials, Gross found a 2.5-bushel difference from reducing speeds by just one mile per hour. "You need to find the right speed for your field for your equipment, and that will vary from one field to the other," he says.

Gross also stresses making sure the fan speed is right for the product being put down. "If you're running 24 hours, you will need to increase or decrease your fan speed as ambient conditions change, to get uniform seed delivery due to changes in humidity."

Limit seed-placed fertilizer.

To reduce seedling mortality, the safest approach is to place only phosphate fertilizer with the seed at rates up to 20 pounds of phosphate per acre. Higher rates might still be safe if there's higher soil moisture, which could protect seedlings somewhat.

Gross places monoammonium phosphate in the seed row and nitrogen and sulphur in the mid-rows. "We're definitely not burning our seed with what we're putting beside it," he says. "It's just enough to get it started."

Penetrate residue.

Use openers and drill settings that penetrate residue to ensure all seeds are planted in the soil. Gross says seed placement is critical, especially for something as shallow-seeded as canola. His Bourgault seeding tools are both on 10-inch row spacing with a two-inch opener.

"While the industry says a narrow three-quarter-inch knife gives you more control over your seed because the knife will cut a nicer groove, we found that the two-inch opener in our soil conditions gives us better seedbed utilization," says Gross.

Before seeding commences, ensure residue is already spread evenly across the soil surface. "You have to manage residue the year before really well before you can get an accurate, ideal seed placement the following year," Gross says. Otherwise, he warns, there'll be emergence challenges.

"We harvest at an angle, so that when we go through residue, you're not following the residue path that the combine left, and you're not plugging those four or five shanks where the swath was," Gross says. They generally seed north and south, and harvest at about an 80-degree angle. "It's smooth and your drill is always running through the residue or the chaff swath, whatever's remaining that the combine couldn't spread. You're not following the same swath."

credit: Brenna Schilds

Steps to improve canola emergence percentage will help farmers get the most out of their seed supply.

Pack according to conditions.
Reduce packing pressure in wet conditions to limit hard crusting, but pack more in dryness to conserve moisture. " 'Set it and forget it' does not work well on our farm," says Gross. "Packing pressure needs to be evaluated and optimized frequently as field conditions can change rapidly."

Gross adds that with all the wind in his area, if the soil on top of the seed is too loose, it can dry out readily, causing many seeds to die after germination.

Seed into warmer soils.
Soil temperatures of 5°C or higher will facilitate reasonably good rates of emergence.

Casselman advises evaluating your canola plant stand at the two-to-four leaf stage. At this point, you can determine seed survival, discover possible opportunities to improve or maintain management decisions, as well as factors related to plant establishment and achieving agronomic goals.

"'Set it and forget it' does not work well on our farm, packing pressure needs to be evaluated and optimized frequently as field conditions can change rapidly."

Walter Gross

credit: Justine Cornelson

The CCC will run Canola Counts again in 2022. Growers and agronomists can access the crowd-sourced survey at canolacounts.ca. You can also find it at canolacalculator.ca, which has other tools to set seeding rates and measure emergence percentages.

He notes that Canola Counts, the crowd-sourced survey tool CCC launched in spring 2021, can be accessed again this spring through canolacalculator.ca or directly at canolacounts.ca.

"The survey tool maps canola plant densities and emergence percentages from grower and agronomist input, while helping to drive the adoption of regular plant counts as an important step in achieving target yields," Casselman says.

MAXIMIZE YIELD

CCC recommends targeting a canola plant population of five to eight plants per square foot.

This provides maximum yield potential, while providing some buffer for plant loss due to post-seeding stresses like frost, seedling disease, weather, insects, and weed competition, Casselman says.

Canola plants in low population density situations grow larger and branch more, and tend to mature later, making it more likely they'll encounter a fall frost that can prevent the development of immature seed, he says. This will cause shrivelled seeds and higher chlorophyll levels, ultimately leading to reduced grade or lost yield, Casselman explains.

University of Saskatchewan researcher Steve Shirtliffe notes seeding densities tend to matter most when conditions are dry.

"When growth conditions are dry, what you see is that the crop canopy can't compensate as quickly," Shirtliffe says. "We tend to get more of a response to seeding rates under dry conditions."

Canopies are key.

Typically, the more light that a canopy intercepts, the higher the yield.

"Anything that slows down that time to light interception, or prevents full light interception from happening, will result in a yield loss," Shirtliffe says.

He recommends row spacing no wider than 12 inches: "Any time you get wider than 12 inches, you'll start to see some small declines."

—Richard Kamchen is an agriculture writer based in Winnipeg.

Rapid canopy cover is key to intercept as much light energy as possible. "Anything that slows down that time to light interception, or prevents full light interception from happening, will result in a yield loss."

–Steve Shirtliffe

credit: iStock.com/eskymaks

Manitoba Canola Growers

2020-2021 ANNUAL REPORT

COMMUNICATION tools are used to deliver trusted canola information covering a wide range of current, practical, and relevant topics.

Focused on farmers, MCGA understands the value of an interactive communication network that engages a wide cross section of experts and resources. Connecting farmers with information and networking opportunities drives innovation and growth for the canola sector.

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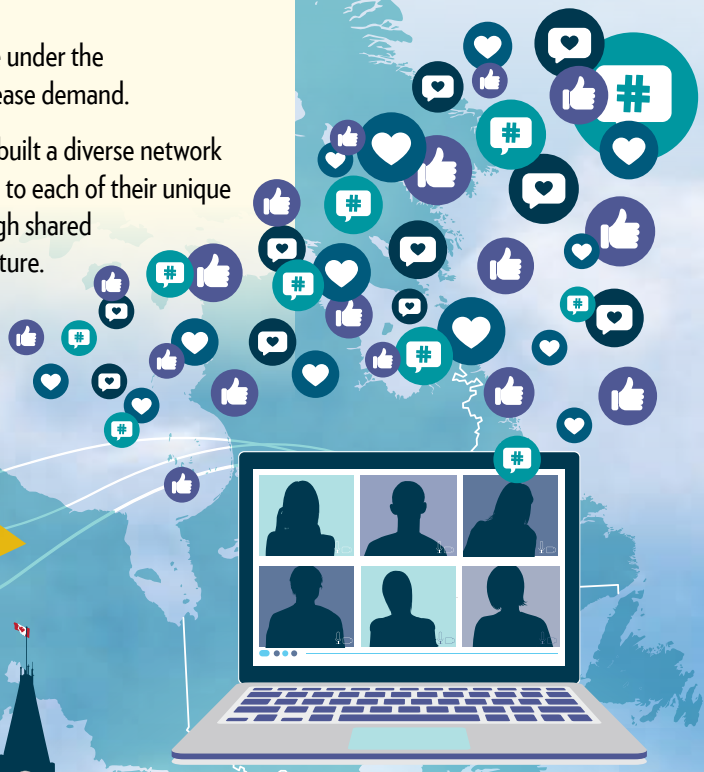
Driven by consumer research, the Canola Eat Well program has built a diverse network of influential experts in their field who amplify canola promotion to each of their unique audiences. This network connects farmers and consumers through shared experiences, conversation, and curiosity around food and agriculture.



In addition to Manitoba programing, MCGA is proud to collaborate with SaskCanola and Alberta Canola nationally to reach urban consumers in the Ontario market.

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Grower survey identifies big agronomy challenges

In the winter of 2020-21, the Canola Council of Canada surveyed 1,000 canola growers on a wide range of production questions. We discovered a few areas that may require a little extra agronomy attention. Here are three big ones.

The Canola Council of Canada grower survey of 2020 identified practices that have an impact on yield and profitability, and showed the adoption rates for our canola best management practices. Canola Council of Canada (CCC) agronomy specialists will use these results to focus on those practices that, if adopted, show the greatest capacity to improve grower profitability and productivity.

USE 4R TO GET MORE FROM FERTILIZER

When the survey asked growers, "Outside of canola market prices and trade blockages, what are the biggest barriers to canola profitability on your farm?", the most common answer was seed cost. Second was fertilizer cost.

Growers can improve the return on investment for fertilizer by following 4R nutrient management practices – the right source of fertilizer used at the right rate, at the right time and in the right place.

Yet, the survey found that only 24 per cent of growers have a 4R fertilizer management plan developed with a certified 4R agronomist. Of those who don't have a plan, 28 per cent have never heard of 4R.

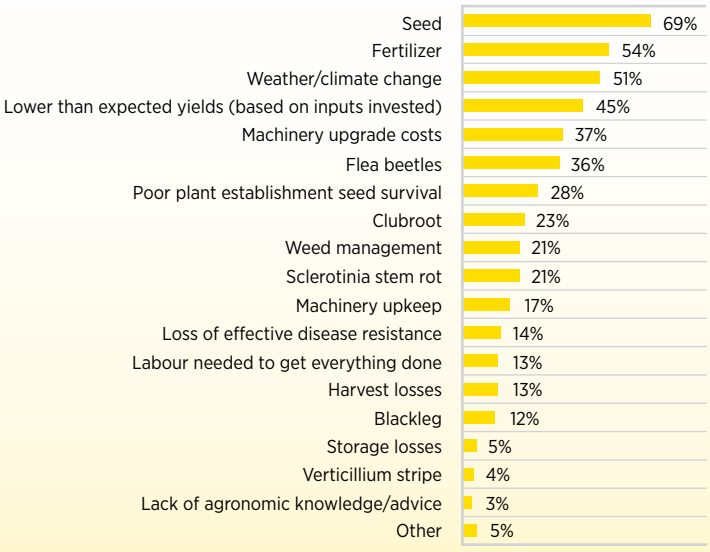
More than half (54 per cent) of growers have the same fertilizer plan for all canola fields, while 4R would like to see a fertilizer plan tailored to each field.

In central Saskatchewan (a band that arcs from Oxbow, through Warman to Lloydminster), 47 per cent of growers soil test "less often (than every fourth year)" or "never". This is by far the lowest level of soil testing – making it a region worthy of focused attention – but all regions have room to improve.

While 4R is important everywhere, the southwest Prairies (the Brown Soil Zone, basically) shows the strongest connection between 4R and yield. In this region, 40 per cent of top yielders have a 4R nutrient management plan developed with a certified 4R agronomist, while only 14 per cent of lower yielders have such a plan.

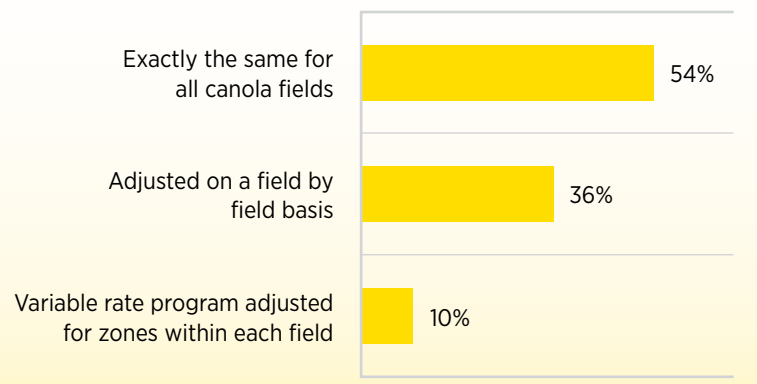
The CCC goal is to have 90 per cent of acres under 4R by 2025, so there is work to do.

BIG BARRIERS TO CANOLA PRODUCTIVITY



The question: Outside of canola market prices and trade blockages, what are the biggest barriers to higher canola productivity on your farm? Growers were allowed to choose more than one answer.

FOCUS ON FERTILITY NEEDS FOR EACH FIELD



The question: Which of the following best describes your fertilizer program for canola? The CCC agronomy team would like to see the majority move to a "field by field basis" and eventually variable rate.

FOCUS ON THE TOP YIELD ROBBERS

Yields have improved since the last major survey in 2011, but are still well below the industry stretch goal – which is to achieve 52 bu./ac. average yield by 2025. Average for growers surveyed in 2011 was 39 bu./ac. For the 2020 survey, average yield for the past five years was 43 bu./ac.

Canola's genetic potential for yield is well over double that amount. For canola to reach its maximum yield potential, the CCC would like growers to start with a target stand of five to eight plants per square foot, achieve uniform emergence, and set a fertilizer rate based on soil test analysis and recommendations. We'd also like to see growers choose the best genetic package for the situation in each field. Beyond that, a big step in improving yield comes down to managing the major "yield robbers".

Pest management begins with regular scouting. Forty-five percent of canola growers scout weekly, or more often. We'd like to see that closer to 100 per cent because pest issues can flare up so quickly.

When asked, "What pests are the greatest economic risk to your canola production?", flea beetles and sclerotinia stem rot were the top two. Rounding out the top six were herbicide-resistant weeds, clubroot, bertha armyworm and blackleg.

Growers are good at scouting (or hiring someone to scout) for flea beetles – 89 per cent say they do this. That drops to 47 per cent each for cutworms and bertha armyworm, and then lower for all other insects. Sclerotinia spray decisions are a challenge, and growers who decide to spray usually make that decision based on yield potential and moisture. Only 10 per cent of survey respondents say they use the sclerotinia check list.

Find scouting and management tips for all major canola pests in the Diseases, Weeds and Insects chapters at **canolaencyclopedia.ca**.

LET THOSE SEEDPODS FILL

Average canola yields could increase quite a bit with later cutting. The survey found that 81 per cent of canola growers swath all or some of their canola acres. Of the swathers, 10 per cent swath based on a target seed colour change of 30 per cent or lower, 26 per cent target 31-50 per cent and 15 per cent target 51-59 per cent.

This is despite pretty strong evidence that yields get better with later swathing, and that 60 per cent seed colour change – or later – is a much better target.

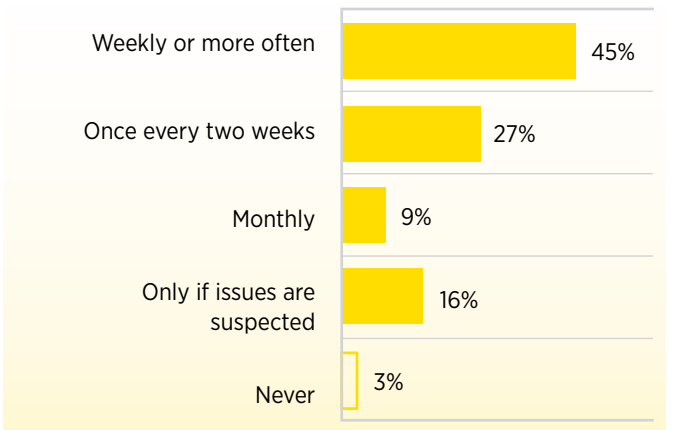
The bottom line, based on these results, is that about half of swathed canola acres are swathed too early for maximum yield.

We have a lot of research to support later swathing. CCC research trials from 2000-02 compared swathing at 20-30 per cent SCC to later timing. Results showed a yield benefit of eight per cent by waiting until 50-60 per cent SCC and 11 per cent by waiting until 60-70 per cent SCC. In a 2013 study, Indian Head Agricultural Research Foundation (IHARF) compared two swath timings – 20-30 per cent SCC and 50-60 per cent SCC. Results showed that swathing at 20-30 per cent SCC resulted in the lowest seed yield, and waiting a week increased canola yields by nearly nine per cent. For hybrids with the pod-shatter trait, recent BASF research shows that yield continues to climb when growers swath these hybrids at 80 per cent or straight combine them.

The benefits of waiting are more pronounced these days because canola populations are lower, so more yield comes from side branches. Extra time is essential to allow seeds on side branches to reach their full size and weight.

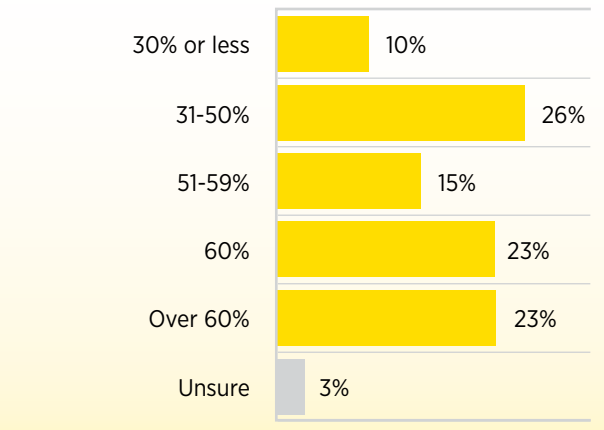
These are just a few of major agronomy challenges that surfaced when we analyzed the 2020 grower survey results. For our timely agronomy updates, please sign up for Canola Watch at canolawatch.org. Find detailed science-based agronomy tips at **canolaencyclopedia.ca**.

SCOUTING IS ESSENTIAL FOR PEST MANAGEMENT



The question: How often was your canola scouted in 2020? Weed competition, insects and disease are major yield robbers, and weekly (or more frequent) scouting is essential for effective management. We'd like to see 100 per cent of farmers do weekly scouting. Many farmers (25 per cent) hire consultants, agronomists, retails or staff to do this for them.

CUT LATER FOR HIGHER YIELD



The question: What percentage of seed colour change did you target to swath your canola in 2020? Of the farmers who swath all or some of their canola, 51 per cent of them target a swathing stage of less than 60 per cent seed colour change. More is better. The decision to cut early could reduce their yield potential. Note: 19 per cent of growers surveyed straight cut all of their canola. They are not included in these numbers.

WHAT IS THE "RIGHT PLACE" FOR FERTILIZER?

Equipment upgrades, new technologies and knowledge from decades of research have aided in the improvements and evolution of application practices. Considering current nitrogen and phosphorus-containing fertilizer application options, what are the best fertilizer placement options for canola in Western Canada?

BY TARYN DICKSON

credit: iStock.com/Alexey Rezvykh

4R nutrient management improves the return on investment for fertilizer. Application practices that use the right source at the right rate, right time and right place will improve nutrient use efficiency by reducing losses and increasing plant uptake.

4R practices improve profitability and environmental sustainability, and contribute to the canola industry goal of 90 per cent of canola acres using 4R practices by 2025. The following recommendations stem from results and conclusions of canola research conducted in Western Canada. The Canola Research Hub at canolaresearch.ca has reports for all studies referenced in this article.

NITROGEN

Placement tips for nitrogen:

- In-soil banding of nitrogen fertilizers during seeding or near to the time of seeding will enhance nitrogen use efficiency.
- Consider operational requirements, direct costs of fertilizer applications, the relative risk of nitrogen loss and return per fertilizer dollar when deciding between surface-application versus in-soil banding. Ramona Mohr's study, 'Impact of source and placement of nitrogen and sulphur fertilizers on canola', reported that banding often reduced nitrogen losses compared to surface applications, and banding showed increased nitrogen uptake at flowering.
- Deep banding in the spring or late fall is (still) the best method to increase nitrogen use efficiency, reduce losses (and greenhouse gas emissions) and, for rates below the soil test recommendations, to increase yields.
- If broadcast applications are the only option, spring timing will reduce losses compared to fall timing. Consider using a urease-inhibitor product with the spring broadcast applications. These conclusions are based on Mario Tenuta's 'Canola response and minimizing nitrogen losses in two-pass seeding-fertilization systems with varying placement methods in Manitoba' study. The study also determined that deep banding reduced nitrogen losses compared to shallow banding and surface application.
- Split applications – side-banding at seeding plus in-season – may not provide a yield advantage over side-banding at seeding, but it can allow for flexibility of adjusting rates based on conditions through the season.
- Although total seasonal nitrous oxide (N_2O) emissions were generally low, emissions were more affected by the total amount of fertilizer nitrogen applied than by the placement method. That was a conclusion from Dale Tomasiewicz's 'Evaluation of sap nitrate for in-season assessment of crop nitrogen status' research.

PHOSPHORUS

Placement tips for phosphorus:

- Phosphorus fertilizer should be side-banded when higher rates are needed. This could be done with a combination of seed-row placement (at safe rates) and side-band or spring-band placement, as it is better to apply phosphate fertilizer in the soil at a time when the crop can access it early in its growth cycle. This a conclusion from Jessica Pratchler and Stewart Brandt's 'Enhancing canola production with improved phosphorus fertilizer management' study.
- The Pratchler study also found that foliar phosphorus applications are not a good alternative to seed-placed applications – unless the field is known to be highly deficient (<10 parts per million of phosphorus in the top six inches of soil) and no other applications are made.
- Patrick Mooleki's study, 'Reducing toxicity of seed-placed phosphorus fertilizer in canola', found that damage from seed-placed phosphorus can be reduced by increasing the width of the openers (from 1″ to 4″) and/or using narrow row spacing (9″ instead of 12″), which increases seed bed utilization.

—Taryn Dickson works with the Canola Council of Canada as resource manager for Crop Production and Innovation, and coordinator of the Canola Research Hub.

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Enhanced efficiency means reduced losses. Fertilizer additives to increase efficiency are most effective in high-risk scenarios – which include high moisture soils, fall application and surface application. Low soil moisture usually means minimal risk of nitrogen loss, but an EEF might help in one scenario.

WHEN DO ENHANCED EFFICIENCY FERTILIZERS MAKE SENSE?

BY JAY WHETTER

A spring 2022 scenario: Soil moisture is short and yield projections are below average. Adding to that, soil tests show a decent amount of residual nitrogen after lower yields in 2021, and fertilizer prices are higher than average. A farmer chooses a lower fertilizer rate based on all of these factors. That is the best decision based on what the farmer knows at the time of seeding.

After seeding, the forecast shows rain and the farmer wonders about a fertilizer top-dress to take advantage of a possible increase in yield potential. The farmer knows that a nitrogen top-dress should go on before the five-leaf stage of canola and that applying before a rain is best because that rain will move the fertilizer down into the root zone. So the farmer uses a spinner to broadcast an extra 30 pounds per acre of urea.

Then the rain comes, as forecast, but it's only one tenth of an inch.

"That is the worst-case scenario," says Mario Tenuta, industrial research chair in 4R nutrient stewardship and professor at the University of Manitoba.

The rain is just enough to wet the urea but not enough to move the fertilizer into the soil. "So the nitrogen will volatilize," says Tenuta. It vaporizes and disperses into the air, and a large percentage of the investment is lost.

One way to protect this surface-applied urea is with a urease inhibitor, which prevents volatilization until a good soaking rain comes along.

THE FAMILY OF EEFS

Enhanced efficiency fertilizers (EEFs) to prevent nitrogen loss come in three main forms: urease inhibitors, nitrification inhibitors and controlled-release nitrogen.

Urease inhibitors. These prevent the conversion of urea to ammonia, reducing volatilization losses from broadcast applications of urea. This gives more time for the urea to be solubilized and absorbed into the soil. Options include Agrotain, Anvol and others. Ask your fertilizer retailer what they offer.

Nitrification inhibitors. These slow the bacteria that convert ammonium to nitrate, keeping nitrogen in ammonium form for longer. This reduces the risk of leaching, denitrification and nitrous oxide emissions. Benefits are greatest in wet soils. Nitrification inhibitors are available for urea, UAN, anhydrous ammonia and liquid manure. Common options include Centuro, N-Serve, eNtrench NXTGEN and Nitrolizer Dart as well as generics and others.

Controlled-release nitrogen. Polymer-coated urea releases nitrogen slowly into the soil under moist and warm soil conditions. Benefits increase if fertilizer is in the soil for an extended time before crop uptake, say with fall application. The widely available option is ESN.

Combinations. Nitrolizer Duo, SuperU and Tribune are dual (or double) inhibitors that contain a nitrification inhibitor and a urease inhibitor.

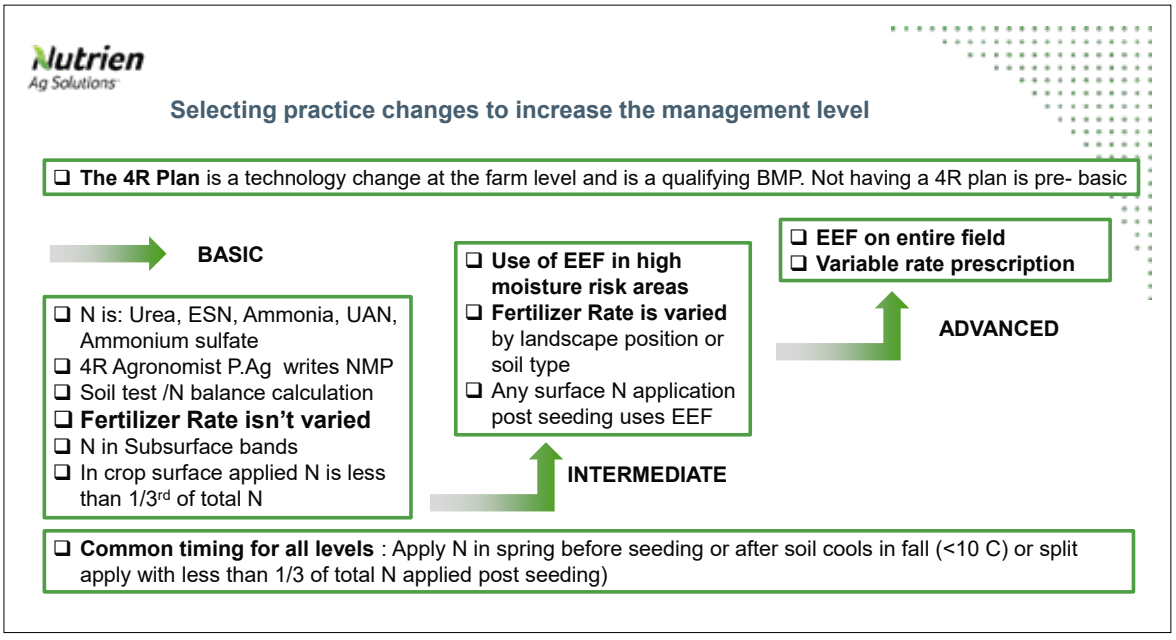
Each will have its own suggested retail price. For a ballpark estimate, budget $5 to $10 per acre for urease inhibitors or nitrification inhibitors and $10 to $15 per acre for ESN and combination products.

EEF RESEARCH

Ongoing projects will improve our understanding of how enhanced efficiency fertilizers (EEFs) can improve nitrogen use efficiency and reduce nitrous oxide emissions. University of Saskatchewan researcher Richard Farrell is working on a grower- funded study called 'Balancing agronomic and environmental outcomes using enhanced efficiency nitrogen fertilizers'. Farrell has some interesting observations on situations that cause nitrous oxide emissions to increase, and he will share those once the study is complete.

The Canola Research Hub at **canolaresearch.ca** has a blog post from October 2021 titled, "Research behind suitable fertilizer source choices". It provides a quick overview of completed projects, including one looking at yield benefits from ESN. The post also has a link to Mario Tenuta's study, "Optimal source, placement and application timing for yield and reduction of greenhouse gas footprint for canola production on light texture soils."

FROM BASIC TO ADVANCED 4R



For intermediate-level 4R management, EEFs will be used any time fertilizer is applied in areas with a high moisture risk and for any in-crop broadcast application. For advanced 4R, EEFs will be used on all fields.

Source: Nutrien

WHEN TO USE THEM

The scenario described at the top of the article is just one risk situation where an EEF could help. In most cases, risk of loss is highest when soils have excess moisture. Broadcast applications and early fall applications also increase the risk due to exposure and time.

EEFs can improve nitrogen use efficiency (more yield and reduced losses from each pound applied) and reduce nitrous oxide emissions.

Michelle Nutting, Nutrien's global lead for agricultural and environmental sustainability, says EEFs can be effective tools for intermediate and advanced 4R nutrient management. (See the 4R graphic.)

Before jumping to EEFs, Nutting would like to see farmers start with a basic 4R nutrient management plan. "Deal with right rate, right time and right placement first," Nutting says. Spring banding at the time of seeding with a rate based on soil tests is a good 4R practice for nutrient use efficiency. "Once these steps are in place, farmers can then look closely at how they may improve the source," Nutting says. "All of the sources can be 'right' from a 4R perspective, but to go another step to reduce greenhouse gas emissions, that's when we look at EEFs."

"EEFs are the right choice when part of the field has moisture pressure, such as in spring when saturated soils are thawed and microbial activity increases and nitrous oxide emissions increase," Nutting says. "Also consider EEFs in any parts of the field, like low spots or poorly-drained areas, that are prone to saturation during the growing season."

EEFs can also reduce losses when fall fertilizer is banded before soils have cooled. Warm soils have more biological activity, so the conversion of ammonium to nitrate is more likely to occur. This is a good time to use nitrification inhibitors, which slow this conversion.

Warren Ward, agronomy specialist and fertilizer management lead with the Canola Council of Canada, encourages canola growers to take a look at their systems and determine where losses are most likely. "That will help in deciding which product will give you the maximum benefit," Ward says. "If you plan to make a shortcut, think about how to minimize your losses with the use of an EEF."

While EEFs may not always pencil out from a yield perspective alone, they will show more value in reducing nitrous oxide emissions. Tenuta is just wrapping up a grower-funded study looking at optimal fertilizer practices for yield and for reduction of greenhouse gas emissions in light-textured soils, a follow up to a previous study on Red River Valley clay. Key conclusions are that fall-applied nitrogen is generally worse for yield, and EEFs only provide an economic advantage in situations with excess moisture.

However, he did find that nitrification inhibitors show a "clear reduction in nitrous oxide emissions," Tenuta says. "As greenhouse gas emissions become a bigger part of farm management, nitrification inhibitors will have more value because they really target the process that produces nitrous oxide."

—Jay Whetter is the editor of Canola Digest

Please read the "4R nutrient stewardship practices" chapter in the Nutrient Management section at **canolaencyclopedia.ca**.

All people of the world have a responsibility to reduce greenhouse gas emissions. This includes farmers. The good news is that Canadian farmers have already made a great start

CONTINUE THE MOMENTUM ON CARBON SEQUESTRATION

BY AYMIE HASLAM

All human practices, including agriculture practices, are under review around the world as leaders look for science-based solutions to reduce emissions and sequester more carbon.

Meetings like the COP26, held from October 31 to November 12, 2021, in Glasgow, Scotland, set international expectations for climate goals. COP stands for "Conference of the Parties" and this year was the 26th annual meeting. For reference, the Paris Agreement came to fruition at COP21 and brought countries together on emissions reductions goals. The agricultural sector bears some responsibility for emissions reductions while also being responsible for providing food security to a growing population.

Here in Canada, the Agri-Food Innovation Council held a conference in October 2021 with the theme, "Agri-food research and innovation in service of a net-zero carbon economy". One issue, covered by a few presenters, is the required balance between emissions reduction targets and global food supply. Ian Affleck, vice president of plant biotechnology at CropLife Canada, says the balance between food security and sustainability must be carefully monitored so that one is not being left behind in favour of the other. A key element to this will be innovation. Affleck pointed out that agriculture has the unique opportunity to feed the population as well as eat the carbon emissions from other industries. He encourages increased access to innovative science-based ideas and technologies for the wider agricultural sector.

While Canadian farmers can do better, they have already made great strides. The Saskatchewan Soil Conservation Association released a report called the Prairie Soil Carbon Project: Monitoring SOC Change Across Saskatchewan Farm from 1996 to 2018. This report states that samplings from 2011 and 2018 show that carbon sequestration continued through that time – it did not plateau.

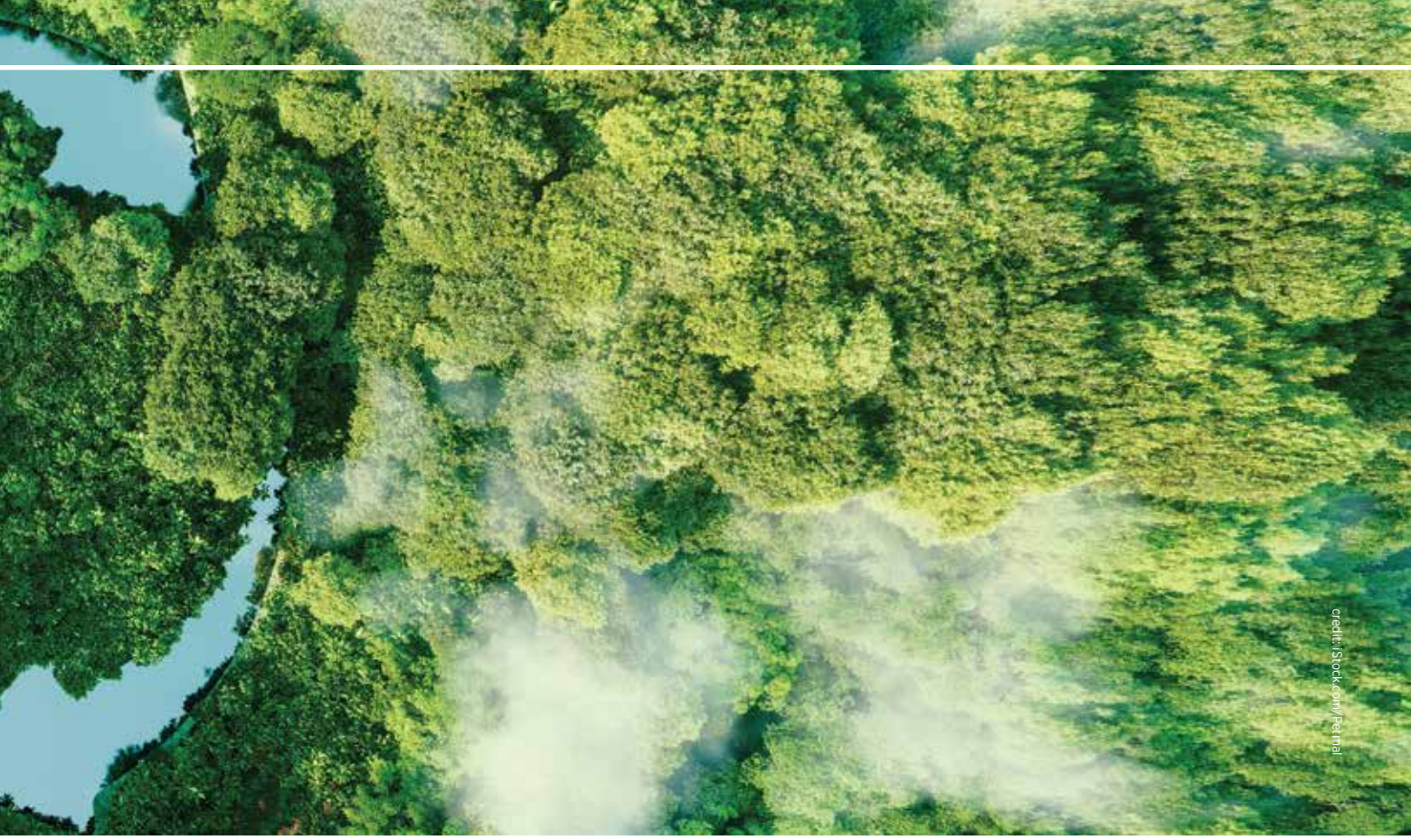
Soil organic carbon (SOC) is "increasing on direct-seeded commercial farm fields in Saskatchewan," the report says, and adds that further samplings "would be necessary to determine when carbon sequestration stops." This is an example of solid science-based information that could increase the likelihood of the adoption of soil best management practices on farm.

To read the Guelph Statement, search for that title at **https://agriculture.canada.ca**.

Biological Carbon Canada released the Assessing Greenhouse Gas Sources and Sinks in the Crop Sector: Alberta & Manitoba document in January 2020. The objective of the study was to "quantify the greenhouse gas (GHG) sources and sinks in the Alberta and Manitoba sectors from 1985 to 2016". The graph below is from the study and shows that the Alberta crop sector has reached net zero GHG emissions.

HOW TO KEEP THE MOMENTUM GOING

David Sauchyn, a climate scientist at the University of Regina, says a changing climate could bring opportunities such as crop diversification and a longer growing season, but also risks of extreme weather. Growers will want to adopt agricultural practices that will help them profit from a longer growing season


credit: iStock.com/Petrmal

and prepare as much as possible for more extreme weather. Sauchyn asserts that adaptation will have to occur in response to an amplification of extremes. It is likely that Alberta will see "wetter wet years and drier dry years". Alberta is getting much less cold, and this will result in a shift in prairie ecosystems.

The Next Agricultural Policy Framework will replace the current Canadian Agricultural Partnership (CAP) in 2023 and become the next five-year investment by the governments to "strengthen and grow Canada's agriculture and agri-food sector." On June 3, 2021, Canada's Minister of Agriculture and Agri-Food, Marie-Claude Bibeau, launched a federal consultation process for the framework. Federal, provincial and territorial governments met early in November 2021 to discuss changes. At the end of the conference, the Guelph Statement was issued and sets the tone for the framework.

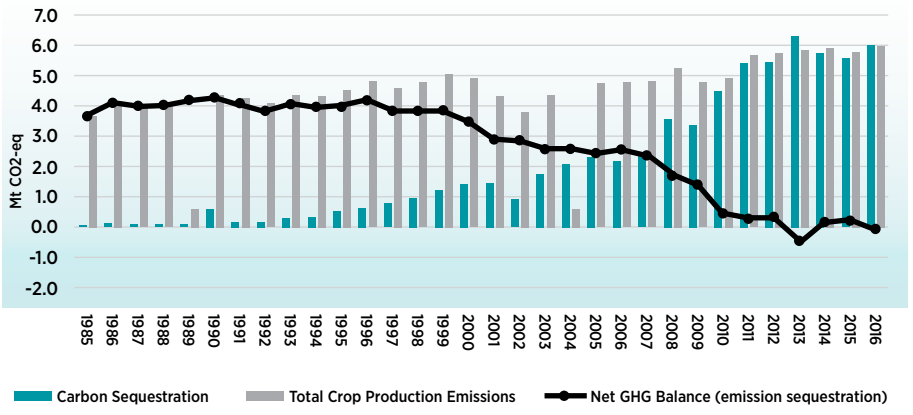
PRIORITIES IN THE GUELPH STATEMENT INCLUDE:

- Supporting GHG emission reductions while positioning producers to seize economic opportunities
- Investing in science, research and innovation
- Supporting sustainable growth by meeting challenges of the domestic and global marketplace
- Building sector capacity and growth
- Enhancing resiliency, including business risk management programs

Concerns for food security are warranted. Changes in climate do affect the agricultural sector. Farmers are responsible for feeding everyone! Agriculture is one of the few industries that can sequester carbon to the point of creating offset credits for emitter industries. Support for the adoption of best practices and business risk management is needed if Canadians want continued access to affordable and healthy food choices.

—Aymie Haslam is a policy analyst with Alberta Canola.

FIGURE 1. ALBERTA NET GHG BALANCE FOR THE CROP SECTOR (1985-2016)



This graph is from Biological Carbon Canada's study called Assessing Greenhouse Gas Sources and Sinks in the Crop Sector: Alberta & Manitoba, which quantified greenhouse gas (GHG) sources and sinks from 1985 to 2016. It shows Alberta at net zero.

In 2021, CCC agronomy specialists tracked the same canola cultivar grown at various locations across the Prairies to measure environment-driven differences in crop phenology. Results showed a few notable trends.

HOW ENVIRONMENT INFLUENCES CANOLA GROWTH STAGE TIMING

BY NATE ORT

Phenology is the study of growth stage timing as influenced by the genetics of a plant species or cultivar, the environmental conditions in which the crop is growing in, and the agronomic management of the crop (GxExM). Phenology is complex because countless factors and interactions can influence the timing of growth stages.

A genetic influence of phenology is hybrid maturity: some canola hybrids reach physiological maturity in a shorter amount of time than others when planted on the same day at the same location. Management practices such as planting date and pest control can also affect crop phenology. The most influential factor of phenology is the environment the crop is growing in: air and soil temperature, precipitation or available soil moisture, soil fertility, and photoperiod, and their interactions with each other, to name a few. Additionally, how and to what magnitude the crop responds to the environment depends on its current growth stage. For example, the optimal temperature for plant growth prior to flowering is typically greater than once flowering has started for many crop species, which is certainly the case for canola.

In 2021, Canola Council of Canada agronomy specialists recorded growth stages for the same hybrid in commercial fields in Manitoba, Saskatchewan, and Alberta. Trends between the environmental conditions in critical growth stages were evaluated with phenology, management practices and crop yield. The duration this hybrid spent in critical growth stages among locations was different (Figure 1), which was largely because of the unique environmental conditions of each growing environment. Some fields emerged sooner after planting than others. These fields had the warmest temperatures leading up to their planting date and were planted after May 15. So, in this case, seeding in warmer conditions after the middle of May resulted in faster emergence.

We also observed that fields with a shorter vegetative period prior to flowering and a longer duration of flowering had greater yield than those with the opposite, a longer vegetative period prior to flowering and a shorter duration of flowering. Once weather records were evaluated with phenology, it was found that when a greater proportion of the flowering days were less than 30°C, the flowering duration was longer. So, a cooler flowering period led to a longer flowering duration, and both resulted in greater yield. Heat stress 101.

Another notable trend was the relationship between the total reproductive development duration (from bolting to 60 per cent seed colour change) and yield: more time spent in this critical stage resulted in greater yield (Figure 2). Do some canola hybrids spend more time in reproductive development than others? Are there any management practices that can influence this duration? A hybrid maturity rating is likely related to this duration, but I encourage you to dive in deeper than this. Canola phenology will be unique to your farm!

This article has more questions than answers. This is because there is no single best GxExM combination that will work for all farms in Western Canada due to their unique management practices and environments. Optimizing crop production requires diligent record keeping and evaluation. To provide more context to yield comparisons, record crop phenology over time and look for trends – like planting date and early season vigour, duration of flowering, and hybrid selection – and how they relate to yield.

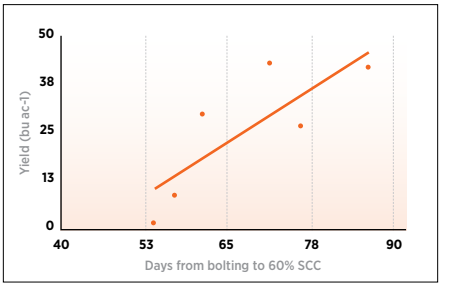


Figure 2. *Relationship between the number of days in reproductive development (bolting to 60% seed colour change (SCC)) and yield (bu./ac.).*

Start with recording planting date, then emergence, and so on and so forth. Record as many (or few) stages as you want. This is also a valuable exercise for side-by-side on-farm field scale trials. When phenology is recorded among hybrids or over space or over time, trends between agronomic management and hybrid performance may be revealed. From this, the next steps for optimizing the GxExM on your farm can be determined.

—Nate Ort is an agronomy specialist with the Canola Council of Canada.

Are you keen to track phenology on your farm? Start here: **canolacouncil.org/research/**

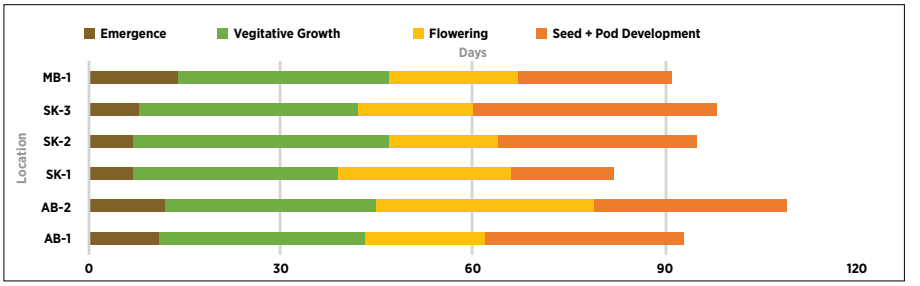


Figure 1. *The number of days spent in critical growth stages for a canola hybrid in six different growing environments across Western Canada.*

The tool provides a quick read on dozens of plant characteristics, making it handy for research. University of Alberta plant scientist Linda Gorim is using MultispeQ in a project to identify canola lines with the greatest photosynthetic capacity.

MULTISPEQ SPOTS CANOLA WITH PHOTOSYNTHETIC POWER

BY RICHARD KAMCHEN

Crop measuring technology out of Michigan State University (MSU) presents an opportunity to improve canola cultivars for Canada.

"We wanted people to think about making their measurements in a different way," says David Kramer, a MSU photosynthesis and bioenergetics researcher. To really understand how plants work, numerous measurements need to be taken and under different conditions, he says. But expensive and time-consuming instruments tend to make that prohibitive.

MultispeQ, an instrument born in Kramer's lab, changes that. The handheld device, which comes for US$99, is clipped to a plant and, in 20 seconds or less, transmits data to your cell phone. The tool measures up to 28 different parameters, many of which have to do with photosynthesis.

Through apps on mobile (Android) or desktop (PC or Mac), MultispeQ connects to the open data platform PhotosynQ where data can be saved, managed, analyzed and shared. Users can also access data stored on PhotosynQ from over 6,600 users in 28 countries working on almost 10,000 different projects, Kramer says.

This data gathering has numerous applications, including predicting yield, when disease or nutrient limitations will be present, and breeding new varieties of crops that are more resilient to environmental changes and fluctuations, he says.

With PhotosynQ being open source, the platform is both a social impact venture and a commercial product, Kramer says. "We want it to bring the kind of scientific tools that more groups of people need to improve crops around the world, or make them more accessible." Thanks to feedback from global users, new developments are on the way. One is to measure water use efficiency in plants, which includes tiny sensors that can be hooked onto plants for days or the entire growing season.

SELECTING FOR CANOLA WITH GREATER PHOTOSYNTHESIS

University of Alberta plant scientist Linda Gorim is using the technology in a project that aims to boost canola yields by identifying lines with the greatest photosynthetic capacity.

She chose the MultispeQ due to its comparatively low cost, as well as its size and ease of use. Previous challenges in measuring photosynthesis out in the field are overcome by MultispeQ's short recording window.

"Now, it's click and go. And we can cover more area in the same day more easily," Gorim says.

From her office, she can watch while field measurements her students take come across her screen.

Gorim first used a previous version of the MultispeQ at the University of Saskatchewan in order to measure photosynthetic differences in lentil genotypes grown under drought stress. She has since used the device to disprove a commercial product's claim that it could increase photosynthesis.

Richard Kamchen is an agriculture writer based in Winnipeg.

The easy-to-use MultispeQ measures up to 28 different parameters, many of which have to do with photosynthesis. University of Alberta plant scientist Linda Gorim uses the tool in a project that aims to boost canola yields by identifying lines with the greatest photosynthetic capacity.

Credit: Linda Y Gorim

Excited or nervous?

Canola Digest asks its six farmer panelists: What trends in agriculture and food get you excited and what trends make you a little nervous?

BY JAY WHETTER

LYNDON NAKAMURA
TABER, ALBERTA

Lyndon Nakamura sees a strong emphasis on protecting the environment. "Producers are already good stewards of the climate and the land, and regenerative agriculture methods have been around for a long time already," he says, "but consumers and government mandates will continue to push us to net more with less."

One way farmers can do more with less, Nakamura says, is with telemetry tools that monitor different weather patterns, disease pressures and crop health. For example, temperature, soil moisture and humidity data from in-field weather stations and soil probes can be plugged into models to determine if and when to spray to protect canola from sclerotinia stem rot. These tools can also help Nakamura Farms make better decisions on when to irrigate and how much water the crop really needs, which will save water and improve water use efficiency.

Nakamura identifies one other other positive trend, which is more direct farm marketing to local consumers through on-farm stores, in-house butcher shops and value-added businesses.

A trend that has him nervous is the labour shortage in agriculture. "I think it will become much harder to find skilled drivers and operators moving forward," he says. "I am also a little nervous that there will be fewer students enrolling into agriculture-based programs that train our scientists, agronomists and veterinarians."

Overall, Nakamura has a positive outlook. "Agriculture is an exciting sector to be a part of and I look forward to what the future brings to the industry."

"Producers are already good stewards of the climate and the land, and regenerative agriculture methods have been around for a long time already, but consumers and government mandates will continue to push us to net more with less."

–Lyndon Nakamura

Leonard Waldner is nervous about the current price and supply situation for fertilizer, seed and feed grains. "These grain prices are a good thing – as long as you don't have to buy feed."

LEONARD WALDNER
LAUDER, MANITOBA

Leonard Waldner is nervous about the current price and supply situation for fertilizer, seed and feed grains. Waldner is the farm manager at Maple Grove Colony, which has just under 4,000 acres of crop land, an isowean hog operation with 1,100 sows and 8,000 laying hens. They grow corn, wheat and soybeans for feed (although drought and heat reduced their 2021 yields), so they have some in-house supply but the "cost" to the business of using that supply represents the price they could get if they sold it. They also buy barley for hog feed because "barley burns off in their hot sandy soil," he says. As of November, prices are $9 per bushel for feed barley, $9 for corn and $11-$12 for feed wheat. "These grain prices are a good thing – as long as you don't have to buy feed," he says.

In planning for 2022 crop, Waldner says fertilizer quotes as of November are four times what he paid last year. "An option," he says, "is to reduce yield targets and make use of whatever is in the ground." After lower yields due to drought, soil reserves should be higher than usual. The farm produces manure from the poultry and hog operations, but not enough to supply all acres. "We get maybe enough for one section of land per year," Waldner says. About one-third of acres each year are in soybeans, which do not get any nitrogen fertilizer. All in all, the farm has some options but input costs are a concern for Waldner.

One bit of good news is that he ordered canola seed early, so he thinks he should be able to get the supply he needs.

ROLAND CROWE
PIAPOT FIRST NATION, SASKATCHEWAN

Roland Crowe is excited about the new canola processing facilities at Regina and what that will mean for canola growers. "Farmers will have more marketing options and less cost in transportation," he says.

One troubling trend for Crowe is the continuing drop in rural farm populations. He'd like to see farms get better instead of bigger, which could slow the population trend and help the environment at the same time. "By farming better, we can make more money from the same land and become more environmentally committed," he says.

> "By farming better, we can make more money from the same land and become more environmentally committed."
> –Roland Crowe

"I'm trying to farm better myself," says Crowe, who is 79. This includes steps to make crops more competitive, like shallow seeding so the crop comes up ahead of the weeds.

Crowe also wants to look into programs that make it easier for him and other Indigenous farmers to access input capital. Reserve land cannot be used as collateral, which makes it more difficult for Indigenous farmers to access operating funds. "If inputs are $200 or more per acre and an Indigenous farmer has 300 acres, who has that kind of cash needed to buy seed, fertilizer and other inputs needed to grow crops?" he says. Yet, the opportunity is there to make a return. "At current durum prices, we could make $500 or $600 per acre if we do things right."

CAPITAL FOR INDIGENOUS FARMERS

Indigenous farmers could get loans through Aboriginal Financial Institutions listed on the National Aboriginal Capital Corporations Association website at **https://nacca.ca/aboriginal-financial-institutions/**. Some have more experience in agriculture than others.

BRETT JANS
NEW NORWAY, ALBERTA

Brett Jans is excited about the new interest in ways to improve soil health with diverse rotations and soil amendments. "As the price of inputs, equipment, and land rent and value skyrockets, this is the initiative to improve the soil that we own," he says. This also brings the "very exciting new sector" of beneficial biological products like humic acid, fulvic acid and improved nitrogen-fixing bacteria. "The only downside," he says, "is that these products are in a buyer-beware market with no regulation on how effective they are or at what rate is required to get the results you're looking for."

Jans would also like to see field-scale multi-year data on the use of lime and gypsum to improve soil pH in acidic soils and to mitigate high magnesium and high sodium soils with gypsum.

As for things that make him nervous, Jans is concerned over the new trend in regenerative agriculture. "I will honestly say I know nothing about regenerative agriculture," Jans says. He thinks that commitments by major food companies to contract grain from "regenerative" acres might be premature. "Is regenerative agriculture scientifically proven to be a sustainable practice that will improve carbon sequestration while also being efficient and economically viable for farmers?" Jans says. "Regenerative agriculture may be fantastic or perhaps we are already practicing it on our farm with a four-year rotation, designated wetlands and avoiding tillage when possible." But he has not seen a checklist that designates farm practices as regenerative or not.

"As a farmer, I recognize a need to change and improve," he says. "I just want to make sure I'm doing things that make a real difference."

"As the price of inputs, equipment and land rent and value skyrockets, the initiative to improve the soil that you own is increasing."

–Brett Jans

"We need to stop using a flat rate of fertilizer for the whole farm, for economic and environmental benefits, but if we want to increase production, we can't have a flat reduction in fertilizer. Instead, we need to increase efficiencies and decreases losses."

–Codie Nagy

"In the past 10 years, people have become more concerned about their food and where it comes from. This is exciting for me."

–Nicolea Dow

NICOLEA DOW
PORTAGE LA PRAIRIE, MANITOBA

For Nicolea Dow, climate change policy is her answer to both questions. She's eager to see how Canada's agriculture system can adapt to the global need for action, but she's also a bit nervous about how farmers will join in the process.

"When I was at university doing my agriculture degree 10 years ago, we wished urban people cared more about agriculture," Dow says. That isn't an issue now. "In the past 10 years, people have become more concerned about their food and where it comes from. This is exciting for me."

Dow finds it exciting because she has a long-term outlook and thinks her on-farm practices will align with concerned consumers. Even though farmers may not "speak the same language" as policy makers and consumers, they care about the same things, Dow says.

"As a generational farmer, I have to take care of the land. I am willing to plant unproductive acres into forages and to plant more trees and take steps to improve soil health and maximize fertilizer efficiency," she says. "It is ingrained in farmers that we do these things to take care of the land, and these actions present a real opportunity for agriculture."

What makes her nervous is that farmers are not seen as experts when it comes to these land stewardship measures. "Farmers want to change. We want to adapt. That is why we invest in research," she says. "Policy makers need to know that farmers already do an excellent job at being sustainable and that farmers are always ready to improve – but we need the research that demonstrates the best ways to adapt and change. I worry that policy is running ahead of proven practice."

CODIE NAGY
OGEMA, SASKATCHEWAN

Codie Nagy likes that Canadian agriculture is having a conversation about nutrient use efficiency, especially for nitrogen. "We need to get more efficient and we need to drive innovation," he says. "Farmers are already doing a good job, but we need a nudge to do better."

When asked what he would do better, Nagy says he'd like to see rates that are more in-tune with what each field and each crop needs. That could include analyzing grain to see how much nutrient was removed at harvest, and apply fertilizer at rates that match removal for each field. He'd also like to use variable rate technology to use rates that align with yield potential of zones within fields. "In general, farmers definitely need to stop using a flat rate of fertilizer for the whole farm," he says.

Biologicals like Utrisha N from Corteva and Envita from Azotic are "intriguing," he says. "Those are the kinds of innovations that get me excited." He also sees a lot of potential in wide-scale adoption of 4R to improve nutrient use efficiency. He'd rather see farmers come forward with a 4R-based plan that will satisfy the need to reduce nitrogen losses to the air and water, rather than have government policy dictate what farmers need to do.

What makes him nervous is a policy that would call for a flat reduction in nitrogen fertilizer supply. "We need to stop using a flat rate of fertilizer for the whole farm, for economic and environmental benefits, but if we want to increase production, we can't have a flat reduction in fertilizer," he says. "Instead, we need to increase efficiencies and decreases losses."

—Jay Whetter is the editor of Canola Digest.

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Making a difference, is Premier Tech. Our scientists, engineers, sales and marketing specialists are always testing and working on new biologicals. In 2019, one of them, *Serendipita indica*, "showed great potential to bring added value for growers to important crops such as Canola, and our teams worked to ensure its viability and performance up to the day that seed goes into the ground" says Dr. Trepanier, scientific expert director at Premier Tech Growers and Consumers. This inoculant collaborates with Canola to IGNITE transcription of plant genes related to nutrient absorption and stress tolerance.

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(total of 12 replicated trial sites)

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Farmers are not alone in the quest for sustainability. All businesses are looking for ways to keep going in the face of change. This article talks to PepsiCo's Steven James, cookbook author Claire Tansey and Canadian Centre for Food Integrity CEO John Jamieson to see what sustainability means to them, and how this relates to canola growers.

WHAT DOES SUSTAINABILITY MEAN TO OTHERS?

BY JAY WHETTER

STEVEN JAMES SENIOR DIRECTOR OF GLOBAL OILS, PEPSICO

While Steven James has spent time in Toronto, New York and most recently Dallas, he grew up in Lacombe, Alberta. He spent a decade in southern Alberta's Taber and Lethbridge area working for PepsiCo making products like Lays, Doritos and Cheetos. He says growing up amid this western canola range fostered a connection with growers, processors and seed companies.

After leaving Alberta, one of his first assignments in Toronto was to transition PepsiCo Foods Canada to high oleic canola oil. "In doing so, we seized an opportunity to create a locally sourced oil solution while delivering low saturated fat levels and great taste across our biggest brands," he says. From that point on, canola has been a big part of the company's food system. "PepsiCo has a significant canola footprint in Canada. In addition to what we source for our five domestic production sites, we export canola oil to our U.S. and Mexico operations," he says. "If PepsiCo was a country, we would rank as Canada's third largest market for canola oil, so we are keenly engaged in looking for ways to ensure partners in this supply chain know where we see consumer trends in the years ahead." (The top two markets are the U.S. and China.)

In 2008, when PepsiCo was transitioning to high oleic canola, the company worked with seed partners, growers and processors on what was required to deliver new low saturated fat solutions to consumers. "We are now increasing our engagement to communicate an emerging consumer expectation for transparency and confidence in responsible supply chains that are good for the environment and the farmers at their source," James says. As part of the company's PepsiCo Positive ambition, PepsiCo will be partnering with growers to deliver five regenerative agriculture outcomes: building soil health and fertility, sequestering carbon and reducing emissions, enhancing watershed health, increasing biodiversity and improving farmer livelihoods.

Over several decades, Canadian canola growers have made strides when it comes to environmental stewardship, which is reflected in the Canola Council of Canada's sustainability plan. James outlines three areas where PepsiCo aspires to engage with growers, processors, ag tech companies and other canola users in the months ahead. The first is to share how PepsiCo's entire supply network, from raw materials to customer's shelves, is in the spotlight with consumers and stakeholders. "Consumers are increasingly demanding transparency and products they feel confident are responsibly sourced and produced," James says. Second, PepsiCo aspires to build creative solutions to document good regenerative ag outcomes that exist now, and accurately capture improvements as they are taking place. "We see existing technology playing a role here to simplify data collection," James says. Third, the company strives to build harmonized approaches across Canadian agriculture and avoid each customer asking for different sustainability solutions by crop from growers and processors.

"We acknowledge that there is hard work ahead. At the same time, we have a ripe opportunity to share with consumers and export markets the safe, secure and sustainable legacy of Canadian agriculture," James says. "We look forward to this journey together!"

"If PepsiCo was a country, we would rank as Canada's third largest market for canola oil, so we are keenly engaged in looking for ways to ensure partners in this supply chain know where we see consumer trends in the years ahead."

–Steven James

CLAIRE TANSEY COOKBOOK AUTHOR AND CULINARY INSTRUCTOR

Claire Tansey writes cookbooks, including Dinner, Uncomplicated, and teaches cooking and nutrition classes – mostly online. When asked what sustainability means for her, Tansey says it means changes that we can maintain forever. "For example, if I teach a teenager to cook, I want to give them both

"If every 15-year-old could learn to cook five simple recipes, the world would be a different place, a better place."

–Claire Tansey

the hard skills and soft skills to be able to keep cooking, keep finding it interesting and nourishing, for as long as they live. If they make spaghetti and meatballs once or twice and then never again, then that time was a waste," she says. "In terms of farming, maybe the same strategy applies. I would hope that sustainable farming practices don't just aim to have healthier soil, air, water and plants for the next 10 years, but forever, with incremental improvements every year.

Teaching gives her many opportunities to interact directly with home cooks in Canada and the United States. "My audiences are primarily working families who want to make dinner time a little easier, to save money, to eat better and to have quality family time," Tansey says.

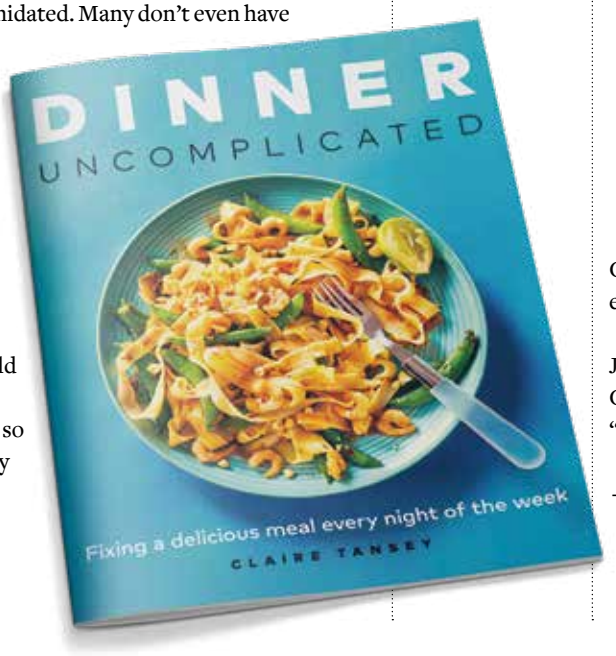
Tansey tells people all the time to use canola oil because it fits with her "uncomplicated" philosophy of making food preparation as easy as possible. "Canola oil is accessible, healthy, neutral tasting and Canadian," she says.

Yet it generates a lot of feedback and questions. "American viewers don't know canola at all, for the most part, and Canadians often think there's something up with canola oil," Tansey says. She's not really sure where this comes from. Maybe they read something online once a long time ago. "Bad things you remember, good things you don't," she says.

Tansey has been to so many Canola Eat Well events, and has heard how staff such as Jenn Dyck with Manitoba Canola Growers and Lynn Weaver with SaskCanola reply to common questions about genetic modification and pesticide use. At the core of many misunderstandings is the disconnect with how food is grown. "People generally have huge respect for farmers, but they don't always connect food with farmers," Tansey says. "They don't realize that canola oil comes from a natural plant."

Tansey has a personal appreciation for how this happens. "I have made these connections, but I have a son who has never been to a farm," she says.

Tansey's sustainability message comes back to cooking – and teaching people how to cook. "I don't understand why people don't know how to cook. It's not that hard. But people are intimidated. Many don't even have pots and pans and knives, they don't know how to shop for groceries," Tansey says. "If every 15-year-old could learn to cook five simple recipes, the world would be a different place, a better place. It would provide so many benefits to life – yet so many people just say "no" to that."



"Sustainability is integrity, and integrity is sustainability. They are one in the same, in my mind."

–John Jamieson

The Canadian Centre for Food Integrity posts research reports and other useful consumer trend information on its website at **foodintegrity.ca**.

Find out more about Claire Tansey and her online classes at **clairetansey.com**.

JOHN JAMIESON, PRESIDENT AND CEO, CANADIAN CENTRE FOR FOOD INTEGRITY

"Sustainability is integrity, and integrity is sustainability. They are one in the same, in my mind," says John Jamieson. "Integrity is doing the right things in as many ways as possible. When the agriculture sector talks about its goals to become more sustainable, this demonstrates to Canadians that we have integrity."

Jamieson says it's OK for agriculture to acknowledge areas where it can improve. "The public doesn't expect perfection, but they do expect progress," he says.

Jamieson came to the Canadian Centre for Food Integrity (CCFI) with a lot of experience in public perception and on-farm practices. He was the Deputy Minister of Agriculture and Fisheries and the Deputy Minister of Rural and Regional Development in Prince Edward Island. He served as executive director of the Prince Edward Island Federation of Agriculture, and is a professional agrologist and certified nutrient management planner.

CCFI does annual surveys of Canadians to see what they think about the food system. The 2020 consumer survey got feedback on sustainability specifically.

"Sustainability can have many meanings for people," Jamieson says. People surveyed gave 10 definitions of sustainability. Forty five per cent of people defined it under environmental terms. Some said sustainable agriculture was about supporting local farmers. Some said it was about small farms. Others said it was how farms treat their workers. For Jamieson, sustainability also has to mean financial health. "A farm can't take the other steps if it's not economically sustainable."

The 2021 CCFI consumer survey asked: If you could design the perfect food system, what would it look like? Results pointed to three "big picture" factors:

1. The perfect food system would be transparent in how food is produced. "Transparency is a big part of integrity," Jamieson says.
2. It would be equitable, in that all Canadians would have access to quality food.
3. And it would have a strong focus on health and nutrition.

The CCFI's role is to use these survey insights to talk about Canada's food system and its importance to the Canadian economy, to speak to the public as a trusted third party.

Canadians need to know that they're in good hands, Jamieson says. He says a central message that resonates with Canadians when it comes to their food system is: "It's good, Canada, we've got this."

—Jay Whetter is the editor of Canola Digest

USING FORESIGHT AS A TOOL FOR FARM SUCCESS

The global pandemic has revealed that agriculture is an essential industry, and farmers are resilient. While we celebrate these successes, it's also important to reflect on what we could have done differently to manage risk and maximize opportunity. Moving forward, farms that use foresight and put business practices in place to reduce uncertainty will be better positioned for continued success.

FROM FARM MANAGEMENT CANADA

The COVID-19 pandemic has made the practice of foresight more relevant than ever. In short, foresight uses a wide array of tools to identify emerging trends and future scenarios, in turn allowing businesses as well as policymakers to make better decisions and improve resiliency.

As the OECD puts it, the objective of foresight is not to "get the future right". Rather, foresight allows us to explore the range of plausible outcomes that should be taken into consideration when planning for the future.

THREE SCENARIOS

The federal government has an entire team dedicated to foresight, called Policy Horizons Canada (PHC). In the summer of 2020, PHC conducted a foresight exercise on the potential shifts and implications of COVID-19. Through their analysis, PHC identified three very different scenarios that could arise by 2023:

Scenario 1: A world in which public health has recovered, but the economy has not
Scenario 2: A world in which an emergency state is the new normal
Scenario 3: A world in which social connection provides resilience through the crisis

Note: These scenarios are designed to stimulate thinking of what is possible, not to predict the future. They should not be considered as the Government of Canada's official COVID-19 scenarios.

WHAT DOES IT MEAN FOR FARMERS?

Sound business practices are the foundation for success for any farm. Having a plan in place provides comfort when facing internal and external disruptions, stress runs high and decision-making becomes clouded.

- Take time to develop or review your farm's strategic plan to manage risk and seize opportunity.
- Consider revisiting your vision, mission and values, and involve family and employees in the discussion. You are more 42 per cent more likely to achieve goals that are written down and shared with others.
- Conduct a SWOT analysis to review the strengths, weaknesses, opportunities and threats related to your business.

Foresight can provide farmers with an additional tool to broaden their perspective on what the future might hold and take steps today to reduce the associated risks. Through opening the range of possible scenarios that may unfold, farmers can be better equipped to identify risks to which their businesses may be vulnerable and adopt strategies to mitigate them. Reviewing and reflecting on the three Scenarios developed by PHC's experts can thus be part of a comprehensive assessment of your risks.

WHAT CAN FARMERS DO?

1. Develop your own scenarios and explore their implications for your business by identifying change drivers that can have a significant, disruptive impact on your operation.
2. Develop scenarios by describing what your business environment could look like under the given conditions.
3. Identify challenges and opportunities for which your current practices and production systems are not prepared.
4. Develop contingency and emergency preparedness plans for overcoming disruptions that impact your business including human resources, animal health and welfare, disruptions in the supply chain and financial setbacks and opportunities.
5. Develop enterprise budgets specific to your operation including best-case, worst-case and most likely-case scenarios.
6. Know your cost of production and track expenses and investments carefully to ensure you can weather market disruptions.
7. Hold family and farm team meetings on a regular basis to track progress and trigger contingency measures if circumstances change that impact your plans. Meet with your farm business advisory team on a regular basis.
8. Network with your peers. Share successes and challenges.
9. Utilize the management tools and resources contained within the National Farm Business Management Resource Centre at **www.takeanewapproach.ca**.

*–Farm Management Canada is the only national organization dedicated exclusively to the development and delivery of leading-edge resources, information and tools to support farm business success. Find more at **fmc-gac.com**.*

Find OECD tips on strategic foresight at **oecd.org/strategic-foresight**

Search for the Policy Horizons Canada report, Foresight on COVID-19: Possible shifts and implications, at **horizons.gc.ca**.

Farm Management Canada resources:

AgriShield
A web-based platform for a comprehensive assessment of risks

Building an effective farm management system
A guidebook and management manual

Read the full version of this article, which includes some scenario questions to consider and an interesting graphic.

Search for all at **fmc-gac.com**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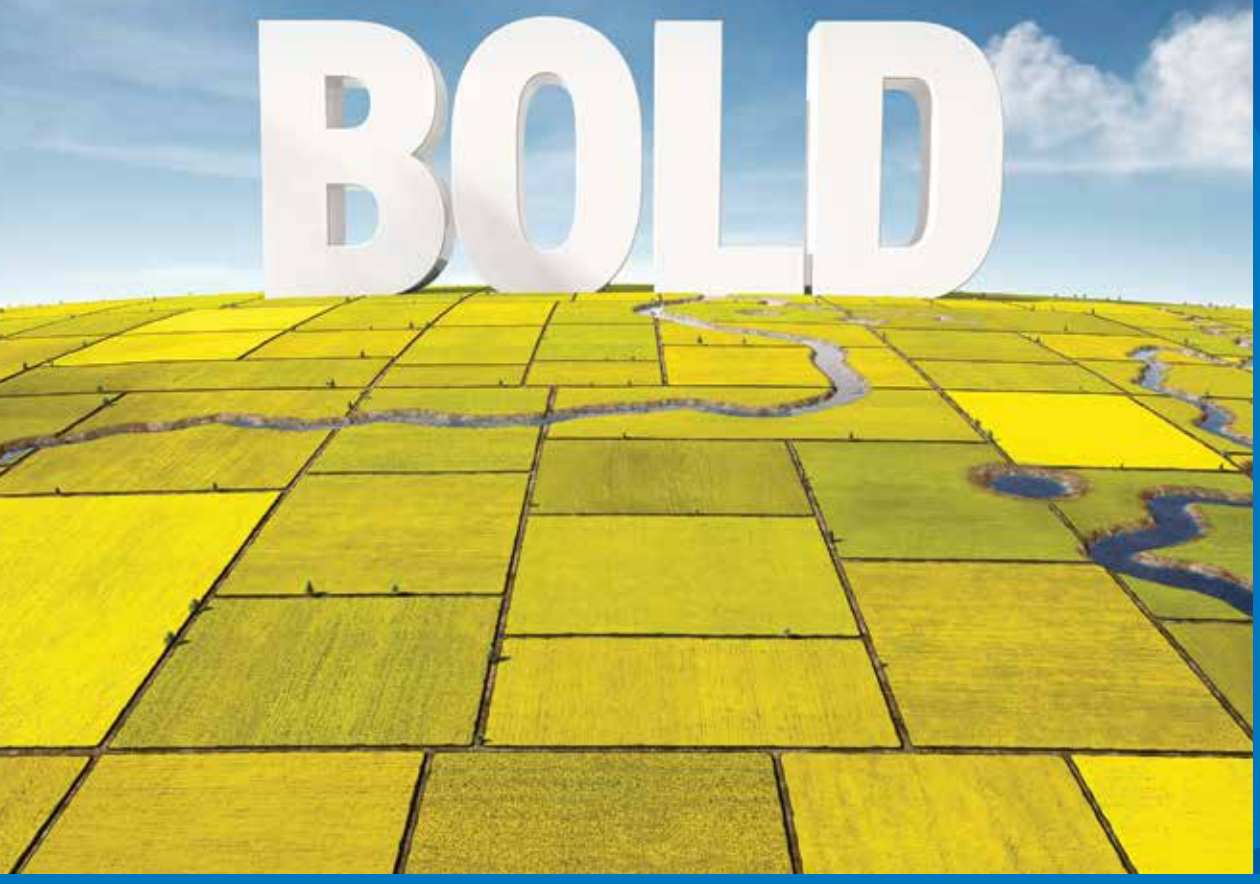

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