

FARMING SMARTER

WINTER 2019 EDITION



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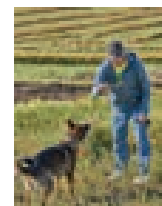
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Farming Smarter is published bi-annually by Glacier FarmMedia LP for Farming Smarter, 211034 Hwy 512, Lethbridge County, AB, T1J 5N9

Editorial Board: Ken Coles, Jamie Puchinger
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Cover photo: Mario Bourque inspects the galls on a clubroot infected root system located by Josie (dog).

PHOTO: MORTON MOLYNEUX

We're better as a community

BY DOUG BRODOWAY



This will be a season that will for sure stick in farmer's memories. The weather we had led to yields from five to 15 bu./acre for much of the south and particularly south east corner of the province for the third year straight. On the west side of the province, they had good news with some record high yields recorded from no shortage of moisture.

Variable weather during growing seasons will always cause issues for farmers and this is where Farming Smarter comes into play as a good partner. This past year brought many new projects to the Farming Smarter team in both research and field scale trials. Most of the projects are four-year research programs, so we can only release a few final reports each year once we complete studies and write final reports for granting organizations.

The Farming Smarter team only conducts research and field scale projects if southern

Alberta farmers can benefit from the knowledge gained. Our goal is to help farmers learn new ways of farming, increase bottom lines and keep up with the never ending changes in agriculture.

As per the results from a membership survey in January, we created subscription packages to satisfy various ways people said they want to interact with us and our information. We also created a membership option for people that want to fully engage in our organization. I encourage you to have a look at them on our web site.

Farming Smarter needs strong membership support and strong partnerships moving forward to continue doing the work we do for farmers and agriculture in general in southern Alberta.

We've enjoyed some very helpful partnerships in recent years. These are particularly important for our public outreach. Events,

publications and website work receives very little funding through research grants and forces us to rely on sponsorships to fund getting information into your hands. If you value what you can learn from our efforts, please let your government and crop commission representatives know you want it to continue. We need this support very much.

As the chairman of Farming Smarter, I thank you for your involvement this year and I hope we can count on your continued support as we embolden agriculture in southern Alberta through sound science and applied techniques. —

Doug Brodoway
Farming Smarter President

General Manager's Report

Ups and downs of research

BY KEN COLES



It was certainly another sad growing season in southern Alberta. Multiple years of drought and poor timing of rain lead to some pretty pitiful crops and lots of weeds! This is particularly concerning as glyphosate-tolerant kochia seems to be taking over the landscape. Irrigators are thankful they had water although many were hit with some nasty hailstorms. Don't you just love farming?!

Dryland trials in Lethbridge were some of the worst I've ever seen. You really learn how important good crop competition is for weed control as we worked our sprayers hard and our summer students too. However, our irrigation trials were lush, and we enjoyed several engaging tours.

My highlights were successfully establishing a huge workload of new CAP funded projects, many new industry contracts including over 100 research trials. We had a new bunch of summer students and a new intern who were just wonderful. Everyone worked hard and had lots fun

which made the summer fly by. We were lucky to have hosted the new Agriculture Minister Devin Dreeschen, his staff, MLAs and county officials on a three-hour tour and no one was left stranded on a deserted island.

Project highlights were the precision planter projects, hemp, fusarium head blight/novel crop sequence, new biobed, clubroot sniffing dogs and working with the Lethbridge College on 360-degree camera's, virtual reality and podcasts.

Harvest was long and plagued with breakdowns, but we were fortunate to get some help from our friends at AAFC. Now it's time to crunch some numbers and plan for next year.

Thanks for your support! —

Ken Coles
Farming Smarter General Manager



Ken Coles and Alberta Ag Minister Devin Dreeschen chat during a break in the action Aug. 21 at Farming Smarter. PHOTO: M. MOLYNEUX

Message from the Minister

As Minister of Agriculture and Forestry, I am pleased to extend greetings on behalf of the Government of Alberta to *Farming Smarter* readers.

Agriculture is essential to Alberta's history, communities and economy, contributing billions to the province every year. Our government is focused on removing red tape and regulatory burden for Alberta farmers and ranchers and building a farm safety and workplace regulatory system that works for this unique sector.

Our agriculture industry has a hard-won reputation for high-quality agricultural products. That reputation relies on the hard work and ingenuity of Alberta producers, and an ongoing

commitment to environmental stewardship and industry development.

We proudly support organizations like *Farming Smarter* because we know innovative farming practices are key to a strong agriculture sector. We have shared goals to support technology adoption, enhance competitiveness and promote sustainable agricultural stewardship.

During the summer's Farm Freedom and Safety consultation's, we heard from producers across Alberta about their research priorities. We want our research priorities to meet the agriculture industry's needs. The feedback we got from farmers provides us an opportunity to focus our priorities on investments that ensure we are making the most of the resources at hand.

Alberta's producers are fortunate to have a publication that informs, inspires and explores new technologies and management practices. Agriculture's long-term success relies on a commitment to research, environmental stewardship and industry development.

This publication is a helpful resource on recent developments in agricultural practices, and helps keep thousands of Alberta producers, including myself, informed and up-to-date.

Thank you to *Farming Smarter* and the magazine's contributors for your hard work and dedication to the province's producers. —

Honourable Devin Dreesen
Minister, Agriculture and Forestry

Oldman Watershed Council

Visual history of stewardship

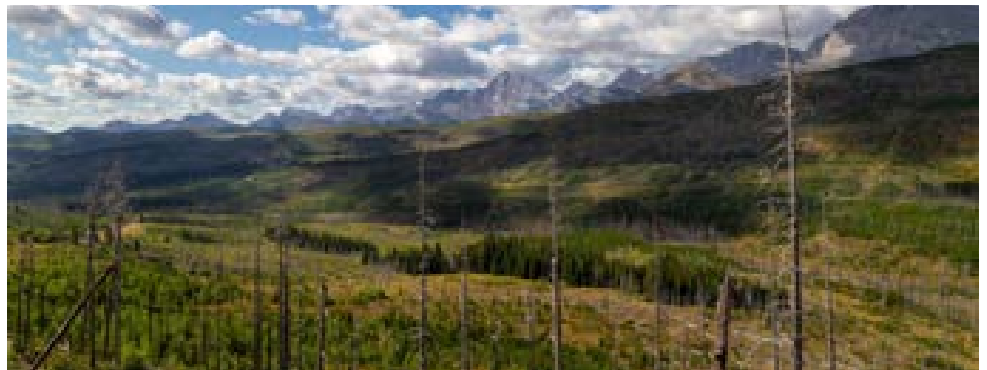
BY JON MARTIN

Soon, you will be able to flip through pages and admire the historic beauty of the Oldman River.

The Oldman Watershed Council (OWC) have been looking at the history of the watershed and how things have transformed into the popular and bustling watershed it is today. As such, we are pleased to announce that we are producing a coffee table book that highlights the Oldman watershed!

Our forthcoming publication, tentatively titled the *Oldman Watershed Council Book Project*, will take highlights from the OWC historical timeline of the Oldman watershed — created in 2016-17 by the OWC — and expand them with beautiful contemporary and historical photographs, as well as stories and essays written by watershed experts and community leaders from the area. A group of excellent authors contributed their unique perspectives on various aspects of the watershed, including agriculture, industry, science, and the environment.

A fundamental challenge for environmental stewardship is having an ever-growing base of engaged citizens who are invested in the land where they live. An educated, inspired, and empowered community is one of the best tools we have to address systemic challenges that



our watershed faces. One of the goals of the Oldman Watershed Council Book Project is to create an enjoyable, informative, document that educates and inspires the reader, and helps them make the next step in their journey to becoming better stewards of the watershed. The content of our book is designed to be accessible to, and grow with a broad audience, from children and curious teenagers, to adults and watershed experts. The visual information is easy for a young person or casual reader to engage with, while highlights from the watershed's historical time and writings from leading experts can bolster the knowledge of an adult reader.

We have fantastic images for the book, including historical archives, membership and

community contributions, and images captured by the OWC team while on photo-hunting adventures throughout the watershed. Our efforts focused on finding new perspectives of beautiful areas that may be familiar to residents and some that may have gone unnoticed or unseen.

As a package, the book will stand as an excellent time capsule of the watershed, an inspirational document for stewardship, and a resource for professional offices, schools, and homes in southern Alberta. For more information about the book or to pre-order visit oldmanwatershed.ca. We look forward to sharing the journey with you and hope that you are as excited about the project as we are! —

Partners working for regional economic strength

Economic Development Lethbridge (EDL) is a non-profit organization focused on supporting existing Lethbridge businesses and attracting new businesses and investors to the region. Its aim is to ensure Lethbridge continues to thrive and grow economically. EDL understands that agriculture is a key piece in the economy of Lethbridge and is working on some exciting projects to ensure that the word spreads.

Farming Smarter and EDL have forged a strong relationship.

“The whole premise of these groups is to make connections and to find ways to improve business investments in a community,” said Farming Smarter, General Manager, Ken Coles. “EDL has been awesome at recognizing the importance of agriculture to the City of Lethbridge. They recognize that it’s an agricultural hub and there are always great opportunities to help grow the greater area of not just the city, but the surrounding areas and the agriculture that supports that economy.”

EDL participates in exciting programs regarding economic development in agriculture around Lethbridge.

CANADA’S PREMIER FOOD CORRIDOR

Canada’s Premier Food Corridor is five partners — Economic Development Lethbridge, Lethbridge County, Town of Coal-dale, Town of Taber and Municipal District of Taber. Collectively, they represent a 50 km stretch between Lethbridge and Taber.

The first goal was to determine what resources



Trevor Lewington speaking at a public event about the value of agriculture brings to Lethbridge. PHOTO: KRISTI COX

there are in the region, so they asset mapped all the businesses currently there.

“This area has so many large key processors and niche innovators that create a breadbasket, not only for the province, but the country and even out to the rest of the world,” said Erin Crane, EDL’s Director of Investment Attraction. “The hashtag we promote is #SouthernAlbertaFeedsTheWorld.”

The primary purpose is to spread awareness of what is in this region already.

“When we mapped out how much we have here, and how influential the players that we have here are to the global economy, it even surprised some of us,” said Crane. “It definitely surprised some of our government contacts.”

One focus is on ensuring that more of the economic benefit of products grown here is retained in the region. Crane explained that much is grown in Canada and then shipped elsewhere to be processed and brought back here to be sold at a higher price.

“We don’t want that to happen anymore,”

said Crane. “We want to be able to grow it here, we want to be able to process it here, we want to be able to package it here and capture more of the economic impact and the jobs that go along with it. Then we can export those products under the Made in Canada brand. That Made in Canada brand is the high value product.”

This goal ties in well with the focus of another EDL project.

PLANT PROTEIN ALLIANCE OF ALBERTA

Trevor Lewington, Chief Executive Officer of EDL is on the Board of Directors for the Plant Protein Alliance of Alberta (PPAA). This group formed in response to the increased interest in plant-based proteins and their associated value-added opportunities. They are working with the Protein Industries Supercluster through the federal government to look at the opportunities for Alberta.

“Canada grows huge crops of lentils and yellow peas in particular,” Lewington said. “We export the raw materials to places like China

so that they can do the value-added processing and create jobs. Then we buy the products back. There's a huge movement to try and do more of that value added here at home."

Lewington explained that the success of the Beyond Meat Burger indicates that these plants are increasingly important and under growing demand. He feels that organizations like Farming Smarter will help meet this demand.

"As we look at southern Alberta, obviously the opportunities are great to produce (plant protein). We have the infrastructure; we've got great processors here; there's a strong food corridor around this region," said Lewington. "But you need companies and organizations like Farming Smarter that can help with improving the crop productivity or harvesting techniques."

EDL sees Farming Smarter as a key partner in attracting agricultural business to the region.

"We get a lot of companies that look to the Lethbridge area because they want to be close to their raw materials," said Crane. "They also want to look at the research and development. This is where staying close with Farming Smarter is ideal, because it differentiates us from other regions."

Both EDL and Farming Smarter recognize the importance of sharing information

and providing venues for face to face collaboration.

EDL operates a technology incubator called Teconnect. This 10,000-square-foot building in North Lethbridge currently houses eight technology start-up companies. Providing a home for start-ups as they move out of their home office space is a much-needed service.

"At some point when you need to have professional meetings and be able to host sessions you need the space for it and the incubator provides that," explained Lewington. "It gives them an office and it gives them access to business advisors. It's creating a supportive and nurturing community where they can be successful."

This facility is also the location for EDL's training programs. Various programs like Entrepreneurship 101, Emerging Technology, and Coding are offered throughout the year at an affordable cost.

Teconnect is a space where like minded individuals are gathered, and exchange of information and ideas happens. The hallway chat can lead to great things.

EDL appreciates that Farming Smarter shares its knowledge through events like Open Farm Days, their annual conference and Plot Hops.

"Anything that we can do to educate people more on how important it is and what the opportunities are is really important," says Lewington. "I think that what Farming Smarter does through those specific events is invite people that might not otherwise hang out together and open them to the potential. That's where you get those interesting ideas."

Lewington draws a parallel between Farming Smarter's extension events and EDL's Teconnect.

"It's like the hallway collision in the incubator," explained Lewington. "Farming Smarter in a way is a live agriculture incubator, bringing different groups together for these events. You never know what partnerships or projects are going to fall out of it."

EDL supports these outreach events through sponsorship as well as providing guest speakers.

"At the end of the day it's all about how we make the Lethbridge economy stronger and more diversified," said Lewington. "Primary agriculture is about 20 per cent of GDP for this city. But when you layer on the food processing, and the R&D that happens at the post secondaries, and insurance, and real estate it would actually be much more impactful than that." —



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Hemp research ramps up

By Lee Hart

As Canadian hemp sales are forecast to explode to about \$1 billion over the next three to four years, Farming Smarter, working with research partners across the province, hopes to provide valuable agronomic information to help producers tap into this dynamic Cinderella crop.

As the nickname for plants in the cannabis family suggests “hemp is certainly like a weed,” says Ken Coles, Farming Smarter General Manager. “Hemp appears to grow well in just about all regions of the province. But it is important that we have a better handle on the proper agronomics of hemp. Particularly in the last year, there has been an increasing interest among growers looking to grow hemp. The crop performs differently in various regions of the province. We’re hoping this research project provides useful information on proper production practices.”

The origins of hemp can be traced back more than 10,000 years and, in fact, in the first half of the 20th century (early 1900s to about the 1940s) hemp production was widely promoted in Canada and across North America to supply fibre for rope and canvas during world-war years and also as a potential source of oil to fuel the new era of the automobile.

Then, through the 1940s and 1960s, government regulations in many world jurisdictions clamped down on the cannabis plant family, primarily aimed to control or eliminate the production of a cannabis family member — marijuana. Even though hemp is not marijuana, with little to no psychoactive properties, it was caught up by the same regulations.

Then in 1998 the Canadian government provided enabling legislation for the production of industrial hemp. Production is still tightly controlled, but the crop can be grown and used for fibre and human food market.

While the legislation opened an opportunity, interest in the crop was largely on a slow simmer. Some producers grew hemp to supply grain processors who had developed a limited but valuable human food market.

But the fibre market stalled in somewhat of a vicious circle. R & D showed that hemp fibre is useful in a wide range of industrial and commercial applications from clothing to construction materials. Farmers said they could grow the crop but needed a processor with a market.



TOP: SARDA trial plots 2019. ABOVE: Josh Sylvain & Dave Cloutier collecting data in the SARDA hemp plots 2019.

The processing industry said it could find markets if it could be assured of a stable supply of plant fibre material. In recent years as hemp acres increased, about a dozen fibre processing plants have come on line with more planned.

So, as interest in hemp simmered along for more than 20 years, what has really stoked the fire under the crop in the past year was 2018 legislation to legalize production and recreational use of marijuana in Canada.

“The legalization of marijuana opened a huge opportunity to extract another compound from the hemp plant, CBD oil,” says Coles. CBD which stands for cannabidiol is a non-hallucinogenic compound found

Continues on page 10 »



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Continued from page 8

in relatively small quantities in the hemp leaves and flowers. However, the oil has shown value as a human health product for pain relief, as an anti-inflammatory and may even help combat anxiety. With the legalization of marijuana, the CBD market opened.

The Canadian Hemp Trade Alliance (CHTA) — an organization that represents growers and processors — estimates the global market for CBD oil in the health and wellness industry could grow to about \$17 billion U.S. over the next five to six years. CHTA forecasts Canada could have a \$1 billion share of this market by 2023.

According to published reports, a 30 ml bottle of CBD oil — the size of an eye-drop bottle — could have up to a \$200 retail value. It may not happen on every farm, but that product value is prompting some processors to pay as much as \$600 to \$700 per acre of hemp.

With an estimated 175,000 acres of hemp grown by Canadian farmers in 2019, up 50,000 acres from 2018, and a further production increase expected in 2020 that brings the story back to the value of good agronomic information.

“Farmers want to learn how to produce hemp,” says Coles. “It appears to grow very well over a wide range of conditions, it is very adaptable, but production practices will be different in southern Alberta, for example, than they are in the Peace River region.”

The three-year Farming Smarter project, in collaboration with the SARDA Ag Research (SARDA) based in Falher in the Peace Region and InnoTech Alberta research centre at Vegreville, all look at key agronomic aspects of hemp— fertility rates, variety trials and seeding dates and rates.

“We are looking at what type of fertility does the crop need, what varieties appear to grow well under different growing conditions and what are the optimum seeding dates and seeding rates in various regions,” says Darcy Boisvert, research agrologist with SARDA.

SARDA has been looking at the potential of hemp production for the past several years although growing season conditions haven't always co-operated, says Boisvert. In 2016, the region dealt with a drought, in 2017 hail seriously damaged research plots, and in 2018 the growing season started off dry and then turned too wet. Plots established for the province-wide research project in 2019 look quite good, he says.

All research sites are evaluating early, mid and late seeding dates, as well as fertility rates with two hemp varieties. Finola is a shorter stature variety more suited to grain production, while Silesia is a taller variety more suited for fibre production.

Seeding dates in the Peace Region, for example, ranged from an early seeding date of May 14, followed by May 24 and June 3. While at Lethbridge, May 6 was the early seeding date followed by May 20 and then June 3 as late.

Different seeding rates for the two varieties are also being evaluated. While 250 seeds per square metre is the recommended rate, research centres are also evaluating how crops perform at 100 and 400 seeds per square metre rates. While conventional air seeding equipment is used for seeding hemp, Farming Smarter in Lethbridge also established plots using variable seeding rates with a precision planter.

Fertility treatments are also varied with three different approaches. While soil testing provides a recommended rate at each site, they are also seeing how the two varieties perform at 50 and 150 per cent of the recommended rate. Along with rates, the type of fertility also varies. One treatment involves urea nitrogen and phosphorus, another treatment



Ken Coles holds up a hemp stock from the Lethbridge trials.

includes half urea and half ESN (slow-release nitrogen), and third treatment includes 75 per cent urea and 25 per cent UAN (liquid nitrogen).

While the seeding dates, rates and fertility trials involve just two hemp varieties, the actual variety trials will be evaluating seven different grain type varieties and eight different fibre or dual purpose types across the province.

“This project might also show if some regions are better suited for one type of hemp over another,” says Coles at Farming Smarter. “While the Peace River region may have a later seeding date than southern Alberta, their days are longer — they have a shorter season but more daylight hours.” Some research has shown shorter days may hasten flowering and increase grain production while longer days may benefit biomass and fibre production.

Coles says hemp is an exciting relatively new crop, with now greater potential to supply a three-way grain, fibre and oil market.

“From my perspective it is just a beautiful crop, it just likes to grow,” says Coles, noting that under some of their irrigated plots at Lethbridge some varieties are standing 14 feet tall. “With proper production practices, it certainly looks like it will provide some new opportunities for farmers.”

And for producers looking for an update on hemp production and marketing, he points to the Canadian Hemp Trade Alliance upcoming annual conference in Calgary, November 26 to 28, 2019. Details at: www.hemptrade.ca.

Enhanced nutrient delivery study underway

BY JANET KANTERS

Aside from water, nitrogen is the major yield-limiting factor in wheat production systems and the costliest when considering the wheat crop only takes up roughly one-half, or less, of the nitrogen applied.

As growers strive for higher yields through intensified practices and new genetics, the knowledge gap around nitrogen (N) management systems remains far from closed.

According to Brian Beres, senior research scientist with Agriculture and Agri-Food Canada in Lethbridge, one question that arises is the role of enhanced efficiency N fertilizers (EEFs) with respect to greater N use efficiency through reduced losses and economic profitability to offset associated input costs.

A new project started this past year hopes to provide an answer to that question — and more. The study by Beres and a team of agronomists and soil scientists will focus on Canada Western Red Spring (CWRS) wheat responses to N management strategies in three soils zones that are representative of the Canadian Prairies. The team will explore system responses when the latest genetics are combined with EEFs applied in a range of timing/placement/rate scenarios to determine the benefits provided to achieve yield, protein and greenhouse gas (GHG) emission targets.

“Nitrogen fertilizer management is complicated by the registration of new extremely high-yielding CWRS wheat cultivars, with field yields of +100 bu./ac. reported by some growers,” says Beres, adding the trade-off for high yield in some CWRS cultivars can be a reduction in protein. Growers must achieve a minimum protein content of 13.5 per cent to avoid price discounts, yet some recently registered, high-yielding wheat cultivars struggle to meet these minimum requirements unless N fertilizer management is focused on simultaneously achieving protein targets.

“Given the innovations around the introduction of EEFs and significantly higher attainable yield benefits with the latest CWRS genetics, a new N management system is needed to fully exploit this new Genetics x Environment x Management (GxExM) synergy,” says Beres. “We’ve done quite a bit of work with that in winter wheat, and so we’re moving that over to a spring wheat system,” said Beres. “What we’ve seen is grain protein concentration in some [varieties] has been



Left: Stettler wheat seeded at Barrhead with 95 kg N/ha applied as urea all at the time of seeding as a mid-row band. — most lodging. **Right:** Stettler wheat seeded at Barrhead with 95 kg N/ha split into three separate applications: 29 kg N/ha applied at seeding as a mid row band; 33 kg N/ha applied at Feekes 4/GS 30/end of tillering; 33 kg N/ha applied at Feekes 10/GS 45/booting — no lodging.

maintained, but in others it hasn’t. That’s not a big surprise when you look at the inverse relationship between grain yield and protein.”

Team member Sheri Strydorst, agronomy research scientist with Alberta Agriculture and Forestry, says some preliminary study results are providing data already.

“I am confident there is a genetic and a management effect of the treatments [we’re applying], but of course statistics need to be run and the data analyzed,” she says. “I am looking forward to seeing the yield and protein data. In the meantime, head count data shows some very cool trends that make me suspect we should be seeing yield differences between these treatments.”

Another outcome of the study is to determine what role EEFs play and, within today’s context around climate mitigation, what benefit or concerns, if any, there is with respect to these types of nitrogen management systems that they would have on greenhouse gas emissions. To that end, the team will collect GHG information from three sites to help determine if there is one management practice or fertilizer form that causes an increased gas flux over another; the hypothesis being that perhaps EEFs might actually mitigate green-

house gas fluxing.

The five-year study concludes in 2023. By then, Beres says they hope to have an updated N management package for CWRS growers based on the GxExM synergy.

“This will not only provide Canadian wheat farmers with the agronomic tools to optimize yield and protein, but it also protects end-use quality targets for grain merchants and the milling industry,” he notes. “It will also support the social license of Canadian wheat farmers — showing more N fertilizer use that supports the 4Rs of nutrient stewardship.”

Other projected outcomes of the study include new science-based knowledge on net GHG (N₂O and CO₂) emissions related to N fertilization in CWRS wheat cropping systems; and economic assessments including cost:benefit scenarios as affected by management strategies that integrate crop genetics and N source.

“Also, results from the proposed project will be incorporated into the Alberta Farm Fertilizer Information and Recommendation Manager (AFFIRM), which will allow producers to work with study findings and incorporate these findings into their individual farm decision support systems.” —

Recovering from hail damage

Time of hail event more important than level of damage or use of recovery products

By Bruce Barker

When the Great White Combine moves in, there is little anyone can do but take cover. But after the storm passes, farmers face difficult management decisions on what to do with what is left of the crop. Research in the hail capital of Canada, that would be Alberta, sought to answer some of the commonly asked questions following a hail storm.

“One of the main purposes of the research was to evaluate some hail rescue products promoted as a way to help a crop recover after a hailstorm. Farmers are bombarded with sales information, and there are some ‘big fish’ stories about how great those products are,” says Ken Coles, general manager of Farming Smarter at Lethbridge, Alberta.

Coles says a local farmer tried to conduct on-farm trials looking at hail recovery products, but the results were too variable, so small plot research trials were established. Building off of hail simulation studies at InnoTech, Vegreville, Alberta, Farming Smarter first built a hail simulator that would mimic hail damage in a crop. The hail simulator consisted of a series of short chains attached to a rotating drum mounted on a front-end loader.

Farming Smarter worked with Alberta’s Agriculture Financial Services Corporation (AFSC) to ensure that the mechanical damage from the hail simulator closely resembled hail damage. With funding from Alberta Wheat and Alberta Pulse Growers, Farming Smarter led a three year study over the 2016 through 2018 growing seasons to assess crop recovery from hail damage and if there were any agronomic or economic benefits from using hail recovery products after a hail storm. In addition to the Lethbridge site, InnoTech conducted research at Vegreville and SARDA Ag Research at Falher, Alberta also participated in the trials.

Technicians used the hail simulator to cause light (33 per cent) and heavy (67 per cent) defoliation at tillering, flag leaf and flowering in wheat. They simulated similar levels of damage at early four to six leaf, flowering and podding stages on pea at all three sites and dry beans at Lethbridge.

Crop adjusters with AFSC assisted with calibrating the hail simulators and by assessing actual crop damage on research trials.

In wheat, they used the nutrient recovery product Alpine G22 at 3 L/ac. + Boron and the fungicide Prosaro at 320 mL/ac. In pea, they applied ReLeaf Canola at 2 L/ac. plus Boron Boost at 1/3 L/ac. along with Headline fungicide at 0.16 L/ac. Bean foliar treatments included Copper Hydroxide (Parasol) as the fungicide/bactericide at 2 L/ac. and Omex P3 at 0.25 L/ac. Technicians sprayed crops on average three days after hail damage.

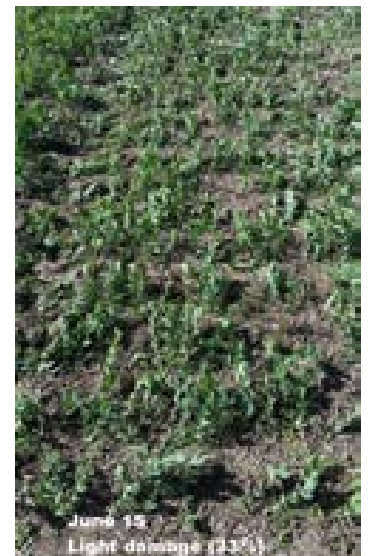
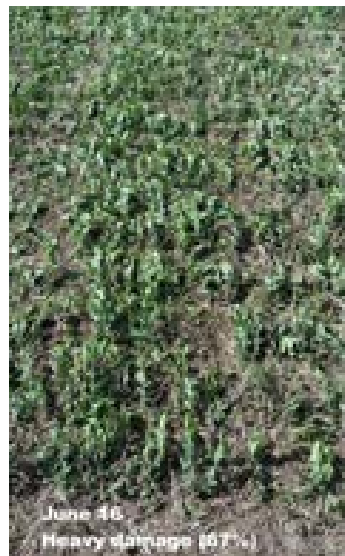
Check treatments were included for no hail damage and no nutrient or fungicide applications.

TIMING MORE IMPORTANT THAN LEVEL OF DAMAGE

In all three crops, the biggest impact on crop yield was timing of the hail event. In wheat, the undamaged check plots yielded 74 to 81 bu./ac. Yield loss at the early damage timing was minimal, but increased as the season progressed. At the early damage timing, 33 per cent simulated hail damage resulted in a yield loss of three per cent (76 bu./ac.), and 67 per cent damage resulted in yield loss of six per cent (73 bu./ac.).



Ken operates hail simulator



Peas were able to recover from early hail damage but not as well as wheat. PHOTOS: KEN COLES

However, yield losses were much higher at flag leaf and flowering stages, ranging from 34 per cent up to 58 per cent yield losses.

For pea, yield loss at the early damage timing was minimal, but increased as the season progressed. At early damage timing, the check yielded 49 bu./ac. Yield loss at the four- to six-leaf stage was 10 per cent (44 bu./ac.) for both damage levels. At flowering, the yield loss was 30 per cent (35 bu./ac.) for light damage and 38 per cent (31 bu./ac.) for heavy damage. At podding the yield loss was 53 per cent (23 bu./ac.) for light damage and 71 per cent (14 bu./ac.) for heavy damage.

Bean plants were affected by hail damage at each timing, however, the response varied between the two varieties at early timing. For Resolute beans, hail damage at vegetative-plant stage produced a decreased yield as damage level increased. For Island beans, an increased yield occurred at light damage followed by a decrease at heavy damage. The increased yield at moderated damage was most obvious on fungicide treated plants. Coles says this suggests that application of fungicide/bactericide may help to improve plant recovery at early foliar stages. At flowering and seed stages, yield losses increased as hail damage intensity increased.

“As farmers, we get hung up on how much damage there is, but timing is much more important than the level of damage,” says Coles. “Once plants get to the reproductive stages, the plants won’t have time to recover and yield losses become high.”

HAIL RECOVERY PRODUCTS INEFFECTIVE

Overall, neither nutrient or fungicide applications helped the crops recover after a simulated hail event. Coles says they could not conclude that a timely application may not result in a benefit. However, after nine site years of data, he believes the likelihood of a positive response is very low, as is a return on investment.

“If we had used the recovery products under a greater range of different conditions, we might have seen a better response. But based on what we saw, one out of nine site years with a yield response, that is too low to justify their use,” says Coles. “Farming is risk management and I would like to see responses at least 60 or 70 per cent of the time.”

Coles recognizes that there are many more questions to be answered following a hail event. Questions such as, ‘at what level and timing should a crop be terminated,’ ‘when should a crop be reseeded,’ or ‘should the crop be harvested for feed?’

“The chances of recovery from hail go down really quickly as the crop matures. It happens in a matter of weeks so we need more answers on what to do after a hail storm,” says Coles.

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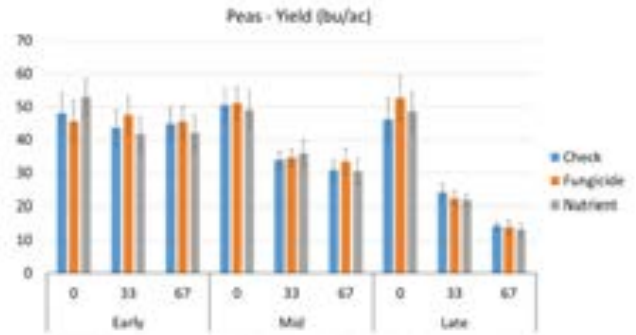


Figure 15. Yield of peas grown at Lethbridge, Vegreville and Falher during 2016-2018. Plants were exposed to hail damage at different timing (Early, Mid and Late), damage levels (0%, 33% and 67%) and using hail rescue treatments (Check, Fungicide and Nutrient). Bars represent combined averages from all locations and years (N = 9). Error bars represent standard error.

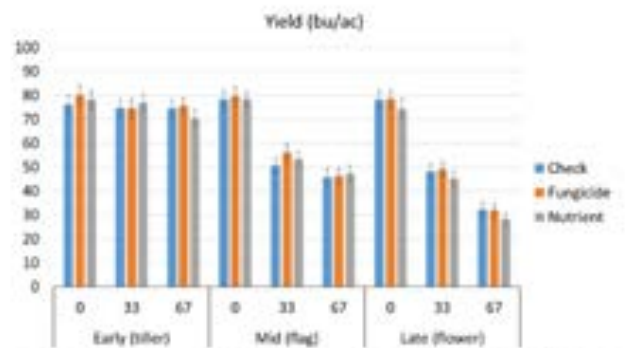


Figure 16. Yield of wheat grown at Lethbridge, Vegreville and Falher during 2016, 2017 and 2018. Plants were exposed to hail damage at different timing (Early, Mid and Late), damage levels (0%, 33% and 67%) and using hail rescue treatments (Check, Fungicide and Nutrient). Bars represent combined averages from all locations and years (N = 5). Error bars represent standard error.



Farming Smarter's hail simulator.

Pollinator sanctuary study indicates that if you build it, they will come

By Kristi Cox

If you build it, they will come — take a pivot corner, a fence line or a ditch and turn those into a bed and breakfast for bees.

Farming Smarter set out to determine what blend of plants would turn marginal farmland into suitable habitat for both domestic and wild pollinators. With the right seed blend creating a long flowering season, farmers could have a significant impact on recovering struggling pollinator populations.

Farming Smarter secured funding for a one-year Pollinator Sanctuary Study through the Canadian Agricultural Program. Field Researcher Saikat Basu is the lead on this project.

“(Basu) took a shining to pollinators in general and, in particular, whether there are mixes of species that we can grow that will provide an extended flower season for various wild pollinators,” said Farming Smarter Manager Ken Coles. “This could create good habitat on marginal areas on the farm and provide an ecosystem service.”

Smaller initiatives are popular now with packets of wildflower seeds given out to the public by various companies. These are helpful, and great for promoting public awareness of the challenge pollinators face. However, to make a big impact on recovering pollinators, Basu feels farmers need to get involved.

“You can do a little backyard wildflower patch, you can grow them in your lawns, we can have a bit in our city parks and municipal gardens,” said Basu. “All initiatives toward bee conservation are appreciable, but I always felt that this is not actually filling in that niche because the farmers are not attracted.”

Basu wants to encourage farmers to create pollinator sanctuaries in areas not usually used for agronomic purposes on farms — perimeter areas; around center pivots; salinity impacted areas; or other areas not used commercially.

It was quickly apparent that rather than looking at a pure wildflower mix for larger scale planting, a blend of different types of plants would be ideal.

“I found that the cost of the bee production seed is too high,” said Basu. “We were looking for an alternative and I thought one of the easiest solutions would be including our



cover crop species. We have a lot of crops that go throughout the season including legumes, brassicas and clovers.”

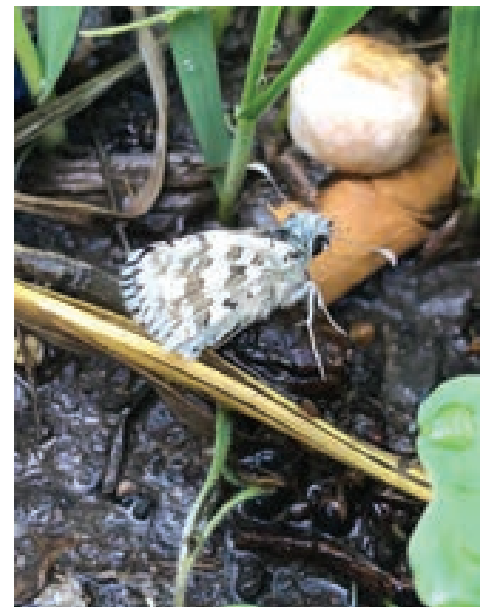
Many of these also function as forage crops.

“If I can mix various combinations of crops that are early season to late season, they sequentially flower,” said Basu. “It increases the bee foraging period.”

The aim was to find a blend of plants that will attract domestic bees and a variety of wild pollinators, provide an extended flowering season, improve soil conditions and require little to no labour beyond planting. The seed also must be affordable, which is not the case with pure wildflower blends.

Basu considers four uses for the plant species going into the pollinator sanctuary:

First, they act as a pollinator sanctuary, but even more than that, a wildlife sanctuary. They



PHOTOS: SAIKAT BASU

act as a little niche that provides homes for small mammals, birds, lizards and frogs. Second, they should be an excellent cover crop. This aids in preventing weeds and increases soil and water conservation. Third, the mixes could be excellent for soil remediation, including in areas where salinity is a concern. Finally, they could function as forage for producers who want to graze stock on the pollinator sanctuaries.

The current study is on Farming Smarter land. It is marginal land near a wetland that can't be used for much of anything else. There are five different treatments, each on a four by six meter plot with four replications of each treatment. They were seeded at two times, early and late, to see how it affects the length of flowering season. The plots are no till and received no fertilizer, irrigation, pesticides or herbicides.

The five treatments used were:

- Straight Annual mix
- Straight Perennial mix
- Annual/Perennial mix
- A commercial pollinator mix
- A wildflower mix available from nurseries

Preliminary results aren't surprising Basu — The more diverse the stand of plants, the higher the diversity of insects that are visiting them.

Basu kept records of which plants were flowering or fruiting throughout the season, developing a floral calendar. By selecting the right combinations, the different plants should flower sequentially, giving the pollinators continual access to flowers.

At the same time, he systematically sampled the insects. Basu utilized sweep netting, sticky cards and image capture to record the insects in each plot.

"I'm sampling, collecting and storing them," said Basu. "They will be sent to an expert for identification and then we will prepare a biodiversity report of the insects attracted to our plots."

He's found honeybees and many other wild bees, but the variety of pollinators is broad, including various species of pollinator flies, beetles, moths and butterflies.

"We do see pest insects coming in too," explained Basu, "but they haven't done significant damage other than flea leaf beetle; which are attracted in large numbers to the mustard crops or the canola family crops that we have."

Saikat explained that with a similar experiment with another group last year, the brassicas came into flower and went to seed early, but they attracted flea beetles and sustained significant damage. The plants recovered, though, and provided further benefit to the bees.

"As soon as the cold weather sets in their leaves come back one more time because it's too cold for the flea beetle to be active," explained Basu. "They have a secondary round of flowering sometimes and they attract bees again."

Weeds are of course a concern, particularly when introducing a mix of plants to an area that will not be sprayed. The researchers were careful selecting the species to be used.

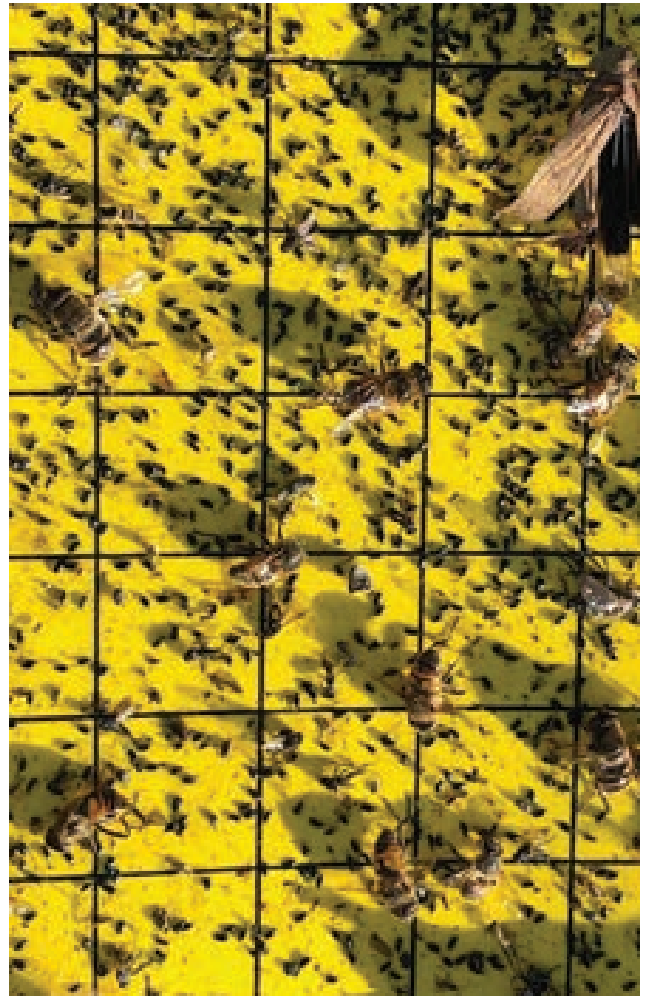
"We checked with the Invasive Species Council and examined any risks and concerns," explained Coles. "We removed some of the species that we were originally going to plant."

"Wherever the plot has been thin with lots of patches in between, the weeds have moved in, creating more weed competition on those plots," said Basu, explaining further that dense seeding deters weeds.

Additionally, pre and post crop soil samples were obtained to examine any changes to the soils that occur under the varying crop compositions.

The plan going forward is to expand the study across differing climatic regions and various latitudes in Alberta in both dry land and irrigated applications.

The hope is to make large scale pollinator sanctuaries a possibility with the cooperation of farmers. "This could make a significant impact in bee conservation in the long run," said Basu. —



Top: Pollinator card. Above: Sanctuary bee. PHOTOS: SAIKAT BASU

Bring certainty to your on-farm research

BY NATALIE NOBLE

Ever had an idea about a technology or practice to give your farm the competitive edge? Or maybe it's a question about how to better use a product to get the results your farm specifically needs. Farming Smarter's Field Tested program (Field Tested) could be the answer you need.

"The idea behind Field Tested is to help develop and adapt technologies and ideas," said program lead Lewis Baarda. "It's a program for facilitated on-farm research. We know that farmers have a lot of questions, and there are just so many options out there right now. Whether it's technology or different products or practices, farmers are looking for ways to evaluate them and make better choices."

Applying is as easy as a phone call to Lewis at Farming Smarter. "Anybody can come to us with a question to see how a technology or practice can help on their specific farm within their own cropping practices, management system and/or equipment to see what the answer is for them," Baarda said. "Whatever your question is, there's a trial we can set up to help answer it."

For farmers, known for innovating and finding answers on their own, Field Tested is a different way of doing things. A more personal program than broader research projects, it brings knowledgeable support to on-farm research based on each specific request.

"It's about what works for you and your farm," Baarda said. "There's value in having someone with the expertise and experience of conducting research help with some of the heavy lifting, especially during those critical times of seeding and harvest."



Where on-farm research can be challenging to implement, Field Tested lends reliable resources. "We're bringing in some scientific principles, stats, trial design and implementation expertise," Baarda said. "Where you might come up with an answer on your own that may be fallible, we're going to bring science to the farm and at the end of the day, we're going to have an answer with certainty and confidence."

That certainty is key for today's farms. As they grow bigger, tech-related decisions around products and practices are bigger too and Farming Smarter sees great opportunity and appetite for on-farm research.

"What happens out there in the field can be a little different from what we see in the lab," Baarda said. "We've had a number of producers come to us with some pretty interesting questions and we've been able to go out and come up with something they can really use. People understand that what happens in the real world of ag — say working with a 50-foot seeder might be a little

different than that with our two-meter wide plot seeder — and what happens on a full section with variability in soil, innovation, weather and other factors is different than a 12-square meter research plot."

With a couple of interesting trials right now, including one that compares the performance of a planter versus an air seeder in canola, Baarda said participants are enjoying seeing compelling research results brought into a field environment.

Also kicking off this year is on-farm research exploring variable rate kochia patch management and in-season soil moisture mapping using soil electrical conductivity sensors. "We're gaining understanding around the soil moisture profile throughout the season across the field rather than in just one location," Baarda said.

Farming Smarter aims to grow the program with more farmers coming into it. "I think farmers have a lot more questions than we know what they are," Baarda said. "There's a lot of opportunity to help producers grow their confidence that what they're doing is the best thing for their farms."

There may also be room down the road for more cooperative research, bringing together a number of farms with the same question. "There is a certain amount of stress a farmer takes on to conduct an on-farm trial, so why not have a couple farmers conduct trials and share that information with a group of ten who have the same question or idea," Baarda said. "There's some real potential to really grow this program into something that takes a little of the pressure off everybody and for a reasonable price everyone can get some good answers to important questions." —



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Spring explodes at Farming Smarter

By The Farming Smarter Team



L to R top: Janine Lock, Cameron Sande, Carlo Van Herk. Bottom: Sara Gateman, Tim Raimbault and Jean Sohler pose for social media promotion of Open Farm Day.

It can be a bit like having a bomb go off when you're half asleep. One day the office is business as usual with familiar family sitting around the table. Seemingly overnight, the lunch table fills beyond capacity and we're outnumbered by young, exuberant faces full of questions and energy.

"The best part of having the students show up in May is the energy they inject into the rest of us old folks that hang around here year-round," says Mike Gretzinger Farming Smarter Research Manager.

That youthful enthusiasm includes a quest for knowledge.

"They bring with them a thirst for learning and applying what they have learned to Farming Smarter, even if they are not directly studying agriculture," says Trevor Deering Farming Smarter 2019 intern — himself one of the more youthful faces around the table.

Ken Coles, Farming Smarter General Manager adds, "It was also great to see them learn, take pride in their work and in Farming Smarter. They built strong friendships with each other and with us."

"They bring some good farming skills and show lots of interest in learning more specific agronomy skills such as evaluating root rot and leaf diseases in cereals; sweeping plots to identify insect pests versus beneficial insects; and learning to identify weeds," says Gretzinger.

Assistant Manager Jamie Puchinger chimes in with, "Each year the crew changes, whether it is one new to only one returning. This makes it interesting and challenging for our permanent staff. We encourage their interests and find different areas of the business to help them develop their skills and knowledge."

Lewis Baarda brings up the fact that the students quickly stir the pot.



Carlo Van Herk poses with the quirky spray model the students created for Open Farm Days.

“They are quick studies and the chaos becomes a well-oiled machine rather quickly. I love the social dynamic the students bring. They see every comment, fumble, or misstep as an opportunity to throw shade and, by the end of the summer, everybody (full time staff included) has an apt and affectionate nickname,” he says.

The mentoring can go both ways when students bring today’s technology and teach staff a thing or two.

“Tianna can out shoot me on social media every time,” says Claudette Lacombe Communications Manager.

It makes for a somber day in the fall when they all go back to school. Suddenly, it seems quiet and spacious around the fields, shop and office.

“I really love the joy they bring with them,” says Shelly Barclay Office Manager. As Farming Smarter’s core staff settle in for the winter.

Coles sums up how all the full-time staff feel that day, “I miss them, but am happy that most are interested in coming back next year.”



Cameron Sande and Tianna Ell watch the registration desk at an event.



Veteran summer staff Saikat Basu throws seed onto the biobed while Jean Sohier and Aidan Sander watch.



Weird young women Janine Lock and Cameron Sande just being joyfully nuts.



International students Tim Raimbault and Jean Sohier check out what they captured in a sweep.

My summer of learning

By Janine Lock



An example of one of many summer shenanigans. Left to Right: Tim Raimbault, Janine Lock, Jean Sohier and Carlo VanHerk. wDiagonal: Cameron Sande.

Four months ago, I walked onto the beautiful Albertan prairie, the land of endless fertile soils and a never-ending sky. To most of you this prairie land is home, to me it was an opportunity vast as the land itself. Being an East Coast girl, raised by the sea and in trees, I had never seen such expansive agriculture. Even though I am studying agronomy and animal science at McGill University, there was so much about prairie farming I didn't know. When I started as a summer student at Farming Smarter, I didn't know anything about irrigation; had never seen a gopher; and I had never even driven a combine!

As is the way in agriculture, I learned on the fly with a lot of help from the rest of the crew. Within the first two weeks, I stopped being starstruck by the pivots and began understanding their pattern. After a month, I had no problem killing gophers and, by the end of the summer, I was able to drive a combine, although admittedly I need a few more hours practice!

All this learning was largely due to the fantastic team I got to work with. Never have I had a job that had such seamless connection within the group. It was a lot of fun to work

with a group of people who were knowledgeable, hard working, supportive and hilarious!

I really loved the work itself. It was incredible being able to work on research that has the power to lead to much innovation within our industry. Having the ability to share the research findings, thru Plot Hops, Field School and Open Farm Days was very rewarding and exciting to see industry leaders and general public take such an interest in it. Myself, I was constantly learning! From learning how and why take green house gas emission readings to doing biomass on a variety of crops. One of my favourite data collection activities was analyzing pea root nodules. I find it incredible how soil micro bacteria and plants can have a symbiotic relationship that allows for nitrogen fixation and improve growth. Apart from technical skills, I learned a lot of general field knowledge such as weed and crop recognition. My mechanical problem solving improved thanks to more exposure calibrating, driving and helping fix farm machinery. As someone firmly based in animal agriculture, all of this was very new to me. Last but not least, as a summer student at Farming Smarter, we learned the many key communication skills that are a big part of working with a successful team!



A healthy root nodule.

I like to think I have become a little bit Albertan over my summer. I can recognize wheat and barley with ease; I can pick out common weeds such as lambs' quarter, kochia and pigweed. I have seen, climbed, camped in and loved the mountains and prairie alike. Just about the only Albertan thing I can't do is pronounce aunt. I have fallen in love with the culture, the people, the land and the agriculture industry! —

Wheat yield gaps under investigation

By Janet Kanters

Canada and the U.S. lag behind other countries such as the EU and Australia with respect to the establishment of yield gaps — the difference between farm yields and theoretical yields under optimum management — and the underlying causes in wheat production systems.

According to Brian Beres, senior research scientist with Agriculture and Agri-Food Canada in Lethbridge, this puts both stakeholders and growers at a disadvantage.

So, Beres and a team of international experts started a project to quantify the magnitude of yield gaps across major wheat producing regions of the Canadian Prairies and identify major production practices leading to economic increased wheat yield.

“Farmers need to be equipped with best management practices to increase individual farm productivity and profitability to remain economically competitive,” says Beres. “And to do that, we have to get a sense of what is the true gap that exists by region, by production area, with respect to, say, your actual yield potential, which is largely optimal genetic exploitation, versus what’s actually happening on the farm.”

Yield gap is the difference between current yield and potential yield for the crop. Recent quantification of wheat yield gaps suggest that current yields are only about 40 to 70 per cent of the potential, but yields can be economically increased to about 70 to 85 per cent of the potential. Beres says producers could economically increase their yields by about 10 to 40 per cent with improved management.

“This proposal would directly address these issues and provide the knowledge currently not available for overcoming these challenges,” he notes. “Impacts would reach beyond the farm gate as Canada and the U.S. would level the playing field with countries in the EU and Australia that already have closed this knowledge gap.”

Canada and the U.S. produce approximately 86 million metric tonnes (MMT) of wheat per year. Still, grain yield in both countries rarely surpasses 50 bushels per acre (bu./ac.). The project aims to identify areas where there is a large wheat yield gap and determine how current yields can be improved economically. The team will also identify management practices leading to improved wheat yields to guide future wheat management recommendations.

“The economic benefit to the wheat producer is to improve on-farm productivity and profitability, which can benefit the entire wheat industry by providing a stable and consistent supply of high-quality wheat in the studied region,” says Beres. “A full economic analysis will be conducted to quantify any purported benefits. Our project can also offer potential environmental benefits by identifying management practices that are currently ineffective at addressing yield constraints; for example, over-fertilization.”

The team will identify major agronomic causes for the yield gap in the Canadian Prairies through on-farm surveys, which have been extensively used in the U.S. Corn Belt. Farming Smarter will be involved by linking into their network of farmers and counterparts across the prairies. A survey will be run out to growers to get a sense of the yields they’re getting, the management practices used, etc.

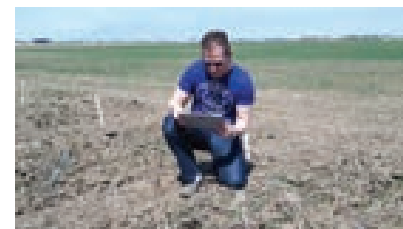
Beres says yield gap analysis has been identified as a priority by the Wheat Initiative and its Expert Working Group for Agronomy. The project is operating under the umbrella of a larger program, the Global Yield Gap Atlas (GYGA), an international project requiring collaboration among agronomists with knowledge of production systems, soils and climate governing crop performance in their countries. The GYGA developed pro-

ocols to accurately estimate yield gaps, already used for 15 crops in 62 countries.

“The yield gap for wheat has already been estimated in several European countries, and in Argentina, Australia and India, and is currently being developed for China,” says Beres. “This collaboration allows completion of our project objectives in a much shorter time frame with significantly fewer resources by utilizing internationally accepted and standardized methodologies and protocols.”

For this three-year project, the target industry is stakeholders of spring wheat in the prairies; however, if resources become available, Beres and his colleagues propose to extend this activity to include crops such as barley, pulses and canola. “The work proposed for wheat will set the foundation to add more crops with less work involved.

“The results from this project have the potential to help prioritize future investments in agronomic research and development, as well as influence agricultural policies to facilitate investments in areas where the yield gap is largest,” adds Beres. —



Brian Beres and a team of international experts started a project to quantify the magnitude of yield gaps across major wheat producing regions of the Canadian Prairies.

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State of agriculture research in Canada

Southern Alberta has a gem

By Trevor Bacque

There is a vast network of research and innovation within agriculture. From pure and applied research to extension events and farmer relations, there's no shortage of studies, investigations and experiments. Within the industry of research and innovation, projects range between very useful, moderately useful and not useful at all. However, most provide a certain level of return to farmers. But how does a farmer truly raise concerns and feel heard in the world of ag research?

The answer is long and not always straightforward, just like the research. On a national scale, most of the research dollars funnel through the federal government at some point. The four primary avenues of research are private, government, universities and NGOs, such as a farmer association where a check-off or funding mechanism is in place from the actual farmers, according to Serge Buy, CEO of the Agri-Food Innovation Council in Ottawa, Ont.

Buy says while Canada improved its agricultural research funding in the last few years, the focus must always be centred on return on investment, job creation and export potential.

"On occasion, you have to pick winners and losers based on the impact for Canadians," he says. "I think there's still a tendency to fund niche sectors that may or may not be really providing good outcomes."

He points to Brazil, Russia and African countries that could begin to compete with Canada in the long-term as their agri-food production increases. Buy says Canada has regained its status as a leader in agri-food research and innovation in the last three years, but warns there's still work to be done.

His organization published a comprehensive report in 2017 titled, *An Overview of the Canadian Agricultural Innovation System*. The data-driven findings, which took nine months to create, explored and documented scores of research and innovation-driven topics in Canada and gave an understanding of where the country has been and may be headed.

The report had many kernels of information, including how \$649 million was spent in 2015-16 by Canada. In 2015, private spending was \$73 million.

In addition, between 1997-2014, Canada produced 90,000 scientific papers, good enough for eighth on a global scale in terms of scientific

production of agricultural research. So, what does that all mean for farmers?

Buy says it all adds up to greater investment in agriculture's research and innovation funding over the last few years, bucking a recent negative trend.

"Labs we're being closed, researchers were moving away from Canada," he says, adding this new movement should benefit farmers. "Now, we are seeing researchers attracted to Canada and interested to set up shop and push leading-edge research. We need to support that."

"Everybody deserves to be heard, but they need to have all the information when they are making a decision, the same as when you go and vote [in an election]."

He says it's key to continue to drive support for the sector with a stronger climate for research and innovation, which would include tax breaks to make Canada more attractive.

There are certainly settings where a farmer is heard with greater clarity and volume, as well, according to Buy.

"How they help drive this is through their associations," he says, adding that the groups are a "fairly strong voice" and suitable forum for a farmer to directly speak about on-farm questions and issues they have that can morph into scientific questions to be answered in a research-like setting.

Universities carry out both pure and applied research, all of which is good for the farmers. Applied has short-term benefits and implementation while pure research "sometimes provides us an idea to boost us for the next 10 years," according to Buy. Another added benefit is how universities often partner with association groups, which, again, has a direct benefit to farmers since they are tied to associations.

Buy says farmers have benefited from applied research due to a shift into that realm between 2005-15 in Canada.

He advocates for farmers voices to be heard, but it's the informed farmers that need to be heard most.

"Everybody deserves to be heard, but they

need to have all the information when they are making a decision, the same as when you go and vote [in an election]," he says.

Those informed voices Buy speaks of are certainly making their voices heard in Lethbridge, Alta. Farming Smarter's members often speak to the organization's staff to find practical solutions to their in-field problems.

Jamie Puchinger is Farming Smarter's assistant manager says working alongside farmers, giving them the most up-to-date results is one of its key priorities.

She describes Farming Smarter's recent research on precision planting for high-value crops. The exclusive research showed a 15 per cent yield bump when traditional wide rows on a planter were shrunk to 12 inches. It was research FS carried out directly because of its members speaking up.

Unlike other research groups, Farming Smarter releases provisional information from multi-year studies after each successive year, arming farmers with information prior to an official report.

"In our case, members are being heard," she says. "We take all the feedback and criticism. We use that information to develop our research projects and applications."

She considers the relationship her organization has with farmers as strong, it's not that way throughout the industry, a problem she believes relates back to apathy and a lack of understanding of how other research is applicable.

"A majority of farmers today are taking a laid-back approach," she says. "If it doesn't affect me today on my farm, then I'm not going to worry about it. If you're not engaged, you're not going to get the value out of what's being done. We have to get farmers used to that, to speak up and actively participate in the conversation to get the information they need to make a decision to make themselves more profitable."

To try and communicate with farmers and have their questions truly enter the research cycle and one day turn into practical benefits, Farming Smarter staff engage with members regularly through open houses, field days, an AGM and generally being open to meet throughout the year.

"It's a needs assessment on a continual basis," she says. "We get to poll our people, find out what's important, relevant and needed research." —

Walk Farming Smarter's fields... from home!

By Madeleine Baerg

Sit back in your favourite chair, click play and find yourself in Farming Smarter's fields. That's the future Lethbridge College and Farming Smarter's plan to bring through a high-tech new project to bring FS fields to farmers. Together, they are developing 360-degree video and virtual reality experiences to showcase some of Farming Smarter's research. Interactive and — yes — pretty darn cool, the immersive experiences are an ideal form of extension.

“When we did our annual survey to members in January, the results showed that the top two ways farmers wanted information is digitally and through coming to events. If we can combine the two — make it so they can get everything they would from being in our plots without actually having to be here — that's the best of both worlds,” says Jamie Puchinger, Farming Smarter assistant manager and the project's lead. “Our whole purpose with this project, and with a lot of what we do, is to find innovative ways to communicate information to our industry.”

Funded by the Canadian Agricultural Partnership, the two-year project kicked off this past January. The first challenge was to identify extension priorities and narrow down a long list of possible projects to showcase. Throughout the summer, Lyle Ruggles from Lethbridge College Digital Learning Team was in Farming Smarter plots every couple of days collecting footage via a 360-degree camera. Over the coming months, the team will take the footage collected and develop them into three types of final products: 360-degree videos (similar to a regular video except that the viewer has the ability to control what they see in 360 degrees), virtual tours (allows the user to click through a space to view 360 degree content exploring that space) and 3D modelling. These experiences may be enjoyed with a head-mounted display, with a mobile device, or on a conventional computer.

By the spring of next year, the team expects to have developed five immersive experiences. They'll be creating two 360-degree tours, one a walk-through of Farming Smarter's nine-crop rotation study and a virtual tour of a bio-bed; two complete virtual reality projects including a time lapse of a hemp trial and an immersive leaf cut-



Devin Dreeschen, Alberta Agriculture and Forestry Minister, takes a virtual walk in a leaf cutter bee tent August 21 at Farming Smarter.

ter bee experience; and one 3D model of a diseased pulse crop root system. The team expects to roll out an additional five experiences by December 2020.

360-degree video and VR has come a long way in just a few years. Today, it's possible for anyone to purchase a fairly good 360-degree camera at one's local tech-supply store. What Lethbridge College Digital Learning Team excels at is adding text, audio, images and more to basic video. These enhancements turn raw, basic footage into something much more.

“If you take a two minute 360-degree video in the middle of a canola field, it would be a very quiet, very simple thing. We'll take that and develop it into something that communicates information; something that is an interactive learning experience,” says Joelle Reynolds, Lethbridge College digital learning consultant. “Our goal is that people will walk away excited that they've experienced something valuable.”

This project's virtual reality, 360-degree video and 3D modeling are just a piece of a larger collaboration between FS and Lethbridge College. Over the next 15 months, the

two organizations will also work together to develop pod casts, and an app to host all these education tools.

While virtual reality may be an almost ideal way to share information with farmers, it is extremely expensive to develop.

“The challenge truthfully is that extension funding is dying,” says Puchinger. “There are fewer and fewer funding opportunities for even simple extension, never mind these more expensive projects.”

That said, the effort and cost are worthwhile, she adds.

“If virtual reality is a learning tool of significant value, we need to know we have the capacity to use it. This was our dabble into VR to test the waters and see what it's truly like.”

She hopes that developing immersive and accessible experiences about farming might serve a side-purpose too:

“Our priority is to provide valuable content to farmers. There is a secondary piece, though. If we package learning in a way that the general non-ag public finds interesting and engaging, it might be their gateway to become more involved,” says Puchinger. —

We change the way people farm!

That's our new mission statement in Farming Smarter's new five-year strategic plan. Hang on! I heard that groan; saw that eye drift onto something, anything else. Why oh why, does anyone write a strategic plan? And, more to the point, why would anyone read one?

We wrote a new plan because we and our working environment changed a lot in the past five years. Change is the only thing guaranteed in life. Everything is up for change, crop varieties, novel crops; agronomic practices; nutrition; pest control; equipment and robotics. How are you going to know which changes will work on your farm?

We're going to try it first and tell you! To make sure we're here for you, we have to follow a plan so we don't forget important tasks that keep Farming Smarter healthy as an organization. So we write strategic plans and follow them as much as is wise.

Farming Smarter is now an organization that has eight full time, year round staff and hires up to nine full time students and interns over the summer months. Five years ago, we had 65 projects on the go. This year we had 100. We're working with scientists across the

prairies from post-secondary institutions, Agriculture and Agri-Food Canada, Alberta Agriculture and Forestry and crop commissions. We also have our own research program informed by southern Alberta farmers.

We commit substantial resources to sharing what we learn with the people that put the science to work in the fields — farmers, farm managers and agronomists working in Alberta. We have an information heavy website, we produce a magazine, e-newsletters, videos and, soon, podcasts. We hold events for both urban and farming public. Also, in recent years, we dedicate resources to agricultural advocacy at the provincial level.

Our advocacy role snuck up on us as our funding environment changed. Research funding for projects is fairly well laid out. While it's not a perfect system, it is at least a system. But all the resources to share what we learn are in question every year. Funders come and go and we're never sure how much we will be able to do in any given year when it comes to website, events and other information sharing.

So, we write plans and set targets. Here are our five targets for the next five years.

- Build a stable and growing resource base for Farming Smarter

- Enhance the recognized value of Farming Smarter
- Deliver relevant and applicable research to southern Alberta farmers
- Field tested is a viable program to evaluate technology, practices and products
- Be southern Alberta's leading agronomy network for knowledge and training

How are we going to meet these goals? Read the plan for those answers. You will find it on the About Us page of our website.

Read it so you understand where we fit into southern Alberta's success and the contributions we intend to make.

Read it to understand how you can help us overcome southern Alberta's crop challenges.

Read it because you can help us reach these targets that will benefit southern Alberta crop farmers.

Read it because if you took part in our survey, you took part in writing this plan.

This plan comes from any dedicated hours by our board of directors and our staff. We will continue to bring relevant, unbiased information to you in a click, a Learning Adventure or conference. Join us; we have a lot of fun! —



Aaron Van Beers, Leduc County Agriculture Foreman, Mario Bourque and Josie, Bill Grimmer and Adi, Ken Coles, Jamie Puchinger & Mike Harding.



Canine clubroot detection

Entrepreneur and plant pathologist asks, "Can dogs detect clubroot?"

By Kristi Cox

Imagine if a dog trainer could come to your farm and tell you exactly where clubroot exists in your fields. That's the goal behind the Canine Clubroot project.

It all started with an entrepreneurial dog trainer and an imaginative plant pathologist who were willing to ask, "Can dogs detect clubroot by scent?" It turns out, the answer is yes. The nose knows, and with the right training, dogs can show the people where it is.

Dr. Michael Harding, a Field Researcher in Plant Pathology with Alberta Agriculture and Forestry read a paper in a scientific journal about a dog that had been trained to detect a disease called laurel wilt in avocado trees. The concept intrigued him.

In New Brunswick, dog trainer Mario Bourque, was following a blog where someone had reported the same story. He contacted some plant pathologists to see if they would be interested in looking at training dogs to detect potato late blight. Nobody grabbed onto the idea, but Bourque didn't give up. He eventually reached out to Harding.

Harding wasn't interested in looking at this

for potato late blight but asked if Bourque had thought about clubroot.

"I suggested clubroot as a disease for canine detection because when we try to scout for the disease, we have to pull the (canola) plant up out of the ground and look at the roots in order to know whether it's there," explained Harding. "We'll pull up about a 100 plants, but you know there's hundreds of thousands of plants that we didn't look at. We can't see with our eyes under the ground, but the dogs can see with their nose under the ground."

Bourque approached his mentor, Grimmer Dog College owner and head trainer Bill Grimmer, and asked him if he thought dogs could be trained to detect clubroot by scent.

"Absolutely! Without a doubt! What's clubroot?" Grimmer responded, his 55 years of experience removing any hesitation.

Harding contacted Farming Smarter to see if they would apply for Canadian Agriculture Partnership funding for the project. Farming Smarter felt it fit their mandate.

"It's something innovative," explained Farming Smarter's General Manager Ken

Coles. "It's a new idea that could potentially help farmers. We submitted the proposal and were successful."

Grimmer and Bourque trained four dogs to detect clubroot by scent. Josie and Adi were the two that made the trip to Alberta to demonstrate their skills and trial their abilities in live canola fields. Josie is a German Shepherd owned by Bourque and had previous scent training. Adi was adopted from a rescue specifically for this program.

"She was slotted to be euthanized because she was a high drive golden doodle dog that jumped on everybody and mouthed them," explained Grimmer. "But I didn't agree with that. When I saw this young dog I said, 'That's the drive that I'd like to have.'"

The trainers started by teaching the dogs to signal when they smelled autoclaved (sterile) clubroot galls sent from Alberta. They were successful with all four dogs.

When they were successful in this environment, they took them out to fields. There are

Continues on page 26 >>

Continued from page 25

no canola fields in the region, so they buried containers with sterilized samples. The dogs rose to the challenge. Confident in the dogs' abilities, they prepared to bring them to Alberta for a bonus test. Would they be able to find live clubroot galls in an agricultural setting?

They started in Brooks and performed an indoor demonstration of their skills.

"The dogs on day one did exceptional in the clinical training because they were so used to that," said Grimmer. "We took all our training equipment out with us and showed that we did it clinically."

They took it a step further and headed out to the fields. The dogs had never been in a canola field before, so had never been asked to find clubroot on a living plant. They struggled with this on the first day.

"They had so many new things to try to wrap their heads around," said Harding. "The first couple of fields were encrusted on the surface. They had experienced clubroot that had been buried in the ground and been able to detect it, but that was in disturbed soil."

Through disturbed soil the scents may be easier to pick up than through encrusted soil. When the trainers planted clubroot samples into the field, the dogs were successful.

Optimistic, the team traveled to Leduc for the second day of trials.

"The dogs were way better day two... They were a little bit more calm, a little bit more focused and they were for sure able to nail it. That was exciting to see the progress within a day."

"The dogs were way better day two," said Coles. "They were a little bit more calm, a little bit more focused and they were for sure able to nail it. That was exciting to see the progress within a day."

The dogs even upped their game, retrieving the plants with clubroot galls.

"The second day at the third field the dogs were indicating (clubroot), grabbing hold of the plant stalk and pulling it out of the ground," said Grimmer.

The sheer physical area of canola fields makes it overwhelming to think that dogs could successfully scout them all. Multiple dogs working together, and high-tech systems could be a solution.

Grimmer has combined the low tech of a dog's nose, with high tech GPS tracking. While the dogs navigate the fields, sniffing for traces of clubroot, they have GPS trackers attached that

allow the handlers to look at exactly where the dogs have gone.

"When the dog signals (clubroot) by stopping and digging, it sends a signal that we can now lock in with GPS co-ordinates," said Grimmer. "That's the highest tech combined with the lowest tech work."

Going forward, it could be useful to know if the dogs can detect clubroot resting spores, and at how low of a concentration. If they are sensitive enough, there is the potential for dogs to be used to check equipment before it is moved from one field to another, or in auction settings. This could be valuable in agriculture as well as oil and gas.

In previous studies, dogs have been proven to be able to detect substances in very low concentrations.

"Universities that study this have shown that the dogs can detect even to the smallest (concentration) what we can humanly detect with our electronic equipment," said Grimmer. "Every time we come up with a piece of equipment that says we can go to this limit, we find out that the dog can do it too. We haven't reached the threshold of what the dog can do."

"This whole project was really proof of concept," said Coles. "Can they train the dogs to sniff clubroot? They've already proven it. Absolutely they can."

The dog nose knows, and the trainers can harness its power. Now it's up to us to decide how we utilize that knowledge. —



While the humans decide on the next test, Adi and Josie take a break. L to R: Caitlyn Reesor Alberta Ag; Adi, Mario Bourque, Morton Molyneux K2 Communications, Bill Grimmer, Mike Harding & Josie.

Farming Smarter adds Taber to research sites

BY TIANNA ELL

Farmers in the Taber area will have easier access to Farming Smarter research in coming years. The Town of Taber and Farming Smarter signed a 10-year lease agreement for land just north of the town.

Farming Smarter plans to conduct research on the land and hopes to host demonstrations and tours at the site.

Farming Smarter submitted a request for land through Santa's Wishlist, a program created by Lethbridge Chamber of Commerce to support non-profit organizations. Members of Taber's Economic Development team saw the request and reached out to Farming

Smarter. They offered 14.83 acres of land for research purposes. The site will provide an opportunity for Farming Smarter to install research plots on a different type of land than they already use in Lethbridge County and Medicine Hat.

"The soil in Taber is sandier and adds another environmental factor to our research. Our research there will benefit the people in that area," said Ken Coles, Farming Smarter General Manager. Adding Taber to Lethbridge and Cypress County offers more specific data for farmers in varied locations throughout Southern Alberta. —



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Farming Smarter Gallery Summer 2019



4



5



6

- 1 We had a tug-of-war between Lethbridge-East MLA Nathan Neudorf and Farming Smarter General Manager Ken Coles with fibre from a hemp stalk to demonstrate its strength during the Agriculture & Forestry Minister's tour, August 21, 2019. PHOTO: MORTON MOLYNEUX
- 2 Volunteer Jazlyn Pedersen joins children in the kid's zone seed pit at Farming Smarter's Open Farm Days August 17, 2019. About 320 people visited Farming Smarter to take part in a whole bunch of activity that day. PHOTO: FARMING SMARTER
- 3 Children and adults are all ears as Farming Smarter General Manager Ken Coles shows the strength of a single hemp stem at Open Farm Days on August 17, 2019. PHOTO: MORTON MOLYNEUX
- 4 Rain or shine our summer students are out in the fields keeping busy and having fun. PHOTO: FARMING SMARTER
- 5 People took part in a demonstration lead by Trevor Deering, Farming Smarter's Research Intern, to record how fast water infiltrates the soil at a Farming Smarter Plot Hop July 25, 2019. PHOTO: FARMING SMARTER
- 6 Listeners gather around Dr. Randy Kutcher as he shares information about fusarium infested crops during a July 11, 2019 Plot Hop at Farming Smarter. PHOTO: FARMING SMARTER

Blowing the applied research horn

By Farming Smarter

Alberta's applied research associations support good agricultural practices and help farmers all over the province. They use rigorous scientific methods to challenge new technologies, agronomic innovations and novel crops so that farmers can adopt these things with greatly reduced risk.

A group of them decided not enough people appreciate their good work and took action. August 21, 2019 saw six applied research associations host an event for elected officials at Farming Smarter in Lethbridge. Here's a little of what happened.



Above: Ken Coles (far right) talks about the increased interest in hemp production since the passing of the Cannabis Act. Farmers want current information on varieties, agronomics, pest/disease challenges and markets for hemp. **Left:** Farming Smarter and Lethbridge College have a joint project exploring the use of virtual reality for agricultural learning. Minister Dreeshen took a turn trying it out. This project has the potential to revolutionize learning for farmers.



The difference between dryland versus irrigated and precision planted versus air seeder was dramatic in 2019. The Farming Smarter precision planting study showed it very clearly. The results from this research could save farmers tons of money.



Early wheat gets the germ

Data continues to show temperature, not a calendar, should dictate seeding dates

By Trevor Bacque

When seeding spring wheat, the routine is simple and most base it on calendar dates. Generally, no other considerations are given, but why? After all, there is so much more known about the science of spring seeding than ever before. Ground temperature is an important factor and many farmers will simply wait until they feel it's warm enough. Well, they're running out of excuses, especially if they talk to Brian Beres.

The research scientist works at the Lethbridge Development and Research Centre and has been dutifully debunking the long-held notion that spring wheat, specifically CWRS, can only be planted in "warm" soils, on arbitrary ideal dates.

Since 2014, he and his team have investigated seeding into cold soils ranging from 0 C to 10 C in two-degree increments. Such an idea will have some shaking their heads, but the results will make those skeptical do a double-take.

He originally had the brainwave as he drove down to Montana for a conference one brisk, spring morning in late March 2012. As he entered the state, he noticed certain farmers were already seeding and it made him wonder if those north of the border shouldn't also be scratching the dirt.

"We constantly talk about planting recommendations based upon a calendar date, we seldom take into consideration soil temperatures," he says, adding he believes the temperature, not the calendar should dictate when a farmer begins seeding.

Most recommendations encourage seeding at around 10 C for rapid germination and emergence, and certainly not at 0 C, but that's just what Beres and his team did. With climate change making it even more possible to get onto the land earlier, a typical May 10 recommendation, often used for crop insurance purposes in southern Alberta, seems outdated for cereals.

The hypothesis was simple: ultra-early seeding of a cold-tolerant CWRS variety coupled with optimum agronomics should result in an extended growing season to maintain or improve yield and overall system stability.

In the first two parts of the experiment (2015-17), they tested CWRS and wheat lines possessing cold tolerance at four sites — Dawson Creek, B.C., Edmonton, Alta., Lethbridge, Alta., and Scott, Sask.

All sites had three cold-tolerant varieties planted in soil temperatures of 0 C, 2 C, 4 C, 6 C, 8 C and 10 C in the top two inches of soil. The test check CWRS variety was AC Stettler.

What they learned over the course of their research made them quite excited.

"With 2 C, there was no risk to yield," he says. "In fact, you could even see some trends where we were improving yield versus waiting until 7 C to 10 C."

Overall, what does he and his team believe about ultra-early seeding dates?

"At a minimum, 2 degrees should be that trigger point regardless of calendar date," he says. "This isn't something you can do every year at every site... but it's catching on as a concept."

Perhaps counterintuitive to common wisdom, Beres and his team found yield drags in temperatures of 7 C to 10 C. He also noted that higher seeding rates of 400 seeds per square metre on spring wheat and 450 for



Steven Simmill and Warren Taylor seeding the first ultra-early treatments, Feb. 16, 2016. PHOTO: BRIAN BERES

winter wheat was the sweet spot based on their extensive research. The team also has data that indicates a positive linear yield response through 450 for high-yielding durum and hard red spring wheat.

The dates of seeding ranged from February 16 to April 21 during the trials. Once seeded, the lowest the ambient temperature ever reached ranged from -2.3 C to -10.2 C. At one test site (Lethbridge, 2016, seeded February 16) the temperature was below 0 C for 36 days and below 3 C for 21 days post-seeding.

Still, the seeds and plants were unaffected, and results were promising across all sites.

In their third experiment, where seeding rate X cold-tolerant genetics X seeding depth was tested, wheat had the strongest yields when planted at 2 C at 6.2 t/ha. Generally, results were comparable at 2 C to 6 C with drop-off occurring at 7 C to 10 C. Overall, results were anywhere between 0.7 and 1 t/ha better than conventional systems.

"When you look at that, you can safely say, at a minimum, adopting an ultra-early seeding system would protect yield and, at times, even provide superior yield ability," he says. "If we are slowly going to see warmer temperatures in spring and more variable moisture in spring, re-thinking how we plant wheat and when is probably something we should get started on now."

The risks are inherent and well-understood: killing frost, seed and labour is doubled and machinery being suited to such soil temperatures.

However, Beres believes the upsides are well worth it and farmers need to take a serious look at a thermometer and not the calendar.

Capturing early season rainfall and snow melt, longer vegetative growth periods and early canopy closure, all of which could lead to earlier harvest and better quality due to reduced frost risk come fall, are net benefits. There is potential that this method means a farmer may not have to deal with regular seeding pests such as wheat stem sawfly, FHB or wheat midge due to the adjusted practices and altered growth phenology.

The next steps of the research involve fall-applied residual herbicides for early season weed management, nitrogen sources and applications as well as finding pre-existing varieties suited to ultra-early seeding systems. The team is also investigating the effect of opener type and have applied for funding for similar research in CWAD. —



Ken Coles addresses a group of provincial MLAs, municipal councilors and southern Alberta business leaders at an event in August 2019.

Making noise for ag

By Madeleine Baerg

After a year and a half of consideration and six months of serious effort, a brand new voice launched to advocate for agriculture in Alberta. Called FarmRite, it is six applied research associations from around the province advocating for stable, consistent research funding.

FarmRite came out of conversations among the association managers of Farming Smarter (FS), SARDA Ag Research, Chinook Applied Research Association (CARA), Lakeland Agriculture Research Association (LARA), the West Central Forage Association (WCFA), and the Peace Country Beef and Forage Association (PCBFA).

“In Alberta, there was a strong feeling that someone needed to champion our research associations. If there is value in the work we do, we need to address who might pay for it,” says Claudette Lacombe, Farming Smarter’s communications manager. “Farmers have to start talking with one voice. Together, we’re much more likely to be heard.”

“We are all independent groups and we have unique issues and unique qualities, but we also share a lot of common ground,” says Dianne Westerlund, manager and forage agronomist with CARA. “We all strive to provide non-biased

information of value to producers locally as well as provincially and we all need a strong base of reliable funding to continue our work.”

Crop producers are accustomed to support around on-farm innovation. At one time, they got it from locally available provincial government specialists. The government passed the torch for information sharing to applied research organizations over time. They gave them the Agriculture Opportunities Fund (AOF) to operate.

“Applied research associations and forage associations have a key role to play in making producers more viable,” says Westerlund. “None of us are doing pure research. We’re not developing crop varieties or chemicals. We’re taking information and making it usable for local producers, evaluating whether it’s something they should consider and connecting pure science to end users.”

Farmers see the value of applied research to their own farms. More and more of them turn to Alberta’s applied research organizations for agronomic insight, crop trial data, region-specific best practice recommendations, and the translation of academic research to real-world application.

These same farmers are very clear in how

they think applied research associations’ important work should be financed. According to Farming Smarter’s survey conducted in January 2019, farmers believe provincial/federal government should carry the greatest responsibility for funding applied research and extension, followed by industry/sponsors, then commissions, municipal government, and, way down on the scale, donations.

Unfortunately, the major funders of applied research associations aren’t so enthusiastic. Crop commissions continue to decrease their financial support, citing decreasing budgets. Alberta Pulse was the latest to withdraw funding. Though those cuts hurt, the most worrisome cut may still lie ahead.

All six organizations’ basic operating dollars come from the AOF. AOF grants came once a year under three-year commitments. They were renewed for more than a decade. This may soon change. The previous government cut AOF funds in their proposed 2020 budget. Whether the current government opts to reinstate those dollars or not is a point of serious concern.

“AOF funding is important to us and critical to the smaller organizations. It’s how we all keep the lights on,” says Lacombe. “If the AOF grant can’t at least sustain basic functioning of each

of the applied research associations, there isn't going to be any money to leverage (to capture other grants)."

There are studies that show the return on investment in agriculture research is 32:1

One of the biggest and most critical uses of AOF funds is extension: a gap that almost certainly won't be filled by any other source if AOF funding is cut.

"There's no such thing as a research grant that gives you any substantial money to convey knowledge out to general public," says Lacombe. "If you have a \$300,000 grant to do research over three years, you might have \$3,000 to get message out. The AOF dollars are critical to our ability to pass applied research on to farmers."

Though instigated by the pressing need to advocate loudly and effectively for AOF funds, FarmRite has the potential — and the goodwill of the associations — to do much more. FarmRite associations plan to use their new collaboration to speak with one voice to government on a variety of topics. They also hope FarmRite will help grow relationships with grower commissions and other industry partners.

"I think it's important for applied research associations to have a collective voice in all avenues of advocacy," says Westerlund. "Within our group, we already have really good connections with both the politicians and the support network. We also have good connections with commissions and private industry. We've had very successful response from industry and government to date. This collaboration allows us to be more efficient, and it creates the potential for us to have bigger clout."

The FarmRite collective will help foster a healthy equilibrium between its associations. They are clear that FarmRite is not designed to, nor should it, take on research of its own. However, FarmRite can serve as a great vehicle to unite the research capacity of its regions where group efforts would help achieve common goals. For example, many variety trials would benefit from plantings in multiple geographic areas.

"Many funding projects want a wider reach than just regional. It can be difficult to expand outward from a regional trial if you don't have the relationships with other associations. Hopefully putting together this group will manufacture those working relationships," says Vance Yaremko, manager with SARDA.

Whether it will expand from its existing six associations — perhaps to include additional like-minded applied research associations and/or industry, academic or other partners — remains to be seen.

"We haven't thought deeply about what growth might look like, but we hope that other groups that see value in our niche of ag research will come to our side to help advocate and possibly to build province-wide research projects," says Lacombe.

Yaremko describes the start-up of FarmRite as a "seamless coming together" of groups all committed to the same goals. FarmRite launched a website and strategic plan to put forward its priorities and move its primary communication efforts forward.

Though FarmRite has the enthusiasm and energy to attack its big priorities, make no mistake: farmers are not off the hook for ag advocacy. It's up to everyone who values applied research and extension to advocate for stable, consistent funding of the organizations that do this important work. Farmers can help reinvigorate crop commission support by nudging those boards. As importantly, farmers can reinforce FarmRite's message to the provincial government via their MLAs.

"As with anything, out of sight is out of mind. FarmRite intends to ensure that ag research isn't out of government's sight," says Lacombe. "We hope farmers choose to be part of sharing that message."

"How should farmers view FarmRite? It's the voice we need for producers," says Yaremko. —

FarmRite's Goals

www.farmrite.ca

GOAL

1

To build organizational stability and impact through leveraged public private partnerships.

GOAL

2

Generate \$40 Million in non-government funds

GOAL

3

Grow Agriculture Knowledge Systems

GOAL

4

To Accelerate and Adapt Regional Innovation in Agriculture



"So how was your growing season?"

The annual kochia migration

By Dr. Charles Geddes

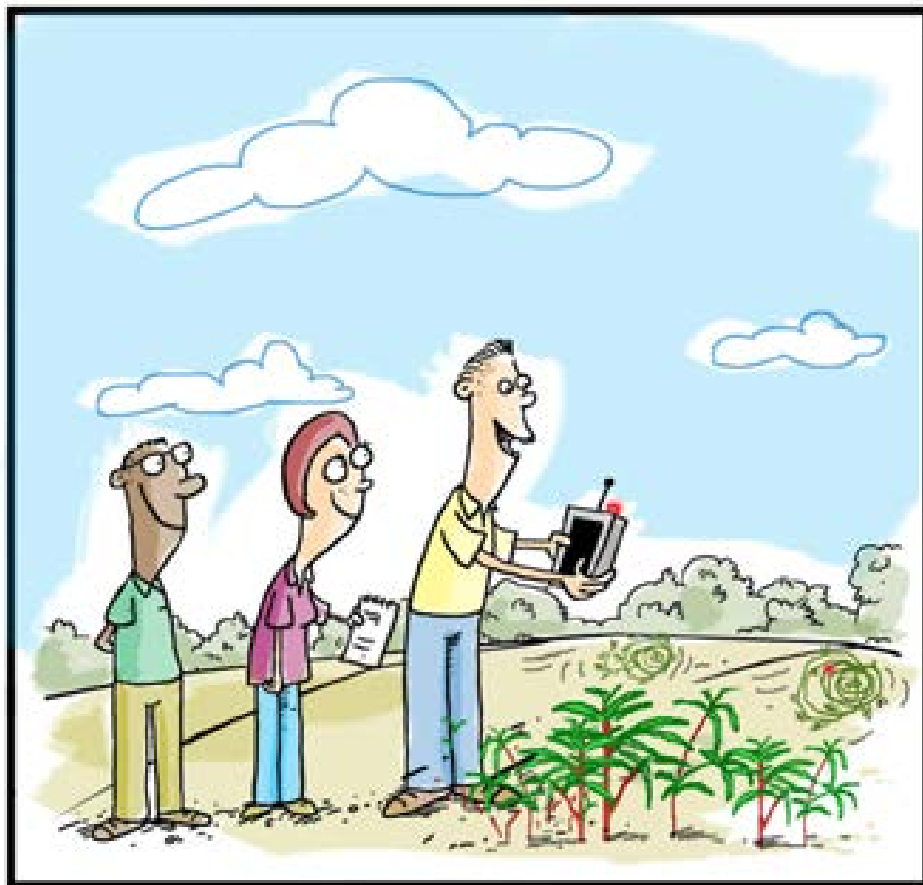
As I write, wind gusts hit up to 100 km per hour in Lethbridge and the annual migration of feral Kochia is in full swing. Kochia is a tumbleweed. This weed grows into a large, bushy, oval, top-heavy plant that senesces in October. Plants with this structure are most common in areas where kochia is not competing with other plants, like low-lying saline areas, where this species often thrives. As kochia plants dry down, the stem weakens, making it easy for the stem to break off on a windy day.

On days like today, kochia tumbleweeds blow across fields in southern Alberta and elsewhere. While tumbling, the plant loses its seed, resulting in dispersal of the weed population to new areas and new fields. This is of particular concern for spread of herbicide-resistant kochia populations, like those resistant to glyphosate or synthetic auxin herbicides.

Kochia scoparia, (kochia for short), is among the most problematic weeds in the southern Canadian prairies and often robs many growers of crop yield. Difficulty managing this weed is, in part, due to the evolution of herbicide resistance (in Western Canada) to Groups 2, 9, and now 4. While many growers implement targeted integrated weed management programs, it is difficult to reduce the spread of this herbicide-resistant weed because it is efficient at both pollen- and seed-mediated gene transfer.

Recently, Agriculture & Agri-Food Canada (AAFC) researchers studied how much drops during kochia migration and over what distance. To do this, they attached tracking collars to kochia plants and set them free in the wind (the experiment was limited to a single field to limit the spread the populations). In this study, kochia plants traveled at speeds of up to 11 km/hr. and lost about 90 per cent of their seed in the first kilometre. However, it is likely that the other about 10 per cent of seed would remain attached for much longer distances.

The next step is to determine options to limit the distance travelled by kochia plants. Fence lines at tree rows work well to stop kochia in its tracks, but what about fields that are no longer fenced and where trees have been removed? Does crop stubble height matter? Or narrow wind-rows of crop left



...whoop, whoop look at those kochia go!

standing in in fields? These are all questions that we cannot answer, yet...

For the time being, we know that when kochia competes with other plants, like a dense crop stand, it loses its ability to form a tumble weed. This tool could be used in field areas with standing crop by using high seeding rates, narrow row spacing, etc. In more-ruderal areas outside of fields, mowing can inhibit the tumbleweed growth form, meaning that the plants won't blow away as easy. Ongoing research at AAFC is looking at both of these tools, and how they can be optimized to manage kochia more effectively. —

Reference: Beckie, H.J., R.E. Blackshaw, L.M. Hall, and E.N. Johnson 2016. Pollen- and seed-mediated gene flow in kochia (*Kochia scoparia*). *Weed Science* 64:624-633





CONFERENCE & TRADE SHOW

DECEMBER 11 & 12
LETHBRIDGE EXHIBITION PARK

KEYNOTES • ALANA KOCH
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3 EVENTS IN SOUTHERN ALBERTA



Autumn Barnes



Greg Kostal



Mark Walker



Ebony Verbonac



Hayley Hilz



AIRDRIE

Tuesday, November 26
Apple Creek Golf Course

LETHBRIDGE

Wednesday, November 27
Coast Hotel & Conference Centre

DRUMHELLER

Thursday, November 28
The Cretaceous Conference Centre

TOPICS AND SPEAKERS:

CANOLA PRODUCTION CHALLENGES IN 2019

AUTUMN BARNES, AGRONOMY SPECIALIST
– Canola Council of Canada

A LOOK AHEAD INTO OUR GRAIN AND OILSEED COMMODITY SPACE

GREG KOSTAL, MARKET ANALYST
– Kostal Ag Consulting

RISKY BUSINESS - A LOOK AT TWO COMMON RISK MANAGEMENT TOOLS

EBONY VERBONAC, PARTNER, ENTERPRISE
– KPMG

HAYLEY HILZ, MANAGER, ENTERPRISE
– KPMG

ARMING ADVOCACY WITH DATA: ELECTION PRIORITIES, BIOFUELS, WATER MONITORING & NEONICS

MARK WALKER, MANAGER, POLICY DEVELOPMENT
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