





January 2018

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# **INSIDE:**

Agronomists at Agritechnica: Highlights from Hanover FARMER PANEL: NEW TECH FOR 2018

"Help us have more fun!"

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# Canola DIGEST January 2018





# ROOT BACTERIA RELATES TO HIGHER CANOLA YIELD

Exploration of the canola root microbiome discovered that an abundance of *Serratia* bacteria in canola roots relates positively to canola yield. Could this bacteria become a yield-boosting inoculant?

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# Post-emergent nitrogen reduces the seeding time crunch

When logistics make it difficult to apply the needed volume of fertilizer at seeding, broadcast applications are probably not the best answer. Post-emergent side banding with a coulter puts nitrogen where and when it's needed without the risk of loss.

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# First ever "Canola Dialogue" event in China

Over 60 people attended the landmark Canola Dialogue in Beijing, China in November. The meeting, the first of what could be an annual event, discussed market opportunities, import standards and the benefit of stable and open trade for Canadian canola into China.

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# Soil sampling in the big data era

Soil test protocols developed for Western Canada in the 1960s are still used and still relevant, but farmers can collect a lot more data now to further refine recommendations. These are not your father's soil tests.



# Building public trust for Canadian agriculture

An update on the Canadian Centre for Food Integrity and the continuing quest to build more trust in Canadian farming and food.





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# Why are low-yielding areas low yielding?

Low-yielding areas might contribute more to the bottom line by cutting inputs to reduce losses or increasing input to improve profitability. The choice depends on answering the question in the headline.

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# Ag tech that may move the needle

A Grain World session called "What technology is going to shape the next 3-5 years?" described tech trends. This includes machinery with artificial intelligence that adjusts on-the-go in response to your guidelines.

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# Rice is nice with... canola sauce?

Soy sauce is made with soymeal and cracked wheat. University of Winnipeg microbiologist Paul Holloway is testing whether canola meal can replace soy meal to make a similar umami-driven condiment.

# DEPARTMENTS

# 4 Farmer panel Tech for 2018

What tech will you buy in 2018? These four farmers share their plans for 2018, including their motivation for investing in a new system or product. As a bonus, we also ask them: Do farms need to hire techies just like they hire agronomists?

# 5 steps to better... Tillage decisions

Tillage is making a comeback with recent high-moisture years, but this may not be positive. Canola Council of Canada agronomy specialist Brittany Hennig goes through five steps to consider before returning to tillage or increasing the use of tillage.

## • Agronomist abroad What won us or

# What won us over in Hanover?

Angela Brackenreed and Shawn Senko went to Agritechnica, the massive machinery show in Hanover, Germany, to see what new ideas and technology could enhance canola best management practices in Western Canada.

## **34** Canola Research Hub Top science for the bottom line

The Hub at canolaresearch.ca has practical tools to return growers' investment in agronomic research back to the farm. The Hub library currently incorporates over 100 agronomic studies and all Science Editions of Canola Digest.



# 2 Business management "Help us have more fun!"

Some farm men are experiencing a serious lack of fun, and this can start to influence the business, family harmony and all aspects of life. The good news is finding your own fun and setting aside the time is a choice. You can do it.

# Business management Sick. Not weak

TSN's Michael Landsberg presented "Why is it so hard to talk about mental health?" at Grain World in Winnipeg in November.

# **PROVINCIAL BULLETINS**

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ALBERTA CANOLA

Join Alberta Canola for their Annual General Meeting on January 30 in Edmonton. Register for the Leading Edge conference to learn about partnerships, joint ventures and incorporated business structures.



The 2017 annual report is available online at **saskcanola.com/about/report**. Register for canoLAB February 21 or 22 at **saskcanola.com/news/canolab**. Learn how to claim your tax credits with the Scientific Research and Experimental Development. O Manitoba Canola Growers

MCGA shows the Governor General's leadership conference what Prairie farms mean to the economy. Want to submit a resolution to the MCGA's next Annual General Meeting? Guidelines can be found at canolagrowers.com.

# CALENDAR

CROP PRODUCTION SHOW 2018 – January 8-11 Saskatoon, Saskatchewan cropproductiononline.com

SASKCANOLA AGM & LUNCHEON – January 8 Saskatoon, Saskatchewan | saskcanola.com

CROPSPHERE – January 9 & 10 Saskatoon, Saskatchewan | cropsphere.com

MANITOBA AGDAYS – January 16-18 Brandon, Manitoba Canola Day at AgDays is January 16 | agdays.com

MANITOBA YOUNG FARMERS CONFERENCE – January 25 & 26 | Winnipeg, Manitoba

## FARMTECH CONFERENCE -

January 30-February 1 | Edmonton, Alberta farmtechconference.com

## ALBERTA CANOLA AGM -

January 30 | At FarmTech albertacanola.com/agm

TOP NOTCH FARMING – February 13 | Melfort, Saskatchewan saskcanola.com/news/topnotchfarming

### LEADING EDGE FARM MANAGEMENT CONFERENCE – February 13 & 14 | Red Deer, Alberta albertacanola.com/LeadingEdge

## CROPCONNECT -

February 14 & 15 | Winnipeg, Manitoba cropconnectconference.com

### SASKATCHEWAN OILSEED PRODUCER MEETINGS –

February 14 | Humboldt, Saskatchewan February 15 | Davidson, Saskatchewan saskcanola.com/news/oilseedmeetings

## SASKCANOLA CANOLAB

February 21 & 22 | TCU Place, Saskatoon saskcanola.com/news/canolab

## CANOLA COUNCIL OF CANADA CONVENTION

March 6-8 | Palm Springs, California convention.canolacouncil.org

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# THE EDITOR'S DESK



# One thing

don't usually make New Year's resolutions, but I have one specific work goal for this year: To increase Canola Watch subscriptions by 50 per cent.

Canola Watch is an email update to address real issues – insects, diseases and more – found in canola fields across the Prairies. It comes out each week during the growing season, and is geared toward agronomists, retailers, extension staff and farmers, of course. I'm the editor, but content is driven by my colleagues – the Canola Council of Canada agronomy specialists – and from various other extension specialists and scientists who contribute. My CCC agronomy colleagues actually set the specific 50 per cent goal and are helping with the cause.

What one thing would you like to improve in your business in 2018? With dozens of potential improvements swirling around in your head this time of year, whittling that down to one thing per year might help get 'er done. The one thing can become the focus of your attention during farm show season. You can talk to companies who offer solutions, attend presentations on the topic, seek out other farmers who have tried it.

In this issue, Taryn Dickson shares highlights from a Grain World session on technology. At the session, panelists encouraged farmers to try at least one new thing each year. Ideas Taryn included in the

This editor's note has me thinking back to a conversation I had with Kevin Folta while on a tour bus in Winnipeg last year. The University of Florida prof is a well-known advocate for biotechnology and he was at a Manitoba Canola Growers event presenting on that topic. I asked about his other work interests and research specialities. A lot of his work is on light - photosynthesis, greenhouses, that kind of thing. But when I asked about research efforts to improve plant photosynthesis, he said that work and all other research to improve productivity would be moot if we could just solve the food waste issue. So much of global farm production is lost in storage or thrown out. Real effort toward this one thing would mean less wasted effort and inputs on the farm and overall better use of resources.

Waste is all around. We pay for TV channels we don't watch. Cell phone minutes we don't use. Horsepower we don't need. Hard-earned money used to pay for excess capacity takes away from savings for retirement, kids' education and travel. Trimming waste is like giving ourselves a raise. Agriculture productivity is similar. What jobs and inputs can be trimmed without changing the bottom line? Maybe answering that question is the one thing for 2018 that could make a big difference to the business.



article are to straight combine one quarter section of canola, fly a neighbour's drone, scout every field every week for at least one year, run a variety trial or buy a drop-pan and check for combine losses.

Maybe your one thing is to stop pouring inputs into field zones that provide limited potential for return on investment, or to improve nitrogen use efficiency. Maybe your one thing is to take better care of your mental health first. You can read about soil variability, nitrogen use efficiency and mental health in this issue. Which brings me back to Canola Watch. As I said at the top, my one thing for 2018 is to get Canola Watch and its scouting information and best management practices into the hands of 50 per cent more farmers, agronomists and retailers. I believe Canola Watch will help farmers make better decisions. Some of those decisions may be to trim an input that isn't needed. If Canola Watch can help each reader do just *one thing* better, it can provide a big bump in profitability. Sign up at **canolawatch.org**.



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# **ALBERTA BULLETIN**



# Join Alberta Canola Producers Commission for their 28<sup>th</sup> Annual General Meeting

# TUESDAY, JANUARY 30 AT 2:45PM – HALL F EDMONTON EXPO CENTRE AT NORTHLANDS

The AGM takes place during the FarmTech Conference. There is no charge to attend the AGM, and registration to FarmTech is not required to attend the AGM.

AGM agenda includes:

- A review of the proposed amendments to Alberta Canola's regulations. These amendments can be found at **albertacanola.com/regulations**.
- A review of the activities, audited financial statements, and budget for Alberta Canola.
- Voting on resolutions. Resolutions to be presented at Alberta Canola's AGM

must be received no less than 10 business days prior (January 16, 2018) to the AGM to allow for background to be collected and resolutions to be prepared for presentation at the meeting.

• Director election. Nominations will be taken from the floor to elect a director to fill a vacancy in Region 8. For information on region 8 and becoming a director visit albertacanola.com/elections.

For information on the FarmTech conference visit **farmtechconference.com**.

# Alberta Canola Connects – Ag Ex Conference

Alberta Canola director John Guelly attended Farm Management Canada's AgEx 2017 Conference in Kanata, Ontario in November on behalf of Alberta Canola.



Read John's

albertacanola. com/connects.

story at

In 2016, Alberta Canola formed a strategic alliance with Farm Management Canada to work together to help deliver farm management information. John embarked on the trek to Ottawa knowing very little about FMC other than a few AgriWebinars he had attended online over the past several winters.

John came away with a whole new appreciation for what this Canadian farm organization does for Canadian farmers.



# Leading Edge Farm Management Conference

# DECEMBER 13 & 14 | RED DEER

Leading Edge gives you unprecedented access to some of Alberta's leading farm management advisors and accountants. This year's course is designed specifically for those wanting more information about making the transition to partnerships, joint ventures or an incorporated business structure. Attend Leading Edge and find out the benefits and implications of these different options.

Leading Edge speakers include Merle Good, Rob Strilchuk, Dean Gallimore, Ryan Stevenson and Reg Shandro.

Get full details and register at albertacanola.com/LeadingEdge.





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# Farewell and Thank You to Megan Madden

In 2013, Megan Madden was contracted to develop a communications strategy for Alberta Canola and to provide media training for the directors and staff. Megan joined the Alberta Canola team as the organization's first Communications Coordinator in 2014.

Megan helped Alberta Canola understand how to get our messages out to our many different audiences – farmers, consumers and government. Her innovative ideas and "just get it done" attitude helped new initiatives like canolaPALOOZA and the Canola Leaders program for young farmers come to life.

Megan and her husband Greg are headed to Revelstoke, B.C. to pursue their passion for mountain adventures and their entrepreneurial dreams.

Thank you Megan for all you have done to help Alberta Canola's directors and staff over the last three years to be better at telling our story.

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Alberta Canola –

Alberta Canola focuses on four key areas:

- Research
- Grower Relations and Extension
- Market Development & Public Engagement
- 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**.

# **SASKATCHEWAN BULLETIN**



# Research Tax Credit

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

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

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

# Save the Date

### SASKCANOLA AGM & LUNCHEON Saskatoon – January 8, 2018 TCU Place

CROP PRODUCTION SHOW Saskatoon – January 8-12, 2018 Prairieland Park

CROPSPHERE

Saskatoon – January 9 & 10, 2018 TCU Place

**TOP NOTCH FARMING Melfort** - February 13, 2018 Kerry Vickar Center

SASKATCHEWAN OILSEED PRODUCER MEETINGS Humboldt – February 14, 2018

Uniplex Convention Centre

**Davidson** – February 15, 2018 Davidson Community Centre

SASKATCHEWAN CANOLAB Saskatoon – February 21 & 22, 2018 TCU Place

For the latest event details and registration information, please visit **saskcanola.com** or call 1-877-241-7044.

# canoLAB

## FEBRUARY 21 OR 22 (choose one) | TCU PLACE, SASKATOON

canoLAB is a hands-on, interactive diagnostic workshop with live plants and insects. Participants are divided into small groups and will take part in a number of 45-minute sessions throughout the day. Instructors will be among Western Canada's top researchers and extension professionals.

CCA credits will be applied for. The event is co-hosted by SaskCanola and the Canola Council of Canada.

Topics include: Clubroot and blackleg

identification and management, phosphorus and sulphur management in your rotation, managing herbicide resistance, weed identification, stand establishment for harvest management, desiccation of canola, insect damage assessment and canola diagnostics.

canoLAB runs from 8:30 am to 4:30 pm daily. Each day is identical. Lunch is provided.

Register now at: saskcanola.com/news/canolab.



SaskCanola director Gerry Hertz at canoLAB 2017

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# 🔇 Sask Canola

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For complete details, check out our annual report – available on our website: saskcanola.com/about/report.php.

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SaskCanola directors Gerry Hertz (left) and Wayne Truman (right) at a field day this July.



# Learn to Lead

STRATEGIC PRIORITIES

RESEARCH REPORT

In November, SaskCanola hosted its second leadership workshop that saw over 20 young Saskatchewan farmers partake in a two-day event that included sessions on governance, media training and decision making. Under SaskCanola's strategic plan, 'Producer Engagement' is one of four key pillars and within said pillar, fostering youth in agriculture has been identified as a top priority. If you are interested in future leadership events and opportunities with SaskCanola, please connect with Policy & Producer Relations Manager Tracy Broughton at tbroughton@saskcanola.com or call 306-975-0732.

# MANITOBA BULLETIN



# Future Leaders Dive Deep into Canola

Governor General's Canadian Leadership Conference hosts hopefuls.

A recent survey of Canadian urban dwellers found that the more recently someone has visited a working farm, the more optimistic they are about job prospects in the industry. They also tend to support an increased role for government in that industry.

Armed with this information, Manitoba Canola Growers (MCGA) set out to show participants of the Governor General's Canadian Leadership Conference (GGCLC) just how productive, unique and important Prairie farms are to the Canadian economy. Earlier this year, members of the 2017 GGCLC spent an action-packed day learning about canola, canola oil, farmers and the importance of agriculture on the Canadian landscape.

"It's critically important that we connect more people to agriculture,"

says Curtis McRae, canola farmer and spokesperson for MCGA. "We're making a strong effort to engage our farmers to share what, how and why they do what they do when it comes to growing our food."

The 20 participants of this year's GGCLC Manitoba study group were treated to a farm-to-food themed day that kicked off with a tour of Winnipeg's Canadian International Grains Institute. The group then traveled to Kelburn Farm, a 700-acre research farm and crop development centre operated by Richardson International where they spent time with farmers learning about the challenges and opportunities that come with modern farming.

"It's one thing to read about how crops grow," says McRae, "But it's a completely different experience when you can crush the seeds of a canola



plant at one station, then move to the next and use that oil to make something delicious in the kitchen."

The GGCLC was created to broaden the perspectives of future leaders in management, unions, government and the community sector. The participants spend two weeks a year traveling throughout Canada and connecting with industries and communities. All are high-potential individuals expected to achieve senior leadership positions in their respective organizations and communities. "The visit with you was a highlight; the passion from the farmers as they talked to us about their work and environmental risks to arable farm land, the tractor ride and the amazing sunset."

-Louise Adongo

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# Resolutions and AGM Notice

# **RESOLUTION GUIDELINES**

Are you interested in submitting a resolution to the Manitoba Canola Growers Association's Annual General Meeting?

Resolution guidelines can be found at **www.canolagrowers.com** or call 204-982-2122.

**DEADLINE:** January 19, 2018 at 4:30 pm **SUBMIT TO:** Fax 204-942-1841 or email delaney@canolagrowers.com

## AGM

MCGA's Annual Meeting will be held Thursday February 15, 2018 at 7:30 am during the CropConnect Conference at the Victoria Inn in Winnipeg.





CANOLA DAY @ CANOLA DAY @ MANITOBA AG DAYS MANUARY 16, 2018 FCC THEATRE 9:00 AM - 12:00 PM



- 9:00 AM -ANGELA BRACKENREED Agronomy Specialist Canola Council of Canada

How did that happen?! A Review of Canola Production in 2017



- 10:00 AM -FLORIAN HAGMANN Farmer 100 Bushel Canola Yield Little Things Matter!

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- 9:30 AM -SHAWN SENKO Agronomy Specialist Canola Council of Canada Precision in Canola



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Exploration of the canola root microbiome discovered that an abundance of *Serratia* bacteria in canola roots relates positively to canola yield. Could this bacteria become a yield-boosting inoculant?



# ROOT BACTERIA RELATES TO HIGHER CANOLA YIELD

BY JAY WHETTER

illions of microorganisms live in every gram of healthy soil. In this world exist those things we know a bit about – such as mycorrhizae fungi and clubroot spores – but also so many more that researchers are just starting to discover. Since plant roots work through and around those microorganisms, it makes sense to explore this crowded mini-frontier to find other species that are potentially beneficial or pathogenic to crops.

Chantal Hamel, research scientist with Agriculture and Agri-Food Canada in Quebec City, is working to identify the "core microbiome" for canola – which are microorganisms "always associated with the plant." She has been involved in two recent microbial discoveries that could help with canola productivity.

### SERRATIA BACTERIA

Hamel worked with Marc St-Arnaud and Chih-Ying Lay, researchers at the University of Montreal, on a field project that demonstrated how the abundance of *Serratia* bacteria on roots relates to canola yield. The research was based on DNA sequencing data from replicated plots at Lacombe, Alberta, Beaverlodge, Alberta and Brandon, Manitoba.

The fact this bacteria correlates with yield *and* inhabits canola roots is significant. "When a yield-enhancing bacteria is more comfortable inside the plant, it is more reliable and we can manipulate it," Hamel says. "It could become an inoculant."

When beneficial bacteria exist in the soil but not on or in the root, their

beneficial performance for the crop can be hampered by factors in the soil environment. These factors can include soil pH, organic matter and other microorganisms, Hamel says. That could be the case for *Penicillium bilaii*, for example, which is commercially available for its ability to dissolve phosphorus in the soil and make it more available for crop uptake.

"We don't yet know how *Serratia* works to increase canola yield," Hamel says. It could solubilize phosphorus, act as growth hormone, protect canola from pathogens, promote beneficial rhizobacteria or something else, she says, adding: "Bacteria can promote growth in many ways." As researchers continue this work, they will isolate *Serratia* to test it directly on canola to see if it promotes growth.

#### Left: A map of canola's core microbiome

Jean-Baptiste Floc'h with Agriculture and Agri-Food Canada created this map of fungal species interaction in the canola rhizosphere. Size of the circle represents the relative abundance of the fungus species. The darker the green, the more significant its interactions with other fungi. Pink arrows indicate a negative interaction; green is a positive interaction.

*Otul is* Olpidium brassicae. *While abundant, the light green colour of its node suggests that it does not respond to environmental influences the same way as others do.* 

The interaction between Otu3 and Otu6 (Humicola grisea spp.) is strong because these are two variants of the same species. Otu56 (Exophiala spp.) is a small but dark circle, indicating low abundance but high interaction. Exophiala produces exophillic acid, an anti-viral compound, and other secondary metabolites that could antagonize microorganisms detrimental to canola. "We should do more research on this," says AAFC research scientist Chantal Hamel.

## PARASITIC FUNGI OF CANOLA

Researchers have known about the virus-carrying fungus *Olpidium* for a long time. To prep for a new Prairies-based study, Chih-Ying Lay had to dig up and analyze the literature from 1878 to 2017. "There was a lot of confusion," Hamel says, "but with this study, we cleared out much of it."

For one thing, molecular genetics can now differentiate two common species among the genus: *O. brassicae* and *O. virulentus*. In non-brassica hosts, *Olpidium* infection is more likely due to *O. virulentus*, which is a carrier for several important disease-causing viruses, Hamel says. Good news for canola, so far, *Olpidium brassicae* was not found to carry viruses.

The study also demonstrated how large these populations can be. In 2014, when Prairie soils were moist at the time of sampling, 70 per cent of the microbial population in canola roots was *O. brassicae*. Interestingly, only 10 per cent of the microbial population in pea and wheat roots was *O. brassicae*. In 2013, when soil conditions were comparatively dry at sampling, numbers were not so high. What this means is that *O. brassicae* is a very canola-specific microorganism and it likes moisture.

Canola plants with high levels of O. brassicae don't seem to be sick, Hamel says, but research hints that there may be some mild growth depression. "So far, no literature can prove O. brassicae is good for canola growth, but research is too sparse to conclude anything," Hamel says. "With such abundance, Olpidium could be displacing detrimental microorganisms."

What further research on *Olpidium, Serratia* and canola's core microbiome could produce, Hamel says, are "inoculants containing the most influential microorganisms to create a beneficial root environment and canola bred for beneficial root associations."

— Jay Whetter is the editor of Canola Digest.



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Low-yielding areas might contribute more to the bottom line by cutting inputs to reduce losses or increasing inputs to improve profitability. The choice depends on answering the question in the headline.

# WHY ARE LOW-YIELDING AREAS LOW YIELDING?

# BY RICHARD KAMCHEN

ommon "low-yield" zones are high hilltops and low saline areas. To provide more precise management of each area requires a little extra information on "why" yields are lower.

Let's start with the hilltops. Len Kryzanowski, Alberta Agriculture and Forestry's environmental strategy and research director, says low yields on hilltops can result from restricted rooting zones that prevent water from penetrating below a certain depth. Gradual erosion of topsoil, whether it is by wind, water or tillage, will also limit hilltop yields.

Moisture availability can determine the severity of yield losses: "If you've got very frequent, even distribution of moisture, then you probably won't see as big an effect, but as soon as you get into a moisture-restricting condition, delayed moisture or droughts, that's when you start seeing the hilltops show their low-yielding situation," Kryzanowski says.

Crop consultant Cory Willness, president of CropPro Consulting, notes many hilltops have good soil, but the problem is they run out of moisture.

"If you can get water on them, they can grow good, and if they are going to grow good, because they're low-fertility areas, they need lots of fertilizer," Willness says. He doubts there's more than one per cent of farmland that contains hilltops with ground so poor that it wouldn't deliver a reasonable crop.

Salinity, however, is more widespread, affecting approximately five per cent of cultivated land across the three Prairie provinces, Willness estimates.

The main cause of salinity is a high water table associated with saline parent material, he explains.

"The crop has to work harder to take up water, and if you have any kind of water limitation, that'll just make the salinity worse," Kryzanowski points out, adding salinity issues are more prevalent in lowerlying areas.

### HOW TO IDENTIFY LOW-YIELD CAUSES

Various technologies exist for farmers to determine whether to adjust their treatment or cut their losses, but Willness warns against relying too much on one over others.

A yield map can identify hilltops and saline areas as the same, and without a map differentiating the two, a farmer will end up applying technology that isn't going to work, he says.

There's no one-stop solution to all low-yield areas.

"If you identify the cause in your field as five different things – insects, hilltops dried out, depressions flooded





Salinity is often the cause of low-yield in low-lying areas, but sometimes the reason is just too much rain. A variable-rate management approach depends on knowing underlying causes and in-field conditions. out, saline spots and compaction – you can't address it all with one solution. You can't just say I'm going to put more fertilizer here, and less here," Willness says.

And without soil potential maps, the root causes of the potential lowyield areas will remain unknown.

"The purpose of soil potential maps – finding the salinity, water-collecting areas, hilltops – is so that when you look at your yield data and your satellite imagery, you have an underlying knowledge base about if an area was probably too dry, too wet or saline," Willness says. "If you don't have that underlying data, you don't have any clue what it was caused by. That's where you run into mistakes."



"It could be a texture problem; it could be there's no topsoil or there's low organic matter. There are a hundred different options. For some of them, you put on fertilizer. For other ones, there's nothing you can do. It's field by field."

## -Cory Willness

Kryzanowski adds that some electrical conductivity tests can also be deceptive and can't necessarily be solely relied on. "Even if you have high nutrient levels, [a reading] could come up as high salinity. So you need to confirm a lot of these measurements with actual soil samples to ensure what you're seeing is detrimental salts versus salts that might be beneficial, such as nitrogen, phosphorous or some of the other nutrients."



SWAT Zone Map

Cory Willness of CropPro Consulting creates these SWAT maps using a proprietary zone mapping procedure that marries soil properties, water modelling and topography into one map. Areas with lower yield potential are not lumped into one zone because best management is often different for hilltops and saline areas, for example.

## ADJUSTING TREATMENT

Farmers are adding manure or compost on hilltops, but Kryzanowski believes tillage and erosion in general are bigger factors. Often, amelioration measures will be limited to growing more drought-tolerant crops.

Willness says hilltop soil issues can vary and so too the adjustments. "It could be a texture problem; it could be there's no topsoil or there's low organic matter. There are a hundred different options. For some of them, you put on fertilizer. For other ones, there's nothing you can do. It's field by field."

For saline patches, surface drainage can help by not recharging the water table, and tile drainage can drain the water and salts, Willness says.

Cultivation or fallowing make the situation worse as they bring salts to the surface. Kryzanowski recommends continuous cropping and, for a severe condition, growing saline-tolerant crops.

"Some producers are doing intercrops by variable rate by planting salt-tolerant species in those areas," says Willness. Some farmers seed cover crops in those spots.

Willness believes farmers are being misled by industry efforts to sell programs based on the idea that yield and biomass variability is consistent and very manageable.

"We don't find that. On 50 per cent of the fields we get yield potential maps on, there's very little relationship from year to year; an extremely poor relationship," he says.

Willness laments a lack of independent, unbiased experts to talk to farmers, leaving their knowledge of fundamentals lacking.

— Richard Kamchen is an agriculture freelance writer based in Winnipeg. When logistics make it difficult to apply the needed volume of fertilizer at seeding, broadcast applications are probably not the best answer. Post-emergent side banding with a coulter puts N where needed and when needed without the risk of loss.

# POST-EMERGENT NITROGEN REDUCES THE SEEDING TIME CRUNCH

## BY BRUCE BARKER

here was a time when broadcasting nitrogen (N) made sense – the 1960s. Ammonium nitrate (34-0-0) fertilizer was common, gaseous losses were minor, investment in application equipment was economical and large volumes could be floated on quickly.

However, the disappearance of ammonium nitrate meant urea (46-0-0) became the nitrogen fertilizer of choice, which came with gaseous losses and poor nitrogen use efficiency (NUE) when broadcast. Floaters became a thing of the past for most farmers as they moved to deep banding and one-pass no-till seeding.

But are we going backward into the future?

"Unfortunately, we are seeing a trend back to broadcasting nitrogen," says Warren Ward, Canola Council of Canada agronomy specialist at Springside, Saskatchewan. "As farms are getting larger, the decision to broadcast is purely logistical. You can cover ground a lot faster with a floater than with a pre-seed band or one-pass seeding operation,"

Ward says broadcasting urea comes with agronomic and environmental impacts. Yield can be lower with broadcast applications and ammonia losses can be high (but can be mitigated with a urease inhibitor).

"Growers are making a choice on whether those impacts are outweighed by getting the crop in the ground faster," says Ward.

Research has long shown that broadcast application has the lowest relative NUE. Average relative values for Manitoba based on time and method of placement, when spring broadcast N is given a value of 100, have been calculated. Generally, spring-banded N is the best application timing and placement option, yielding 20 per cent better than fall banded N or spring broadcast N. Saskatchewan and Alberta have similar guidelines. (See the table.)

Mario Tenuta with the soil science department at the University of Manitoba recently revisited these guidelines because of advancements in technology. Advancements include enhanced efficiency nitrogen products that are protected from volatilization or nitrification Nitrogen efficiency based on application time and placement.

Time and Method	Relative Values					
Spring broadcast	100%					
Spring banded	120%					
Fall broadcast	80%					
Fall banded	100%					
Source: Manitoba Fertility Guide						





or both, and seeding tools that shallow-band N in a one-pass seeding system. Tenuta wanted to find out if changes in source and placement would increase nitrogen use efficiency and reduce N<sub>2</sub>O emissions in the Red River Valley of Manitoba. The Canola Agronomic Research Program (CARP) project was funded jointly by Koch Fertilizer and the Manitoba Canola Growers.

Urea, Agrotain and SuperU were surface broadcast in the fall at 70 and 100 per cent of recommended N along with a zero-N control. Spring treatments included the same N fertilizer products and N rates in a surface broadcast, shallow-banded one inch deep and deep-banded three inches deep.

Overall, the nitrogen source did not affect canola yield. But placement and timing did. Surface spring-applied N had lower yield than spring-applied shallow or deep-banded N. Fall surface broadcast at the recommended N rate yielded 13 bushels per acre less than spring applications.

"The results verify past research that subsurface banding of granular urea improves yields compared to surface application. As well, surface application in fall is way less efficient than spring application," says Tenuta. "There was no benefit to yield in using granular urea with urease alone or urease plus nitrification inhibitors to yield. However, urease plus nitrification inhibitor did reduce N<sub>2</sub>O and NH<sub>2</sub> loses for surface-applied granular urea."

## SPLIT APPLICATIONS OFFER AN ALTERNATIVE

Certainly, the volume of fertilizer put down in a one-pass operation is much higher now than in the 1980s when the move to no-till began. With improved genetics and higher yield potential, Ward says common fertilizer application rates for a 50-bushel per acre canola crop are 130 lb./ac. of N, 40 lb./ac. of phosphate, 20 of potassium ( $K_2O$ ) and 30 of sulphur. The overall volume of fertilizer is quickly reaching 400 lb./ac.

Bryce Cowling, who farms at Hamiota, Manitoba, sought a different solution to tackle the volume of fertilizer put down in a one-pass seeding system. Typically, he put down between 110 and 140 lb./ac. of N in a one-pass sideband with his Seed Hawk air drill. He applied a combination of liquid and granular N, but his N requirement along with other nutrients meant 60 acres per fill at seeding.

Motivated by a demonstration conducted by Steve Larocque, a farmer and agronomist at Three Hills, Alberta, Cowling invested in a Fast Manufacturing 8200 coulter banding applicator to apply part of his N after emergence. Now Cowling applies 80 lb./ac. of N at seeding and another 60 lb./ac. side-banded just prior to bolting. Timing is targeted just prior to when the rate of nutrient uptake increases rapidly.

"One of the reasons we went this way was that we wanted to speed up seeding. We've gone from 60 acres a fill to 100 acres a fill, which helps us get the crop in faster," says Cowling.

The liquid applicator has coulters on 24-inch centres, running between his 12-inch seed-row spacing. The 64-foot wide unit matches his 64-foot air drill width. He uses RTK guidance for both seeding and post-emergent banding. Guidance keeps the coulters



Coulter applicators place fertilizer in a band between the rows. Steve Larocque provided these photos (above and previous page), taken during his own trials in canola and wheat.

between the seed rows. He says there is some implement drift from side to side – but not to the point of damaging the canola.

Larocque, who started post-emergent applications in wheat and canola in 2013 with Fast's 8100 applicator, ran a side-by-side demonstration on canola in 2014 comparing 120 pounds of post-emergent N banded with coulters or streamed on in a liquid band. A fertilizer blend of 60-30-0-20 was side-banded at seeding. His seeding equipment didn't have the capacity to compare a third treatment with the entire N side-banded at seeding.

Conditions for the post-emergent applications were ideal with 15 mm of rain falling the day after application. However, despite this rainfall, the side-dressed application with coulters yielded 14 per cent more than the streamed demonstration.

"With that rainfall, the streamed N should have worked just as well. I think we had so much crop residue on the surface that the N was immobilized for a period of time and the crop ran out of nitrogen," says Larocque.

One concern farmers have with split applications is that they are already busy enough with spraying in the post-emergent season. Cowling says his post-emergent side-dressing application is relatively quick. He travels around seven to 7.5 mph and covers about 60 acres per hour.

Cowling has seen other benefits to splitting N application. "We were putting so much nitrogen in a sideband that it was compromising seedling safety." He is seeing better stand establishment and better NUE. It has helped reduce lodging as well. As far as yields go, Cowling hasn't made comparisons to his previous one-pass sideband system, but he doesn't feel he is giving up any yield.

## SPLIT APPLICATIONS FOR RISK MANAGEMENT

In a three-year study from 2004 to 2006, Guy Lafond at Agriculture and Agri-Food Canada at Indian Head



found that if soil moisture conditions are dry at seeding, putting down only two-thirds of N requirements is a good hedge against the weather. If rainfall occurs, the balance can be side-dressed. If conditions remain dry, farmers can assess the likelihood of a yield response from additional N.

Ward cautions that a surface dribble band or broadcast application will be at risk of volatilization. Surface applications also need rain to move N into the soil.

"From a nutrient management perspective, side-dressing is supplying nitrogen when and where it is needed," says Ward. "Not too many people are side dressing with coulters, but I would like to see more of that rather than broadcast applications that are inefficient and have greater risk to cause environmental harm." The goal with an in-crop nutrient top up is to have all nutrients in place before peak uptake.

SOURCE: Adrian Johnston, AAFC Melfort, based on Quest canola variety.

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Farm Credit Canada Advancing the business of agriculture



Soil test protocols developed for Western Canada in the 1960s are still used and still relevant, but farmers can collect a lot more data now to further refine recommendations. These are not your father's soil tests.

# **SOIL SAMPLING** IN THE BIG DATA ERA

BY BRUCE BARKER



atellite images. Yield maps. Drones. Gamma rays. Electrical conductivity. RTK elevation. Farmers and agronomists have more data available to them than ever before. Has soil testing kept up? After all, the beginnings of soil testing started on the Prairies in the late 1950s and early 1960s.

"The soil tests and protocols we developed in the 1960s are still being used now and are still valid. The one exception is for nitrogen; we don't have a good test to predict the amount of mineralization that will occur," says Geza Racz, soil science professor emeritus at the University of Manitoba. "We need to couple the nitrate soil test with a way to predict mineralization to more consistently account for soil organic matter, tillage, crop rotations, fertilizer management and manure applications." (See the sidebar for more on the nitrogen test.)

All three Prairie Provinces established publicly funded soil test labs in the early 1960s. In Manitoba, for example, Robert Soper was hired in 1958 by soil science department head Bob Hedlin to develop soil fertility tests for Manitoba soils. Racz was hired in 1961. The three soil scientists along with colleagues and graduate students went on to develop sampling protocols, test extraction methods and calibrate lab results to fertilizer response in the field.

In the late 1980s and early 1990s, the provincial soil test labs were either sold to private soil testing companies or closed, but the standard tests they developed are still widely used.

In Manitoba, the sodium bicarbonate (Olsen) test was developed for analyzing phosphorus soil fertility, and was well calibrated by Soper and colleagues on the higher pH soils of Manitoba. At the University of Alberta, Jim Robertson found the Miller Axley extraction method worked better on the low pH soils around Edmonton. It was used until the 1990s when Alberta Agriculture soil scientist Ross McKenzie verified that the Modified Kelowna method of extraction provided more dependable results on a wide range of soil pH levels across Alberta. Saskatchewan also used a Modified Kelowna test.

Today, Rigas Karamanos, senior agronomist with Koch Fertilizer Canada at Calgary, Alberta, who managed the Saskatchewan Soil Test Lab and subsequently EnviroTest Laboratories Saskatoon from 1989 through 1997, cautions that some soil test labs are using extraction methods different than those developed and calibrated on the Prairies.

"Some labs are now using extraction methods that aren't calibrated on the Prairies and have no value to farmers," says Karamanos. (See the table, right.)

### ZONING IN ON FERTILITY

When soil test protocols were first developed for Western Canada, entire fields were sampled to develop fertilizer recommendations across the field. For uniform fields, this sampling protocol worked well but could be time consuming. For example, Racz says that for nitrogen, a composite test of 30 samples across a field to a four-foot depth provided the most reliable results. But researchers realized that sampling to four feet was impractical, and Alberta, Manitoba and Saskatchewan settled on sampling to depths of 0-6", 6-12" and 12-24". Eventually, soil test protocols evolved to 0-6" and 6-24" and most composite samples consist of 20 core samples per field.

Then precision farming came along. With development of GPS guidance and the technology to vary rates across different management zones, the ability to develop different fertility recommendations for different parts of the field became reality.

"In a sense, you are still doing a composite sample but just in more management zones to try to understand differences in soil characteristics and fertility," says McKenzie.

Getting to those different management zones is a hotly debated process among precision farming companies. In its simplest form, McKenzie says zone maps can be developed by looking at changes in elevation, since topography is a major influencing factor in how soils are formed. Upper slopes are typically lower in organic matter and nutrients. Mid-slopes are generally average in soil nutrients, texture and organic matter. Lower slopes are usually highly fertile and productive. Elevation maps can be collected with GPS and converted into topography maps with a free software program called LandMapR. These zones can then be ground-truthed with soil sampling. This approach is supported by research by Raj Koshla at Colorado State University that found permanent soil characteristics combined with the farmer's experience resulted in the best management zones.

Other approaches use more data acquired from various sources. Decisive Farming uses multiple years of satellite imagery to directly connect actual field performance to the development of management zones. After zones are established, typically five to six zones in a field, the zones are benchmark soil sampled at 0-6" and 6-24" with analysis of over 20 different soil characteristics. From there, variablerate fertility and seeding plans are developed.

"Developing zones and prescriptions is about dealing with probabilities. You can't control the weather, so the purpose is to increase the probability of growing the largest and most profitable crop," says Remi Schmaltz with Decisive Farming.

Cory Willness, president of CropPro Consulting at Naicam, Saskatchewan, uses a zone mapping system called SWAT (Soil, Water and Topography) that is developed by layering in RTK elevation, topography features, soil organic carbon, water flow paths and electrical conductivity maps.

Manitoba-based Farmers Edge uses satellite imagery to identify production zones in a field and confirms zone accuracy by ground-truthing and zone-based soil sampling. Variable-rate prescriptions are developed, and profit maps analyze return on investment.

A new company on the scene, Soil Optix in Ontario, uses a scanner to read gamma rays emitted by the soil. A sensor bar mounted 24" above the soil is driven around the field every 40 feet to measure Caesium-137, Uranium-238, Thorium-232 and Potassium-40. Layered maps are developed that include soil texture, macronutrients and topography. Premium maps can include micronutrients, water availability and hydraulic conductivity. A 160-acre field will have up to 32 calibration soil tests done to ground-truth the

"Developing zones
and prescriptions
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the weather, so
the purpose is
to increase the
probability of
growing the
largest and most
profitable crop."

–Remi Schmaltz

Extraction Methods Calibrated in Western Canada							
Nutrient	Calibrated for Western Canada	Not calibrated in Western Canada					
Ν	Water (bicarbonate, Kelowna modifications)	Mineralization indices, e.g., hot KCI, amino sugars, phosphate borate					
Ρ	Olsen (bicarbonate), Kelowna modifications, Miller Axley Bray (weak and strong), Mehlich extractan						
К	Ammonium acetate, Olsen, Kelowna modifications	based on %K saturation, K/Ca					
S	0.01M CaCl <sub>2</sub>	Not applicable					
Cu & Zn	DTPA	HCI extraction					
В	Hot water extractable	Sorbitol					
Mn	None	All extractants					
CI	None	Cl electrode, chromatography, AgNO <sub>3</sub> , water mercury (II) thiocyanate					
Ca	None	All extractants					

Source: Rigas Karamanos.

"The zones yielded differently, but the slope of the N response curve was about the same in each zone. The economics were about the same for the variable rate N and the blanket rate. There is a lot more that we need to know about fertilizer response on different soils and slope positions in the same field. Further, crop response differs in wetter versus drier years." -Ross McKenzie

gamma ray layered maps. Variable-rate maps can be developed for seed, fertilizer and other inputs.

"Soil Optix doesn't develop management zones. We have 335+ data points per acre, or one every 10 square feet, and develop variable-rate inputs based on these high-resolution topsoil maps," says Mitch Blyth with Crop Care Consulting in Manitoba. Soil Optix sells the sensors and runs the correlations to create the background soil maps. Crop Care is the provider in Western Canada, which does the fieldwork and provides the prescription maps.

These approaches and more used by other companies come with a cost of managing data and developing prescriptions. Costs generally range from \$5 to \$15 per acre.

### CONVERTING KNOWLEDGE TO PROFIT

Yes, we can collect a lot more data about our fields and create productivity zones within fields. But is the payback there? Alberta Agriculture ran a variable-rate fertilizer application research study for four years. McKenzie says that delineating management zones by topography was relatively simple to do and was better than using satellite imagery. The research found that N response was relatively good in each soil management zone.

"The zones yielded differently, but the slope of the N response curve was about the same in each zone. The economics were about the same for the variable rate N and the blanket rate," says McKenzie. "There is a lot more that we need to know about fertilizer response on different soils and slope positions in the same field. Further, crop response differs in wetter versus drier years."

Schmaltz says weather is the number one factor determining production. Precision farming is about managing that risk, he says, and that farmers who apply blanket rates across a field have a higher financial and production risk than farms using variable rate.

"Precision farming isn't perfect, but it works to help manage the variability in a field and evaluate where the agronomic program can improve," says Schmaltz.

Schmaltz also says that precision farming goes beyond simply yield and net return per acre. Other factors such as more uniform ripening, easier combining and logistics come into play. He recently had one farmer who expanded from 10,000 acres to 15,000 acres and was contemplating purchasing an additional tractor, seeder and air cart for \$1.5 million. Decisive Farming was able to look at fertilizer applications and logistics and increased the number of acres per fill by 32 per cent – eliminating the need for an additional seeding unit.

Today, Schmaltz estimates that about 15 per cent of farms use precision farming and variable-rate application. For the other 85 per cent, perhaps the first step is to actually soil test. McKenzie says that as a general rule across Alberta, only about 10 per cent of dryland farmers regularly soil test. The estimate is 30 per cent or more for irrigated land. While times are changing, using your father's and grandfather's soil test is still the foundation of fertility programs.



# The N test

The nitrate soil test has been around since 1901 when it was developed in Wisconsin. In Manitoba, Bob Soper and colleagues researched and verified the nitrate soil test as a means for developing nitrogen (N) fertilizer recommendations in the early 1960s. The other Provincial soil test labs in Saskatchewan and Alberta also adopted the nitrate test.

The nitrate test was evaluated in an era when summerfallow occurred every other year and pulse crops were not grown. The nitrate test was reliable on these lower-organic-matter summerfallow fields tested in the fall. But with the move to no-till, increasing organic matter, more manure and pulse crops in rotation, the N-supplying power of the soil is changing.

"To be honest, the nitrate test today doesn't provide a good indication of the nitrogen-supplying power of the soil," says Ross McKenzie, crop nutrition consultant and retired Alberta Agriculture soil scientist. "It is good at measuring the amount of nitrate in the soil, but it can't predict the amount of nitrogen that will become available in the spring through mineralization. For example, on irrigated soils in southern Alberta, we frequently see 80 lb./ac. of N or more, mineralized during the growing season in control treatments."

Geza Racz, the soil science professor emeritus at the University of Manitoba who worked on calibrating the original nitrate test in Manitoba, agrees. With no-till, continuous crop farming and rising organic matter levels, he says that mineralized N plays an important role in fertilizer recommendations and crop response.

"We are getting much higher rates of mineralization than in the past. We need to look at that and figure out how to predict it," says Racz.

Agronomists and soil test labs are looking at ways to compensate for the lack of a mineralization test. Labs typically provide a 10 to 20 pounds per acre N credit for crops grown on pulse stubble. Pulse straw has a low carbon to nitrogen ratio and is quickly broken down and mineralized into nitrate the following spring.

McKenzie says farmers and agronomists are looking at soil organic matter levels and past experience to help refine fertilizer N recommendations. The challenge is that mineralization is very dependent on soil moisture and temperature. Warm and moist means higher mineralization. Cool and dry mean less. Further, the types of crops grown in the rotation in the previous 20 years influence the amounts of easily mineralizable organic matter, which in turn affects N mineralization.

"It is a grey area. Some labs are looking at organic matter and making predictions on mineralization, but making predictions is as good as it gets," says McKenzie.

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What tech will you buy in 2018? These four farmers share their plans for 2018, including their motivation for investing in that system or product. As a bonus, we also ask them: **Do farms need to hire techies just like they hire agronomists?** 

# BY JAY WHETTER



## BEN HEIDE BOISSEVAIN, MANITOBA

ne improvement Ben Heide has his eye on for 2018 is accurate yield data collection. It could be a weigh wagon with a scale. It could be a truck scale in the yard. Or it could be a more

accurate yield monitor on the combine. John Deere, for example, has a new yield monitor with extra sensors that recalibrates with every tank full.

"As time goes by, I can see us making more and more decisions based on variable yield results across a field," Heide says.

The Heides tried variable-rate fertilizer applications last year, and Heide says improved yield monitoring would help confirm the value of this approach. "I think I see a value in it, but to check out ways to make poor parts of the field as good as the best parts of a field will take some accurate yield data," he says.

For example, he wonders if tile drainage to improve saline areas will provide enough return on investment. "I can see us trying some tile drainage to find out," Heide says. Yield data to compare tiled versus untiled areas or "As time goes by, I can see us making more and more decisions based on variable yield results across a field."

—Ben Heide

Ben Heide wants to make better use of the Excel spreadsheets program, like in this visual example, to improve decisionmaking. to compare results from specific patches before and after tiling will be necessary in making the right decisions for the whole farm.

Speaking of help making the right decisions, Heide says something as simple as mastering the Excel program can be a high-return investment in tech and time. "I've always strongly believed in analyzing cost of production," he says. Figuring out how to use Excel spreadsheets to their fullest can be a simple and low-cost tech solution to improve farm results, he says.

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ř.	East 2	Canola	200	43	\$408	\$60	\$55	\$12	\$150
ŧ.	South 1	Canola	150	42	\$399	\$60	\$55	\$12	\$150
È,	South 2	Canola	350	40	\$380	\$60	\$55	\$12	\$150
ð	South West	Canola	290	45	\$428	\$60	\$55	\$12	\$150
1	West 1	Canola	245	35	\$333	\$60	\$55	\$12	\$150
ź	West 2	Canola	157	40	\$380	\$60	\$55	\$12	\$150
\$								Total	\$218,788
4	<b>Total Acres o</b>	f Canola	3037						





## JOLENE AND BRENNON STRAIN NORTH BATTLEFORD, SASKATCHEWAN



about \$400 each) into a few bigger bins. That year, they lost a small bin to heating (it didn't have cables) and they probably would have lost one of the big bins if the cable hadn't alerted them.

One sensor in the middle of the bin started to move up in temperature. They acted immediately and turned over the bin, but it was a close call. "By the time we had the semi full with the first load, canola had stopped flowing out of the bin," Brennon says. In the end, they got everything out, cooled down and blended and didn't lose any value, but if they had relied on probes – which they would have done without the cables – they probably would have missed the temperature rise in the middle.

That was incentive enough to install the Bin-sense Direct cable system. With their current set up, the Strains plug into the bins to check the readings. In time, they hope to upgrade to wireless. "Even with the cables, I probably don't plug in and check them often enough," Brennon says. "With the wireless system, which uses a wireless router mounted at the top of the bins, I'd get alerts on my phone every time I came into the yard."

The other new piece of tech the Strains will buy for 2018 is a Horsch-Anderson high-speed planter with 15" row spacing and section control on each disc. "Going with a planter, where depth and placement are more precise, seed mortality would be drastically reduced and more seed will germinate at the same time, resulting in a more evenly maturing crop," Jolene says. Their plan is to seed at two pounds per acre, down from their usual four pounds.

"In the end, we will have fewer plants per square metre and we know there are risks with that," Brennon says. "So we'll have to monitor a lot more for insects, and if we lose seedlings to frost, there will be a higher chance of having to reseed." But based on their current calculations, this new technology could pay off fairly quickly. Left: Brandon Gibb will grow InVigor L233P with pod-shatter tolerance in 2018, with the goal of straight combining.

### "Going with a

planter, where depth and placement are more precise, seed mortality would be drastically reduced and more seed will germinate at the same time, resulting in a more evenly maturing crop."

—Jolene Strain

Below: Bin-Sense sends bin-temperature alerts to your smart phone.



## BRANDON GIBB HILL SPRING, ALBERTA

he biggest tech change on the Gibb farm for 2018 will be adding a shatter-tolerant canola variety for straight combining.

"We had a challenge in 2017

with uneven maturity. With it being so dry, our low spots were green but canola on higher ground was dry and shelling out," Brandon Gibb says. With shatter tolerance, the crop can sit a little longer waiting for higher yielding green areas to mature with lower risk of shatter loss across the rest of the crop.

"We haven't tried these shatter-tolerant varieties before because we hadn't seen a variety that matched the yield potential of standard varieties in our area," he says. "But I have yet to see a bad comment on Twitter about L233P." So that's the variety they will try.

In Southern Alberta, farmers "start to panic" if canola is still standing the first week of September, Gibb says, but adds that hot 35°C days in mid August really limit the safe hours for swathing. With shatter-tolerance, they won't have to swath in August and will be less nervous about standing canola in September.

"Standing canola can handle a September snow better than swathed canola, and we feel that standing canola will have an advantage when we get those big fall winds," Gibb says. Big winds will mean yield loss either way, but he says swaths blown into wads after a wind take longer to dry down after a rain and can be really hard on the combine.





## JAY FERSTER SHELLBROOK, SASKATCHEWAN

ay Ferster had three canola bins start to heat on him this past fall. The bins have temperature-monitoring cables set to notify him by text whenever one sensor shows more than a 2°C temperature rise within a 24-hour period. All three bins sent him texts.

"The system worked," Ferster says. "Without it, we would have lost one bin for sure. The investment paid for itself right there."

For the worst of the three bins, he emptied the whole bin to cool it down. For the other two, he took out just enough to remove the top where the temperature increase occurred.

Ferster had just installed the cables on 25 of his major bins that usually hold canola. He plans to install them in all bins over the next three to five years. For bins without cables, he checks them the best he can. That includes taking out some canola to cool the core. "Our plan has been to take the tops off all canola bins before New Years every year," he says.

Right now, Fester's cabled bins have just has one cable down the middle, even for bins with 30-foot diameters. "It has worked the way we wanted so far," Ferster says, but he'll reassess after the spring when the outside air warms up and moisture cycles within the bin change.

Another possible tech investment for Ferster in 2018 is a drill that can seed canola more accurately. His goal is to improve seed survival and keep costs down.

### SCHYLER RAAEN ROLLA, BRITISH COLUMBIA

chuyler Raaen, who farms in the Peace River region of B.C., has a goal to address farmland variability in 2018. He wants better production out of areas that hold water, and he'd like to be able to seed those areas earlier. Having more even stands and spending less time dodging low spots would make for better productivity, he says.

Raaen wants to know that crop inputs have good potential on the whole field, which will translate into a better return.

"I believe this to be the best ROI for our operation right now," he says. "Not that this is new technology, it's just the next step for our operation."

The primary issue is land topography and the water management challenges this presents. Raaen is looking at different options to deal with this. "We would need to upgrade our vertical GPS accuracy and purchase the necessary equipment," he says, which will cost between \$160,000 to \$200,000.

"Tech support is critical," he adds. "Unfortunately tech is so proprietary that we are pretty much reliant on the manufacturers and dealers. With communication errors and hardware failures etc., we can't diagnose these problems ourselves very often."

— Jay Whetter is the editor of Canola Digest. Want to be in a future panel? Email Jay at whetterj@canolacouncil.org.



# Do farms need a techie?

The farmers interviewed for this panel answer the question: Do farms need techies just like they might need an agronomist?

**Brandon Gibb:** We hire a guy to do our mapping and GPS because we don't have the time. I can see the day when farms have tech advisors, but at the same time, farmers could end up doing more of that themselves. With autosteer, I have time in the cab to research new technology. And with self-driving field equipment like SeedMaster's DOT system, which is the future, I look forward to the day when I don't have to be in the cab at all. That time saved could go toward tech-related jobs.

Jay Ferster: We're not quite there yet, but maybe in the next five years? For me, I'm after young staff anyway and technology just comes naturally to them. My sons are 17 and 15, and most of my staff are 24 or younger. They pick up technology faster, and they don't mind trying something new. Younger guys can be hard to keep, but I try to pick staff who want to stick around and get involved in the business.

**Ben Heide:** I'm not sure every farm needs a 'techie,' but rather someone who can gather information in a way that helps them to be more profitable through good decision-making processes. There is a tonne of info

available, and I'm not the most tech savvy producer, but to sift through and eliminate 'noise' and find products or tools that help my bottom line is where I find a lot of value. This applies to the whole cycle from machinery acquisition through production right to marketing a final product.

**Brennon Strain:** I think so. On our farm, we have guys who just have no use for new technology so I can't put them in a machine that is too complicated. But then we have guys who are like our techies. They keep up with the technology and will learn it.

Jolene Strain: Technology is always changing and evolving, sometimes quicker than we can adapt to it, so keeping up is very important. You got to be in it or you will be left behind.





### **STEP 1. SEE THE BIG PICTURE**

While total seeded acres across the Prairies went up 12 per cent from 1991 to 2016, use of tillage to prep the seedbed decreased by 58 per cent and no-till increased by 943 per cent in that time, according to Statistics Canada figures. Popularity of no-till operations grew mainly due to decreased fuel usage and increased concern for soil conservation. Although extensive research has shown that no-till operations yield even more benefits than initially realized, tillage has been making a comeback.

## **STEP 2. RECOGNIZE THE RISKS**

While tillage does help rid fields of excessive moisture, consider these other tillage factors before deciding to till:

**Clubroot spreads.** Clubroot spores move through the transportation of soil, and tillage equipment can be a significant mover of soil. Removing soil from equipment before leaving a field is extremely important. If soil erosion increases, this also increases the movement of clubroot.

**Soil pans form.** Tillage will disrupt aggregates (pores which hold air and water and/ or allow them to pass through), therefore decreasing the soil structure stability. This can limit drainage capacity and oxygen movement within the soil. With a return to tillage, fields can form tillage 'pans', a horizontal soil layer with a lower porosity and higher bulk density than the soil above it.

# **Tillage decisions**

Tillage is making a comeback with recent high-moisture years. With all the benefits of reduced tillage, is this a positive? Canola Council of Canada agronomy specialist **Brittany Hennig** goes through five steps to consider before returning to tillage or increasing the use of tillage.

**Organic material (OM) goes down.** The greater the tillage, the greater the loss of soil OM. Once tilled, expect at least five years for soil to gain back its no-till productivity in regards to OM stability.

## STEP 3. ASK YOURSELF, IS TILLAGE A TREND OR A REQUIREMENT?

Although I have listed many negative factors surrounding tillage, in some situations, tillage is required. No one answer will fit every situation. Look at each field and scenario differently and critically, considering climate, cost, soil type, moisture, labour, drainage, type of weeds, insects and disease, crop type, crop residue and field conditions (deep ruts, for example).

# STEP 4. CONSIDER ALL OPTIONS FOR LAND PREPARATION

Different implements can aid in crop residue distribution and incorporation, and moisture maintenance. Understanding which will provide the best fit for your situation will help make a better decision.

**Conventional:** A system incorporating most of the crop residue into the soil from multiple cultivation passes.

**Conservation:** As StatCan defines it, this is a system that limits the severity of tillage to retain stubble and crop residue still visible on the field. Alberta Agriculture's document "An introduction to wind erosion control" ranks implements by the

residue incorporated into the soil after one pass. A moldboard plow incorporates 60 per cent after one pass. A chisel plow incorporates 30-50 per cent. Tandem disc is 40 per cent. Harrow is 5 to 35 per cent.

**True Vertical:** Using rippled and/or straight discs in the soil that are placed straight into the soil (zero degree angle) to cause shallow vertical soil movement.

**Pseudo Vertical:** Discs are placed on an angle or too deep into the soil. This causes significant soil movement, and high speed makes it worse.

## STEP 5. INCLUDE AN ROI CALCULATION IN THE DECISION

Costs play a major role in deciding whether tillage is required. Equipment currently on hand, labour available and current field conditions are factors in the return-on-investment decision. For example, although there are great benefits in true vertical tillage implements, feasibility is not realistic for every grower, nor is the unit required for everyone. Critical judgment calls are vital when deciding if your field requires tillage. What are you willing to risk long term for short-term gain?

— Brittany Hennig is the Canola Council of Canada agronomy specialist for Southern Alberta. Email her at hennigb@canolacouncil.org. A Grain World session called "What technology is going to shape the next 3-5 years?" described the following tech trends.



# **AG TECH** THAT MAY MOVE THE NEEDLE

# BY TARYN DICKSON

hat technology will the future bring? One session at the revived Grain World conference (previously run by the Canadian Wheat Board; this year run by FarmLink Marketing Solutions and Farm At Hand) in Winnipeg on November 15 attempted to answer this question, with a focus on agriculture in the next three to five years.

So what are the trends to watch for or become an earlier adopter on? The three panelists in the session outlined five areas with good potential.

### 1. AI (ARTIFICIAL INTELLIGENCE)

Machines have huge room for improvement in their ability to respond to situations by themselves and adapt to dynamic situations just by 'learning from past experiences or likely outcomes'. This concept of machinery reasoning – making the most suitable decision based on all the given information – is essentially mimicking the human brain. If you think this may take more than a few years to achieve, Chris Foster, small grains production systems manager from John Deere, says the company he works for already has a combine that makes adjustments on the go (which people can still override, if they want), adapting to field variability. He doesn't think autonomous machinery, which will work well with AI, is too far away either.

### 2. SATELLITE IMAGERY IN REAL-TIME

Instead of this just being a 'postmortem' tool to assess fields at the end of the year, Patrick Crampton, chief operating officer for Farmers Edge, thinks that satellite imagery will soon provide the opportunity to monitor your field in real-time throughout the growing season, providing information on in-season decision making. For example, imagery could identify the amount and location of weeds and combine that with crop-stage information to allow farmers to make



Chris Foster, small grains production systems manager from John Deere, says John Deere already has a combine with artificial intelligence, making adjustments automatically and on-the-go. more accurate decisions regarding herbicide applications.

# 3. DIGITAL GRAIN MARKETING

Lyle Ehrmantraut, president and CEO of Ag Exchange Group, foresees more and more grain marketing being done online with help from well-designed programs, such as the CXN360 platform that his company offers. By giving growers real-time access to all the grain buyers they are interested in, growers can have more marketing choices, more freedom and transparency, a greater ability to make the best decision and the convenience of selling grain from their phone.

## 4. PRECISION USE OF DATA

Foster says farmers can expect improved data quality and increased adoption of data-driven precision agriculture. This will lead to even more collaboration between farmers and their crop advisors, he says. With the increased amount of data collected, Foster says growers may want to make sure they are cognizant of data security. Finding a trusted partnering company to work with is very important before handing over all the farm data. Sharing data with a competent, trusted source can be quite beneficial, especially when data pooled or aggregated with other data can start to show clear best practices.

## **5. DECISION AGRICULTURE**

Crampton uses the term "decision agriculture" to describe another big trend going forward. Increased use of predictive models will help farmers make more-informed decisions.

Programs like eScout, for example, already help combine input data with known information (ex. thresholds to follow) to produce suggested actions for farmers. New weather models are continually better at predicting and detecting conditions – such as inversion warnings for growers planning to spray their fields.

Improved predictions may also improve efficiency by alerting farmers when they need to stop and address machinery maintenance issues before they turn into breakdowns. Crampton pointed to the company UPS which already uses a similar technology to predict when a delivery truck breakdown is likely to happen and then preventing it (and thereby also increasing efficiency within their operation). Because it will require significant amounts of data to increase the accuracy of these models, they should become more accurate and therefore more helpful as data accumulates over time.

## HOW WILL THIS ALL TRANSLATE?

Thankfully all of these high-tech advances are expected to be developed with user-friendly interface platforms, similar to cellphones, so you won't need to be a computer programmer to run your drill.

Foster also seemed confident that technologies wouldn't price them-

selves above what a farmer can afford – as long as the increased returns to the farmer from this technology is factored in. That said, he advocates for farmers knowing their production numbers in order to make the best economic decisions.

In addition, with all the websites and programs to compare products (including brands, featured qualities and prices), it is now quicker and easier to compare dealerships and companies.

# SO HOW CAN YOU BE READY FOR THE FUTURE?

**Know your numbers.** Figure out which production values you don't know and start collecting them. Collect and calculate input costs, other costs, yields, quality factors that influence price, and gross and net returns each year, until you have a five-year rolling average. This becomes a comprehensive database for decision making.

**Track decisions.** Write down some (or all) of the big production decisions you made this year. This may include fertility information, conditions that led to the decision to spray or not, the type or lack of tillage you used, etc. It may be a surprise how many profit-influencing decisions you make in a season. Assess those decisions. What did you learn from an in-season or afterseason assessment of each major decision? Don't dwell on any missteps, just remember these lessons in future years.

**Be inspired.** Continue to be inspired by new technologies (especially those outside of agriculture) that could be applied to improve your operation.

**Be creative.** Continue to be creative with your problem-solving skills as you manage challenges each year.

**Try one new thing.** Try at least one new thing each year. This could be straight cutting one quarter section of canola, flying a neighbour's drone, scouting every field every week for at least one year, running a variety trial, buying a drop-pan for your combine or something else.

Talk it up. Describe (or even brag about) your improvement to at least one other farmer and ask them what new things they've tried recently. You just might make each other a bit more profitable in 2018!

— Taryn Dickson is resource manager for the Canola Council of Canada's crop production & innovation team.

Below: ActiVision cameras are part of the John Deere Combine Advisor system. The smart combine can sense an increase in losses and adjusts automatically as conditions change throughout the harvest day. As the company says, "It addresses losses a typical combine driver would not address."



# AGRONOMIST ABROAD



# What won us over in Hanover?

Europe grows a lot of *B. napus* oilseed rape (OSR) and OSR production tools are a big part of Agritechnica, the massive machinery show in Hanover, Germany. We went to see what new ideas and technology could possibly enhance our canola best management practices in Western Canada.

# BY SHAWN SENKO AND ANGELA BRACKENREED

gritechnica agricultural trade show in Hanover, Germany attracted 450,000 visitors this year, according to the official website, with more than 100,000 coming from outside of Germany. All were coming to see some of the 2,803 international exhibitors in a covered area of more than 100 acres.

We went to Agritechnica with a mission to see and learn about new production technology for winter oilseed rape, a very important crop in much of Europe. We wanted to find innovations that could benefit Canadian canola growers.

On our list to investigate were header technology for direct cutting, seeding equipment (specifically those set up for small-seeded crops) and precision ag technology. Further to that, we hoped to stumble upon other novel products and academic research.

Immediately striking is how elaborate and professional the exhibits are, with every detail from layout to lighting well executed. A lot of

exhibits have technology available in both English and German to guide the learning experience if a company representative is not available.

Although we were not particularly focused on tillage implements, they were everywhere. It seemed every unit had multiple disturbance methods, and they were often in combination with a tool of another function. One-pass tillage and seeders were common, and we saw some tillage and sprayer combinations. To further facilitate this many-jobs-at-once approach, most tractors are equipped to mount implements front and back.

## SEEDERS

Seeding with planters in Europe is common, but not into direct or min-till systems. Typical seeding rates used are in the 20-30 seeds per square meter. A few of the manufacturers have lines with heavier frames and openers and are investigating options for use in reduced tillage, but some of the smaller manufactures systems were not





SeedEye from Vaderstad precisely counts every seed that passes through the seed tube. With this feature, it can deliver the desired amount of seeds per unit of area, eliminating the need for calibration.



This Amazone spreader has precision spinners that adjust angles and rates, based on the mapping system, to provide what is basically "sectional" control to reduce overlap while keeping the proper rate across the remaining spread area.

Agritechnica featured a number of planters designed to direct-seed small-seeded crops like canola. This one, the Tempo planter from Vaderstad, holds the record for the most acres of corn planted in 24 hours at 1,240.59.

Above:

currently robust enough to handle reduced tillage. Most of the companies selling planters also had a line of very aggressive tillage equipment for pre-working to compliment them. One plans to field-test its high-speed planter in fields across Western Canada in 2018. Row spacing, although adjustable on many of the planters, still remains wider than the range that research in Western Canada has shown to be ideal.

### PRECISION SPREADERS

The spreader and broadcasting equipment section was so large it alone would take up most of the space at most Western Canada ag shows. Precision options, including variable rate, have really improved the simple spin spreader. Sectional control reduces overlap while keeping the proper rate across the remaining spread area. We see this technology being useful with current work looking at lime application for control of clubroot. With high rates and significant costs involved, being able to precisely apply a varying rate would make it more affordable and productive. As crop yields increase and sustainability measures become more and more stringent, the ability to apply all the nutrients for a crop up front may not be a possibility, so technology like this may be needed to precisely add nutrients.

### HEADERS

It was easy to find header technology designed specifically for straight cutting canola and rapeseed. European producers want a header that can work for all crops, and most company representatives agree that this is the "variable-knife" auger header – which we have very recently seen in Canada. Agritechnica had many versions on offer. Companies like BISO also had kits to modify conventional headers.

With these variable-knife headers, the cutterbar can be adjusted from the cab, with an extension typically out to at least 24 inches. The furthest extension we saw was just over 30 inches, but there may be models that go further. The knife can be brought in as close or closer than would be typical for a conventional auger header. We also saw flex auger headers with variable cutterbars.

Most headers were equipped with vertical knife dividers, crop lifters, steel pick-up fingers on the reel and full-fingered augers. Only one draper header was seen throughout the show, and representatives told me that the market share in Europe is very low. One model was a hybrid between an auger and draper, with a narrow draper on the table in front of the auger.

Some headers had more aggressive feeding pieces at the feeder house. A few companies offered headers that

could be put into transport mode from the cab, with one or multiple sections folding on top of the other.

Although Europeans are much further along and experienced in direct cutting, our Agritechnica experiences suggest we're on the right track as we move toward more acres being harvested this way in Canada.

### STORAGE

Storing in bins does not appear to be as common in Europe as it is in Canada, but there was a larger focus on storage and storage-monitoring tools than traditionally seen at this type of show.

We saw the "FlexWave" technology for the first time. The unloading system for bins has an in-floor conveyer and balloon-like system that expands and deflates on each side to push the last of the grain into the conveyer.

### OTHER OBSERVATIONS

As we walked through the show, we noticed that:

- Most implements had markers for guidance.
- Companies have a large focus on pull type, highclearance sprayers. These appeared to be more common than self-propelled sprayers.
- A lot of companies have an emphasis on their ability to compensate for varying terrain. Exhibit promotions often showed how an implement's tires and the axles adjust over rolling terrain.
- Efficiency, precision and input reduction were the name of the game for both existing and prototype units. Examples were the hybrid units, like the self-propelled sprayer and fertilizer spreader combo from Amazone and precision technologies that pinpoint application needs in real time.
- Many companies incorporate apps and technology to remove as much of the manual requirements as possible. For instance, Vaderstad uses an app to calibrate the planting unit, working through a Wi-Fi signal from the planting unit itself.
- There appears to be a lot of collaboration between companies. For instance, "agri-router" is a data services program from DKE Data that allows all forms of data from participating companies to "speak the same language." This eliminates the problem of multiple platforms from different brands of equipment that are not compatible. Ten companies are currently participating.

## CONCLUSION

We could have spent more than two days at Agritechnica. We missed more exhibits than we investigated. The overwhelming diversity of equipment, tools, inputs and projects on display from around the world was a great example of the continued investment and innovation put forth to advance agricultural practices.

— Angela Brackenreed and Shawn Senko are agronomy specialists with the Canola Council of Canada. Email them at brackenreeda@canolacouncil.org and senkos@canolacouncil.org.











European producers want a header that can work for all crops, and most company representatives agree that this is the variable-knife auger header which we have recently seen in Canada. This one extends 800mm (about 32 inches) and is adjustable from the cab.

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# **Top science for the bottom line**

The Canola Research Hub at canolaresearch.ca is a user-interactive database with practical tools designed to return growers' investment in agronomic research back to the farm. The Hub library currently incorporates over 100 agronomic studies and the annual Science Editions of Canola Digest.

# BY BARBARA CHABIH

he canola industry contributes more to the Canadian economy than any other grain or oilseed crop, and research investment through a long-term science strategy provides innovation that will expand its potential. Canola agronomic research is supported by the industry through the provincial canola grower organizations, the Canola Council of Canada and government-backed research partnerships, with studies focused on increasing yield and profitability for growers, reducing production risk and enhancing sustainability.

The 2017 Science Edition of Canola Digest released in November highlights the excellent return that well-spent research investment of levy dollars provides and how that investment opens up other sources for funding. The grower experiences featured in this issue, alongside summaries of recently completed and ongoing projects, demonstrates how research pays dividends to the canola growers of Western Canada.

The science behind these specific grower stories can be found in the summaries, full project reports and video interviews available on the Canola Research Hub at canolaresearch.ca. Here are some recent findings that help build on over three decades of research and provide best-practice recommendations for today's canola varieties.

## FERTILIZER RECOMMENDATIONS FROM SOIL TESTING

One such study, led by Kabal Gill of Smoky Applied Research & Demonstration Association (SARDA), found that soil-test-based fertilizer applications can be a sustainable and economical technique to optimize crop production and profit margin in both direct-seeding and conventional tillage systems.

This study investigated the effects of different fertilizer rates and seeding systems (direct seeding and conventional tillage, individually and in combination) over six growing seasons. Fertilizer rates were tested at 0, 60, 100 and 140 per cent of the recommendation in a canola-cereal (wheat or barley) rotation, based on annual soil tests for depths of 0-6" and 6-12". The amounts of nitrogen, phosphorus, potassium and sulphur nutrients were calculated for each treatment.

Soil-test-based fertilizer applications aren't always used due to questions of their effectiveness. Gill's results suggest that these recommendations are reliable, and nutrient availability from Plant Root Simulator soil probes supported the accuracy of soil test results. A fertilizer rate near 100 per cent of the recommendation was able to achieve optimum canola yield.

# LATER SWATHING OR STRAIGHT COMBINING FOR HIGHER YIELD

With growers taking on more acres than ever, the time crunch at harvest can make it tempting to begin



"Knowledge gained through local fertility trials has helped us make better fertilizer-rate decisions, which have made a big difference to the bottom line for our farm."

—Danny Dion, Donnelly, Alberta swathing early. But the yield gain and improved quality resulting from allowing additional time for colour change can make it well worth the wait. These findings were first published in the CCC's Crop Production Centre summary reports from 2001 and 2002 and have been supported by subsequent literature.

A 12-site-year study from locations across the Prairies and one site in B.C. determined that the highest-yielding swathed crops were cut at either 50 to 60 per cent seed colour change (SCC) or 60 to 70 per cent SCC on the main stem. By swathing progressively later (up to a maximum of 60 to 70 per cent SCC), canola fields also produced higher seed weights, greater oil content, lower green seed percentage and a higher grade.

Later studies also determined that yield loss and swath timing were strongly related. The lowest losses were associated with swath timing as late as 60 to 80 per cent 'brown seed' and the highest losses recorded at 10 to 20 per cent (Brown et al, 1999). Harvesting canola when seeds were brown to black also resulted in higher seed quality for growers producing seed canola (Elias and Copeland, 2001).

An extensive study of Western Canadian canola samples confirmed that yield and oil content were

Canola seed yield (tonnes/ha) based on fertilizer rate (% of recommended)								
Treatment	2011	2012	2013	2014	2015			
Mean 0%	3.19	1.41	1.42	0.83	1.04			
Mean 60%	4.08	2.56	3.34	1.58	3.01			
Mean 100%	4.02	3.02	3.73	1.79	3.14			
Mean 140%	4.31	3.30	4.27	1.83	3.39			
*LSD	0.31	0.178	0.46	0.166	0.341			

Source: SARDA \*LSD is least significant difference at 5% probability.



positively correlated (Daun, 2006) and that the increased duration required for higher-yielding crops to mature also provides the time needed for chlorophyll levels to decrease to an optimal level. This is supported by findings that per cent green seed is significantly higher in early-harvest canola and seedpod shatter losses are greater in later-harvested canola (Watson et al, 2008).

With current hybrid varieties and lower target plant populations that result in more yield from side branches, later swath timing is even more crucial. Of course, every year won't necessarily allow for ideal conditions, but waiting even a few extra days to swath will reduce average quality losses and increase yields for the farm. For more information, check out the CCC swathing guide at **canolacouncil.org/links/swath**.

Researchers have also worked to determine if the risks from straight-combining of canola are offset by increased yield potential, based on producer experience. In the Canola Harvest Management Study led by Paul Watson of Alberta Research Council under the provincial grower groups' Canola Agronomic Research Program, treatments included low and high crop density, low and high fertility, early and late weed removal and early and late harvest time. These factors were selected to evaluate the relationship between potential yield and shatter loss.

Watson's results conclude that straight cutting canola is a viable

option for producers. Averaged across all sites and locations, the top five straight-cut treatments consistently provided equal or better yields when compared to the optimal swath check. The most important factor for improving yield was increased fertility, and the probability for success is increased by following best management practices for stand establishment, crop nutrition and pest management.

Another study led by Chris Holzapfel of Indian Head Agricultural Research Foundation (IHARF) found that some varieties are better suited to straight combining than others and that success largely depends on environmental factors and timeliness of harvest. This four-year, multi-site study examined yield losses due to pod shatter and pod drop at optimal and delayed harvest dates.

While varieties showed differences in resistance to pod drop and pod shatter, environmental conditions often had a greater impact on the quantity of yield losses. These findings may have been impacted by the varying days to maturity for each variety, ranging from 90 to 106 days across all varieties tested.

Timing of harvest affected total yield reductions, as expected. Varieties harvested when ready had losses of less than five per cent, compared to the sites harvested three to four weeks later with an average yield reduction of 15 per cent across all site years and varieties. Holzapfel determined that 25 to 50 per cent of these yield losses were generally the result of pod dropping as opposed to pod shattering.

As long as harvest wasn't delayed too much, this study found that losses from straight combining shouldn't be significant under normal environmental conditions. Pre-season selection of shatter-tolerant varieties should still include consideration for yield potential, days to maturity and herbicide system rotation, and growers should strive to complete harvest as soon as possible after the crop is fit to combine to minimize losses.

You can find summaries, reports and interactive data from this research, and other completed and in-progress studies, on the Hub at canolaresearch.ca.

-Barbara Chabih is communications program coordinator with the Canola Council of Canada. She manages the Canola Research Hub.



"One bit of farmer-funded science that has made us a lot of money is work to show how later swathing and, in some cases, straight combining can produce higher yields."

—Jody Klassen, Mayerthorpe, Alberta

# Ins Real Loo

# Inside the Canola Research Hub

Looking for canola research and best practices in canola production? Find it at the Canola Research Hub – canolaresearch.ca

- Navigate a library of research summaries
- View and filter research data
- Watch video interviews and clips
- Access published resources
- Download multimedia materials
- Keep up to date on science-based industry news and events

The Canola Research Hub has been made possible by the canola industry's investment in agronomic research through the CCC and grower check-off dollars administered by their provincial organizations. It is supported by a \$15 million Agriculture and Agri-Food Canada canola research cluster investment under *Growing Forward 2* (GF2).

The Hub's library currently houses over 100 reports from programs including AAFC's Growing Forward (GF), the Canola Agronomic Research Program (CARP), studies funded by the provincial grower groups and the Ultimate Canola Challenge (UCC). This database will continue to expand. Over 60 people attended the landmark Canola Dialogue in Beijing, China in November. The meeting, the first of what could become an annual event, discussed market opportunities, import standards and the benefit of stable and open trade for Canadian canola into China.



# **FIRST EVER** "CANOLA DIALOGUE" EVENT IN CHINA

# **BY JAY WHETTER**

t the opening of the first ever Canada-China Canola Dialogue, Bian Zhenhu, president of China Chamber of Commerce of Import and Export of Foodstuffs, Native Produce and Animal By-Products (CFNA), remarked on the healthy relationship between Canada and China since the 1970s and the great potential for canola sales into China, particularly targeting the large middle class.

Canada's Minister of Agriculture and Agri-Food Lawrence MacAulay, in his address at the Dialogue, reminded everyone in the room that "when you buy Canadian canola, you are buying the best." MacAulay was in China leading a Canadian industry trade mission, and the Dialogue was a key part of his agenda. Canola represents about half of Canada's agri-food exports to China. He said the Government of Canada is committed to working with China for the good of Canadian canola trade.

Over the past decade, China has become a large and reliable market for Canadian canola seed, oil and meal. China is the top market for Canadian canola seed, buying just under 4.0 million tonnes through the 2016-17 crop year. China also accounted for 26 per cent of Canadian canola oil exports in that period, second to the U.S., and 19 per cent of meal exports, also second to the U.S. In all, Canadian canola trade to China in 2016-17 was \$3.4 billion – 30.6 per cent of the total value of Canadian canola exports. (Find these numbers and more in the November Canola Digest article, "Canola Market Snapshot 2017", online at **canoladigest.ca**.)

China needs food imports. While the nation of 1.4 billion people is highly productive – with government policy supporting and achieving



near self-sufficiency for rice, wheat and corn – it will continue to buy large quantities of vegetable oil to meet domestic demand. Canadian canola oil, with its high quality, reliable supply, low saturated fat and high heat point, should have strong appeal among Chinese cooks. Canola meal is also a good value option for Chinese dairy, swine and aquaculture producers.

The Dialogue provided an opportunity to emphasize these points. It also gave Chinese authorities a chance to share their perspectives. Huang Yajun, division chief for China's Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), the regulatory agency responsible for the safety of grain imports, discussed blackleg and dockage.

In September 2016, Canada and China agreed to implement a science-based workplan that mitigates the risk of blackleg to China. The risk with dockage, China has said, is that it could introduce blackleg *L. maculans* into China. Canada says the risk is very low, and virtually zero when these shipments go straight to the processor. Canada also says lowering the dockage specification doesn't change this.

"We are patient enough. We will wait for 2020," Huang said (speaking through an interpreter) in reference to negotiations.

Part of the purpose for the Dialogue is to present these points in an open meeting so they may be expressed and resolved without trade interruptions. The Dialogue aligns with an important recommendation from the Canadian Agri-Food Trade Alliance's February 2017 report, "Chasing China," which says political and official interaction will have to increase "if trade between Canada and China is to expand and if the objective is a more predictable trading environment."

In his presentation at the Dialogue, Jim Everson, president of the Canola Council of Canada (CCC), talked about standards and regulations in Canada. He mentioned the CCC's Keep It Clean program to ensure Canada's canola exports meet food standards in China and all other "This agreement signals the start of a new relationship with Chinese importers based on cooperation to support mutually beneficial trade."

—Jim Everson



# *Left: Over 60 people attended the Canola Dialogue in Beijing.*

Right: During the Canola Dialogue in Beijing in November, Minister of Agriculture and Agri-Food Lawrence MacAulay witnessed the signing of a Memorandum of Understanding between the Canola Council of Canada (CCC) and China Chamber of Commerce of Import and Export of Foodstuffs, Native Produce and Animal By-Products (CFNA). Signatories were CCC president Jim Everson (left) and CFNA president Bian Zhenhu (right).

markets. He talked about the importance of science-based regulations for Canadian and Chinese consumers. The bottom line is that Canadian canola is a safe and healthy product, and scientific studies prove this. "And stable and open trade in canola means a healthier cooking oil for China," Everson says.

As part of the Dialogue, Everson and Bian signed a Memorandum of Understanding (MOU) between the CCC and CFNA. The MOU includes provisions such as communicating on regulations affecting trade and working together to facilitate industry meetings and exchanges.

"This agreement signals the start of a new relationship with Chinese importers based on cooperation to support mutually beneficial trade," says Everson. While the Dialogue did include different positions on various potential trade issues, at the end of the day China and Canada have the same interest – and that is to trade in a high-quality oilseed product that Canada produces and China needs.

— Jay Whetter is the editor of Canola Digest. An update on the Canadian Centre for Food Integrity and the continuing quest to build more trust in Canadian farming and food.

# **BUILDING PUBLIC TRUST** FOR CANADIAN AGRICULTURE

## BY TREENA HEIN

ublic trust in the food system is a very big issue these days. Consumer concerns range widely, from environmental impact issues (bee numbers and algal blooms) to food prices and new genetic techniques.

The pressing question, in the view of Crystal Mackay, president of the non-profit Canadian Centre for Food Integrity (CCFI), is to what extent will farmers be trusted to operate and take advantage of new innovations? "There are new and amazing opportunities in agriculture to use fewer resources or use them more efficiently, but we can't take advantage of these opportunities if we don't have the trust of consumers," she says. "Transparency is no longer optional and everyone in the food system is responsible for building trust."

CCFI members represent the diversity of the food system, and include the Canadian Canola Growers Association (CCGA), Alberta Canola, companies, institutions and more. "The founding of the centre is a sign that Canada's ag sector has realized public trust is bigger than any commodity, province, company or any other part of the food system," Mackay explains. "It's a holistic food system issue that spans the developed world. We are an affiliate of the U.S. CFI, and we continue to build on the thinking that's been done there through millions of dollars of investment."

Like its U.S. counterpart, CCFI holds a yearly Public Trust Summit, offers training opportunities for members and contributes to **bestfoodfacts.org**, a science-based online resource where experts from North America answer consumer questions about their food. CCFI also conducts public trust research. "While there are some similarities amongst Canadian and U.S. consumers, the views and attitudes here are unique, so it's very important to have our own data," says Kelly Green, CCGA director of communications. "CCFI's annual survey allows us to gauge public attitudes about Canada's food system from field to fork. Over time, this research helps us see trends, better understand which issues are most important to consumers, more effectively provide information and build trust."

### WHAT ARE CONSUMERS SAYING?

One of the most important results of CCFI's 2017 survey of 1,307 Canadians is that while only 43 per cent believe the food system is headed in the right direction, it's a significant jump from 30 per cent in 2016. "Not only can we compare over time," notes Mackay, "but we can compare responses among provinces, to the U.S., and among groups of responders such as women, men, foodies, moms, millennials and more."

Transparency was a focus of this year's research, and respondents ranked farmers as most or second-most responsible for demonstrating transparency in four of five areas of food production. "People want to be able to ask questions about absolutely everything on their plates," Mackay says. "It's not appropriate anymore for a food company or a farming association to put out a press release when there is a new food product launched, or when a new technology or other development is now available. We have to put everything under the lens of public trust all the way along."



And being scientifically sound isn't enough. A technology or practice or product also has to be ethically based and economically viable. "We have to achieve a balance of the three and these discussions are now occurring," Mackay says.

Major global ag companies are also doing their own public trust research. Bayer did a recent survey of 10,000 people in 10 countries and found that many consumers remain emotionally skeptical about trusting science. Indeed, the intersection of public trust and science was the focus of Bayer's 'Future of Farming Dialog' in Europe this summer. At this event, Liam Condon, Bayer's Crop Science Division president, noted that "we live in a posttruth era in which populism and political polarization jeopardize the acceptance of modern science. Well-established scientific facts are questioned by people who prefer to believe in rumours and emotional campaigns."

On that point, CCGA president and Manitoba farmer Jack Froese finds it handy to use a comparison. "Consumers are free to adopt the latest technologies for their own enjoyment if they can afford them," he says. "Things like drones or robotic vacuums or automated voice-command systems for the home to turn lights on and tell you the weather. These are not necessities, these are pleasure tools, but at the same time, consumers want to restrict farmers from using the latest technologies to produce food, a necessity."

Froese says consumers don't understand how innovations let farmers protect the environment and produce food more abundantly with less water and other inputs. "They also don't understand that although Canadian farms have become larger and are under modern financial structures, they are still very much family farms," he says. "And that what I grow, I feed to my children and my grandchildren." Froese also wants consumers to know how much farmers care about bees. "We need bees and they need us," he says. "I cannot do things that harm bees. I am dependent on them."

Mackay believes it's important that every canola farmer help address the fact that 92 per cent of Canadians know little about agriculture. "Agriculture and food is becoming more complex and people are increasingly further removed from the farm," she says. Communications with consumers should not focus on convincing, but on engaging, she says.



Froese recently had a challenging opportunity to engage with a consumer. Froese had rented fields from this consumer's late father for quite some time. "He asked me why he should continue to rent the land to me for growing canola," Froese says. "I was really taken by surprise, and I told him I would get back to him very soon. I didn't know what to do. I thought about it, and then went and got the soil tests for the land. I took it all to him a few hours later. The tests showed over time that organic matter had gone up, nutrient levels were up, the soils was much improved. It showed him in black and white that soil condition and health is something that a farmer protects and care for."

Mackay points out CCFI research showing that consumers trust farmers more than, for example, university or government academics and David Suzuki, and trust farmers far more than they do farming associations. "We need to build on that," she says. "We have to look at new methods of connecting with consumers, and keep in mind that for any topic online, the negative that consumers find vastly outweighs the positive. Please keep having conversations, one person at a time. Share bits on social media. Promote 'Best Food Facts.' Do whatever you're comfortable with."

 Treena Hein is an award-winning science writer and educational resource consultant. A survey from the Canadian Centre for Food Integrity suggests that, on environmental issues, Canadians believe farmers themselves more than farmer associations.



# Canola conversations

Canola industry efforts to build consumer knowledge and trust include:

- Talking with Canadians about the important relationship between canola and honey bees.
  Read "Bees and canola: A sweet relationship" at canolacouncil.org.
- CCGA is involved with 'The New Farm Project' through the Toronto Star and Metro Newspaper, which includes 21 stories so far about many kinds of Canadian agriculture.
- Creation of a canola exhibition at the Canada Agriculture and Food Museum (a permanent and travelling exhibit).

Soy sauce is made with soymeal and cracked wheat. University of Winnipeg microbiologist Paul Holloway is testing whether canola meal can replace soy meal to make a similar umami-driven condiment.





# RICE IS NICE WITH... CANOLA SAUCE?

**BY JAY WHETTER** 

oy sauce was invented in China in 500 B.C., according to the short history at Kikkoman's website **kikkomanusa.com**. A thousand years later, a Japanese zen priest, who experienced soy sauce while traveling in China, starting making the sauce in Japan. Over the centuries, modifications to the Japanese process included using wheat in equal proportion to soybeans.

Kikkoman, the famous Japanese soy sauce brand, opened the first commercial soy sauce brewery in Japan in the 1600s. With rising U.S. demand, it launched a processing plant in Wisconsin "in the heart of America's wheat and soybean country" in 1972.

Paul Holloway, a microbiologist and associate professor at the University of Winnipeg, thought, "We have millions of tonnes of canola meal, why not try canola sauce?"

His study 'Can we replace soy sauce with canola sauce?' is one of the few non-agronomy studies to receive funding through the grower-organization-driven Canola Agronomic Research Program (CARP). Over the past year, he and some students have been experimenting on a very small scale using Tupperware tubs and 10-litre pails.

Their procedure is fairly simple. Step one is to create the "koji." They mix cracked Manitoba wheat 50:50 with canola meal from the Viterra processing plant at Ste. Agathe, Manitoba, then add Aspergillus soyae fungus, which breaks down the meal. To that, they add a little water every day to create the necessary moist environment. After three to five days in a sealed tub, the chunky mass called "koji" is ready.

Holloway's team produces a few cups of koji per batch. Commercial soy sauce production, he says, uses a long, large, steamy tube to generate large quantities continuously. Ingredients pour in the top and slowly auger through the tube to extrude out the far end as finished koji.



For step two, koji goes into a bucket of salt water (18 per cent salt) along with lactic acid bacteria. (Lactic acid fermentation is also used to make sauerkraut.) This ferments for a minimum of six months. Through this time, proteins break down into the amino acids that give the sauce its "meaty taste," Holloway says. In Japan, this brothy taste is considered the fifth flavour – called "umami". In North America, we're more familiar with the first four flavours: sweet, salty, sour and bitter.

The final step after fermentation is to strain out the solids. The resulting liquid is canola sauce.

Holloway and his students review each batch for colour and taste, trying it straight and on rice. Canola sauce, they discovered, is naturally light brown, not the black of soy sauce. They also found it quite salty when taken straight.

"In our informal taste tests, we found that two of our batches of canola sauce were comparable in taste to commercial soy sauce," Holloway says.

For next steps, Holloway and his team are trying food-grade dyes to darken the sauce and will roast the wheat to see if that enhances the final colour. As for the saltiness, the 18 per cent salt is traditional, providing "a natural preservative" through the fermentation stage. They will experiment with lower-salt brines, but as Holloway says, the two sauces are not that different in a taste test.

The team doesn't have large quantities of sauce made yet, but Holloway says anyone who sees commercial potential is welcome to take a test sample.



Left: The canola sauce final product is lighter in colour than traditional soy sauce.

Right: University of Winnipeg microbiologist Paul Holloway tests 'canola sauce' recipes at his lab.

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# "Help us have more fun!"

Some farm men are experiencing a serious lack of fun, and this can start to influence the business, family harmony and all aspects of life. The good news is finding your own fun and setting aside the time is a choice. You can do it.

# BY ELAINE FROESE

remember distinctly where on the gravel road we were when my farming husband relayed

a strange question from a crop protection survey: What's the one thing we could help you do better on your farm? "Show us how to have more fun!" was hubby's quick reply.

The male gender bias here is intentional as the dilemma is this: farm men are not having fun.

Let's start with a definition, or a question. What does fun mean to you?

It is travel? Expedia's travel study found 62 per cent of the ag industry surveyed felt vacation-deprived. Is it play? A hearty laugh with family or friends as you work on the farm? Or a special set-aside time where you go away to hunt, fish, golf, play floor hockey, hike or light a bonfire at the lake? No Expedia bookings required. As an extrovert, fun for me is doing something with other people because other people give me energy. I love to be deep in conversation face-to-face with friends and family. Brene Brown's latest book *Braving the Wilderness* explores the importance of connection to others, especially sharing emotional connection face to face. Sometimes men enjoy this collectively at football or hockey games, being present at the live event, not merely facing the blue light of SportsCentre TV.

## WHY AREN'T YOU HAVING MORE FUN IN YOUR LIFE?

This question makes you feel uncomfortable, so you might as well just stop reading now. But hang on. "Why?" is the question of intent. Your intention to grow a profitable farm is honourable, but what are you sacrificing on the journey to build your empire? I coached





What does fun mean to you? It is travel? Or a hearty laugh with family or friends as you work on the farm? Or a special set-aside time where you go away to hunt, fish, golf, play floor hockey, hike or light a bonfire at the lake? a young couple desperately trying to create new boundaries to protect family time on winter evenings and weekend Sundays. They risk a crumbling marriage and possible divorce if the marriage relationship is not repaired.

Answering the "why" is a good step toward solutions. You get to choose how you spend your time and who you want to connect with. Marilee Adams, author of *Change Your Questions, Change Your Life,* would encourage you to adopt a learner mindset around seeking ways to add more fun to your days. One idea is to shut off the TV and play games again. We just learned to play cribbage.

Why you're not having more fun could be because...

## **"There is too much work to do on the farm."** Can you ask for help? Hire help? Say enough is enough and take a break to walk in the woods? What



might you need to let go of? Work and play are called polarities. They are an unresolvable problem in the quest for balance that can only be managed, not solved forever. The upside of more play in your life is a more productive workforce when the farm calls.

**"My health is failing."** Consider what you can do to be healthier, meanwhile build on what you can do. For example, take the grandkids skating on the pond. Have weiner roasts. Teach the next generation how to change spark plugs on the antique tractor you are restoring.

**"I am too old to have fun."** Hogwash. When did age become a barrier? An attitude of gratitude will propel you into new ways of having fun. Embrace art, music and creating things anew again. Weld me a new piece of farm junk art.

### "My friends have all moved away."

Okay, you're the last farmer standing in your field. Go for a community supper, go help a neighbour, serve somebody and get re-connected again. If all the lonely guys congregated at an auction sale over pie, they wouldn't be lonely would they? Reaching out is the first step to finding ways to have fun. Carve out time to make new friends. Explore **www.mensheds.org.au**. I know of a group of men who enjoy hanging out in a garage once a month to fix things, listen and BBQ.

### "People don't just visit anymore."

Not true. People choose not to use their cell phones to ask if you would like to connect, and they assume you are too busy to spend time chatting. Ask any person recovering from an injury and they will tell you how precious texts, phone calls and visits The upside of more play in your life is a more productive work force when the farm calls. are towards the feeling that you matter and belong. We ran errands one Sunday to three separate farms and each family begged us to stay for a visit. Who in your circle of friends needs to visit with you?

### "I think I might be depressed because I haven't laughed in

**months."** Take this seriously. Visit your doctor to see if there are physical reasons you are not having fun. With all the Internet options for funny videos, you might just need to be more intentional about using comedy to tickle your funny bone.

**"My wife thinks dancing is fun and I don't dance."** Where is it written that you can only do things as a couple? Your wife can go to dance class, and you can do another activity that fills your soul. If you danced when you were dating, then I suggest you go to dance lessons together and re-kindle the original spark.

#### You have forgotten how to be

**present.** Nature is renewing. Amazing sunrises and cloud formations are cheap entertainment on the Prairies in all seasons. Take time to pause and be present to your surroundings, including the flora, the fauna and the amazing folks who show up at the farm. Take the time to build the straw bale fort, the snow quinzee hut or slide down the ravine or coulee. Re-connect to the things that brought you joy as a child, and do them again now.

The farmer's fun factor is a choice. Talk about your play options. Then get out and do them!

— Elaine Froese enjoys playing with her new grand-daughter, watching Blue Jays (the birds) at the lake house, and holidaying with her hubby. Building forts with children is her idea of pure fun. Visit www.elainefroese.com. Read Dan Buettner's new book The Blue Zones of Happiness: Lessons from the World's Happiest People.

# **BUSINESS MANAGEMENT**



# Sick. Not weak

TSN's Michael Landsberg presented "Why is it so hard to talk about mental health?" at Grain World in Winnipeg in November.

# BY TARYN DICKSON

y name is Michael Landsberg and I've been called arrogant, brash and cocky, and I have suffered from depression and severe anxiety since 2000. It has taken me down and left me feeling like I had no value. I am currently on medication (although I am not advocating that this is a solution for everyone, but it has helped me) and have gone to therapy for this. I am not ashamed or embarrassed about this. And I am definitely not weak."

This was Landsberg's opener at the Grain World lunchtime session sponsored by Canadian Canola Growers Association and Manitoba Canola Growers after a short introduction on mental health in the farming community - a video with Paul Harvey's narration of the 'So God made a farmer' poem and the acknowledgment that farmers are tough, hard-working people and can

have struggles with mental health.

Landsberg, who has been with TSN since 1984, hosted Off the Record, TSN's 18-season series from September 1997 to December 2015, and has hosted Olympic Games coverage. Landsberg first publicly mentioned that he had struggles with mental health in an interview with Stéphane Richer, a successful hockey player who played for the Montreal Canadiens and also struggled with mental health.

The emails Landsberg received after that interview really impacted his life. They led him into more conversations about mental health and to becoming a public spokesperson on the subject. He is an advocate for reducing the stigma of mental illness, personally and as an ambassador for the Bell "Let's Talk" initiative.

explained. It is like an injury that requires fixing. You just can't see it the same way you can see other diseases.

You can see the impact of the disease, though, as nearly everyone in the audience raised their hand when asked if they know someone who has been affected by a mental illness or even worse, by a suicide resulting from mental illness. Still, while on the subject and discussing the importance of it, very few people were able to admit to having mental health issues.

It can be hard to talk about it, but there are people to help. Please see the sidebar with phone numbers for resources and support. ∺

- Taryn Dickson is resource manager for the Canola Council of Canada's crop production & innovation team.



# Mental illness is a disease, Landsberg

# Farm Emergency Resources and Support

Whether for yourself or a family member or friend, contact these help centres for any mental health concerns:

British Columbia: CRISIS Centre BC, 24-hour support. Phone 310-6789 Alberta: Mental Health Hotline, 24-hour support. Phone 1-877-303-2642

Saskatchewan: Farm Stress Line. Phone: 1-800-667-4442

Manitoba: Manitoba Farm, Rural Support & Northern Support Services, (M-F 10 a.m. to 9 pm). Phone 1-866-367-3276

Manitoba: Klinic Crisis Line, 24-hour support. Phone 1-888-322-3019

Ontario: Mental Health Help Line. Phone 1-866-531-2600

Find more information for all provinces here: nfu.ca/about/farm-emergency-resources-and-support. Stock.com/ThitareeSarmkasat Credit:



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