

FARMING SMARTER

Spring 2023 Edition



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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
Editor: C. Lacombe



COVER PHOTO:
Mike Gretzinger and team plant ultra early durum for Dr. Brian Beres project experimenting with planting by soil temp instead of date.

PHOTO: SEAN KJOS

Sturdy foundation supports bright future



Farming Smarter celebrated its tenth anniversary in 2022. The roots of the organization go back to the 1980s when innovative southern Alberta farmers started gravitating toward each other to combat forces around them. Back then, they talked about moving to no-till farming and introducing pulse crops into rotations. But they wanted to reduce risk through in-field research that wouldn't cause anyone to go bankrupt.

Eventually, the groups coalesced into Farming Smarter and Alberta's largest agriculture innovation hub emerged as a non-profit association with Canadian charitable status.

"It can be very easy for an organization with previous success to continue doing what always worked. At Farming Smarter, past success provides the foundation for what can be done. This allows for progressive and strategic growth built on those foundational pillars," says current board member Mandy DeCecco-Kolbaba.

Farming Smarter is still farmer-led through its board of directors but boasts a highly proficient and dedicated staff that stand on the foundation and continue innovation support for Alberta farmers.

"These days it's hard to find unbiased information in any industry. So, to have that in agriculture here in southern Alberta is very valuable. Year after year its a trusted resource for information and farming practices," says current board member Nathan Stamp.

Gone are the days when a couple of staff members conducted a few trials on Lethbridge College land. Farming Smarter now has projects across southern Alberta. It does small plot, field scale, and custom research. Staff and board work together on advocacy projects and supporters gather at events to network and learn from research professionals and each other.

The whole industry works in a shifting environment — economic, climate, social and international forces buffeting every part. It helps to have a large network that includes friends such as Nathan Neudorf, MLA for Lethbridge-East, Deputy Premier and Minister of Infrastructure.



Lethbridge College students help harvest and record hemp plots. PHOTO: FARMING SMARTER

Board Long Service Awards

George Lubberts	2010-2022
Craig Walsh	2009-2020
Art Bird	2008-2019
Doug Brodoway	2010-2021
Ron Noga	2004-2014
Doug Clemens	1998-2015
Richard Fritzler	1996-2016
Tony Brummelhuis	2004-2015

Funding mechanisms and priorities have changed as much as anything else and it requires a constant effort to source funds for research projects, matching obligations and, particularly, extension.

"We continue to diversify our funding base with growth in research contracts and project support from RBC Tech For Nature and The Weston Family Foundation for example," says Rob Dunn Board vice-president.

The organization also has some long-term, beneficial partnerships such as the one

with Lethbridge College that brings students to work along side staff as part of their learning. There are also Program Partners under the Smart Partner program that offer direct financial benefits to the organization and its paid subscribers.

There are no plans to slow down either. In 2022, the board supported executive director Ken Coles' Nuffield Scholarship as an initiative that promises great impetus for Farming Smarter advancement.

"A highlight was supporting Ken's Nuffield Scholarship," says Will Van Roessel. Nathan Stamp adds, "With insight from around the globe, those experiences help drive the vision and fuel the efforts of the organization."

Greater things are on the horizon!

Ryan Mercer
Farming Smarter board president

Passion for innovation



Agriculture innovation is chaotic, risky, and quite frankly terrifying. But in Canada, fortunately we tackle innovation with abundant land, access to capital, science and technical support. We are, so far, unencumbered by policy. There's nothing like an agriculture tour of a third world country to put our woes into perspective.

I embarked on a mind-bending trek in October. This little excursion transported by big body over 18,000 km to a place I never expected go but always enjoyed saying — Zimbabwe! Thanks to my first world pampering, I was dreading the 50 hours of travel but managed to survive it rather well thanks to Amazon Prime and Netflix. Oh, and a sweet little NapCab (little bed) in terminal 1 of Frankfurt airport!

Upon arrival in Victoria Falls, I joined a group of 22 fellow Nuffield Scholars hailing from the U.K., Australia, Ireland, U.S., Canada, and Zimbabwe. I didn't really know what to expect. Our first stop was a visit to the infamous Savory Institute where we met Allan Savory himself — a founder of holistic management. While many regen enthusiasts

were star struck, I was my typical self quietly observing and kicking my critical thinking muscle into high gear. It was incredibly interesting to see firsthand the theories attempting to be put into practice, the realities vs the perceptions, the commonsense vs the science and the business vs morality.

The trip consisted of visits to many flourishing ag ventures including CCC Pigs, Red Dane Dairy, Imire game reserve and a tobacco farm, PHI Corporate farm and feedlot, drip tech blueberries, Cannabis, row crops, irrigation, mixed farms, Pandenga Crocodile farm, Kariba aquaculture, Banana and Paprika. Throughout all these visits, we learned about a tumultuous history from the colonization of Rhodesia, independence in 1980, the Mugabe Government, land reform, subsistence farming, economic instability, hyperinflation, dual currencies, black markets, poverty, and political corruption beyond belief.

All of this to extremes we can't even imagine. We complain about inflation, but I can show you a 200 trillion-dollar bill that was legal tender. We complain viscerally

about government, while Zimbabwe protesters get gunned down. We struggle with an increase in interest rates, loans don't exist in Zimbabwe. We complain about the price of land, they aren't allowed to own land. Yet despite all this, the spirit of farmers still prevails as they innovate, conserve resources, manage costs and risks, increase production, diversify, and market products and love what they do.

Being able to share this experience, discuss and debate with such a wonderful group of people was a soul enriching experience. It doesn't mean our challenges aren't real, but it should be a reminder that our barriers aren't so bad and that the opportunities to succeed are tremendous. All we need to do is get off our chairs and do it!

Here's to a fruitful and innovative season!

Ken Coles

Farming Smarter Executive Director



Sometimes, the elephant in the room is an elephant! PHOTO: KEN COLES

Protégé wins 2023 Orville Yanke Award

BY JENNIFER BLAIR

Josh Beck credits Orville Yanke as the person that started him down the path of soil conservation that led to him win the namesake award.

“We were pretty close, so it’s pretty special for me to win this award.”

“It’s a pretty big honour for me,” said Beck, a fourth-generation farmer who has a mixed operation near Hilda. “Orville was my mentor, so I was able to spend time with him one-on-one for three years learning from him directly and seeing the benefits of the changes he made.

At the time, nearly 20 years ago, Orville Yanke was at the forefront of the soil conservation movement in southern Alberta, but the No. 1 lesson he taught Beck is as true today as it was then: “Keep the soil protected.”

“A lot of his lessons were just about how to farm with the least amount of disturbance to the soil,” said Beck.

“The one thing we’re consistent with is low disturbance — things like using a disc drill and trying to maintain a level of thatch or residue on top of the soil to conserve water.”

That’s especially important in his area of the province, Beck added. “We’ve been in a drought cycle for a number of years. In our area, we have to conserve every little bit of water we get. To do that, with the winds that have been coming, we have to keep that ground protected.”

Beck began to slowly cut chem and summer fallow out of the rotation, instead turning to continuous cropping. “That’s where we are now — strictly continuous cropping with the intent of leaving that stubble.”

And so far, the work he’s been doing has paid off.

“I hate going back to this all the time, but we had a massive wildfire in 2017 that burned about 2,000 acres of land we farmed,” he said. “From where it burned and where it didn’t burn, we noticed a 10- to 15-bushel difference because that soil didn’t have that coverage on it anymore.

“Keeping a thatch layer to hold in moisture and keep the wind evaporation off has been key for us.”

That has also translated into higher yields in general over the years, Beck added.



Jennifer & Josh Beck receive the award presented by Judy & Tara Yanke.



Josh Beck. PHOTO SUBMITTED

“Back when we were summer fallowing, a 30-bushel crop was a really good crop, but now, a 30-bushel crop is pretty disappointing. We’ve probably gained at least five bushels on average, and now we’re also growing 45-bushel wheat on not a lot of rain some years.”

Getting to that point has been “lots of trial and error,” though.

“Trying to figure out what will work here has been a challenge,” he said. “We’ve

been trying different cover crops for three or four years, but the weather just hasn’t co-operated.

“So it’s been a challenge to implement some of these soil health principles or practices that they’re doing other places into our climate.”

But with the rising cost of land and other inputs, Beck sees his soil conservation work as a way to keep his cost of production as low as possible.

“With the cost of land these days, we need to do as much as we can with what we have,” said Beck. “If we can continue to help the soil — really figure out how to unlock the potential in the soil — it’s going to help us keep our cost of production down.

“There’s great potential in the soil, so the big thing is to get it to work for us.”

And Beck suspects his one-time mentor would agree.

“When I’m doing this work, I often wonder what Orville would think about it,” said Beck. “I think he would be pretty intrigued as to what we’re trying to do here, and if he were still farming, he would definitely be trying to implement some of these practices.” **FS**



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Keep in touch with soil moisture



BY KRISTI COX

Farmers can find manually checking soil moisture and creating effective prescriptions through the cropping season cumbersome. Farming Smarter recently completed a study investigating ways to automate variable rate irrigation (VRI) and make its full potential accessible to farmers.

The goal was to develop a module LiteFarm could offer through a free, open-source farm management tool and test it on one of Stamp Seeds' irrigated fields in 2022.

"There is a decent amount of centre pivots in southern Alberta equipped to irrigate variably," said Lewis Baarda, Farming Smarter field tested research program manager. "It takes time, resources, and expertise to determine rates for different zones in the field, develop a digital prescription, communicate it to the pivot and ensure the pivot executes the plan properly."

Before participating in this study, Nathan Stamp, farm operations manager at Stamp Seeds created his own prescriptions. He reported that it worked okay but took considerable time and effort.

In some cases, farmers use VRI technology on a static basis. They know the low spots and high spots, so they build a couple of prescriptions for a field and deploy one of those options according to whether it's a wet or dry year. This is a step in the right direction, but the technology can offer much more.

Baarda worked with Michele Korschuh, an irrigated crop scientist at the University of Lethbridge, Dr. Mark Johnson with Ensemble Scientific and Kevin Cussen with LiteFarm on this 18-month research project.

They successfully created a module that integrates field maps, soil moisture sensor data, weather forecasts, and crop evapotranspiration models to create a prescription for variable rate irrigation.

The team installed about 100 soil moisture sensors from Ensemble Scientific in Stamp's field when it was seeded. They installed 17 sensor arrays giving a real time connection to the soil.

Soil sensor data remotely uploads to the model that generates a VRI prescription based on that data. Once the farmer receives

this prescription, they can look at it, tweak it if needed, and then input it to the pivot control. Eventually, this could be delivered directly to the pivot.

Significant rain events in the field trial period limited the need to use the irrigation prescriptions, but this trial demonstrated the potential for automating and streamlining the process of creating VRI prescriptions.

“The prescriptions that were created were fairly accurate,” Stamp said.

As crop values and input costs increase, cost effectiveness of VRI could also increase. Having VRI accessible to more farmers would be beneficial.

“Right now, water use costs are minimal for irrigation, but as values go up, there could be a (financial) benefit of not over applying and having excess runoff,” said Stamp.

This could also be used with a non-VRI system.

“Maybe before you planned to go physically check, it would alert you that a field is drier than you thought, so you would irrigate sooner and this could potentially save you yield loss,” said Stamp.

To develop this fully, Baarda explained they would like to examine it in different environments and with different pivots. He also sees a benefit of looking at decreasing the number of sensors and zones within the field, as most producers would find 17 sensor arrays cost prohibitive. **FS**



Lewis Baarda, Kirsten French and Tal Ibanez standing by an installed sensor array.
PHOTO: FARMING SMARTER



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Canada needs thoughtful, nuanced, big picture sustainability

BY MADELEINE BAERG

The Canadian federal government seems to be following Europe's hyper-targeted, non-scientific lead on climate policy direction, especially where policy relates to agriculture. That shift is already costing Canadian farmers.

Farming Smarter actively supports sustainability given the realities of agriculture today. So calling Canada's primary ag research funding tool Sustainable Canadian Agriculture Partnership (SCAP) is fine as long as the funding goals support actual sustainability science.

"What we need is a balanced process that isn't solely politically motivated," says Farming Smarter Executive Director, Ken Coles. "We're moving away from programmatic agronomy and breeding, big-picture approaches toward an exclusive focus on little pieces of the environmental puzzle. Focusing purely on highly specific climate change outcomes like greenhouse gas emissions actually diminishes our ability to achieve real climate change goals. It doesn't consider the complexity and value of agriculture. I'm really worried about where this direction will lead us."

By almost any measure, Europe has far more environmental and climate change regulation and actions than Canada. The Green Deal directs much of Europe's policy. It is a sweeping strategy introduced in 2019 by the EU's executive arm and supported by all 27 EU member countries except Poland. Its main objective targets zero emissions by 2050 through elimination or offset of greenhouse gas emissions. The strategy covers nearly every sector of the European economy and Europeans' daily life, from recycling and waste management to transportation to taxation. It also specifically and significantly targets agriculture.

The Green Deal archives much of its agriculture work through 'Schemes:' incentives for environmentally focused on-farm practices. That system, says Coles, led to a drastic change: European farmers now often farm policies instead of farming the land.

"I did my Masters degree in environment and management. I care about the



2021 and 2022 Nuffield Scholars visit Holkham Hall, an estate farm in Norfolk County, England. Here Ken met the Earl of Leicester and learned that the feudal system still operates.



While in Zimbabwe, Ken learned that many farms rely on tobacco crop income for resources and capital to fund many farming operations.

environment. But I'm also very, very afraid of policies that incentivize without necessarily having an appropriate top-level perspective and the scientific engagement to ensure that these induced practice changes are actually the right things to do," he says.

The EU's efforts to promote environmentally friendly agriculture are often short-sighted, promoting a seemingly positive outcome but ignoring that outcome's negative ramifications.

For example, to meet the government



While visiting Martin Gosse de Gorre, a former French summer student at Farming Smarter, Ken learned that Martin had never visited the research centre just down the road from his farm. So, they went to visit plots experimenting with growing canola without neonics.



glyphosate reduction targets, French farmers now manage weeds with multiple tillage passes. In fact, French agriculture, the definition of ‘minimum-tillage’ now means one fewer pass of a plow in a multi-pass system.

“Roundup is one of the major tools that allowed Western Canada and all of Canada to widely adopt zero tillage. It is scientifically proven time and time again to be a much better way of conserving our land, minimizing erosion and improving all factors of soil health,” says Coles. “Europe’s desire to reduce pesticides doesn’t take into account the critical environmental value that no-till contributes in soil health.”

Here at home, government research dollars offered through SCAP now focus heavily on just two specific outcomes: increasing carbon sequestration and mitigating greenhouse gas emissions.

“If it doesn’t have those two key components as part of the project outcomes, then the leverage is reduced, which means your funding will drop from, say 75 per cent to only 50 per cent of the project,” says Coles.

If, in fact, the project can get funding at all.

Agriculture and Agri-Food Canada researcher, Brian Beres, posted to Twitter in mid-January reporting that, for the first time in 23 years, he hadn’t been successful in capturing funding to study winter wheat.

Winter crops effectively and productively cover the land in a way that is cost-effective, environmentally beneficial and offers return on investment. Yet, says Coles, “Because it doesn’t have the words ‘cover crop’ in it, it’s not the flavour of the day so the funding isn’t there.”

Quite possibly in the long run, the government’s focus on limited, highly specific climate outcomes doom Canada to be less successful both in agricultural production and in real environmental improvement.

There are multiple examples of critical research lacking funds because a bigger picture isn’t considered — both a bigger environmental picture and a more nuanced view of agriculture’s value.

For example, the risk and cost of Aphanomyces disease currently dampens farmers’ enthusiasm for pulses. But, as every farmer knows pulse crops fix nitrogen in the soil. We can consider pulses a huge part of the greenhouse gas equation in Canadian agriculture. Logic would suggest Aphanomyces research has a direct correlation to Canada’s climate outcomes. Yet, multiple Aphanomyces-based research projects didn’t get funding in the most recent round of applications because, says Coles, “They were seen as disease focused, not climate-focused. The bigger picture context isn’t being considered. When policy and funding become politically motivated rather than

practically and relevantly motivated, that’s a huge concern to me.”

Coles worries that this shift to targeted, political decision-making will not only ultimately reduce Canadian agriculture’s ability to positively impact Canada’s climate change objectives, they’ll reduce the Canadian agriculture industry’s scientific, agronomic and innovation capacity to a point that it’ll be lost forever. “We’re not encouraging people to get involved in the areas that we need to, which is how to grow crops better with less.”

Even if Europe’s agriculture policy serves European needs (though that’s arguable), it shouldn’t stand as a model for Canada. Canadian agriculture is different in almost every way from its European counterpart. Whereas farms average about 43 acres in Europe, they average almost 1,200 acres in Alberta: nearly 30 times as big. Our country is huge in geography and incredibly diverse in agricultural production: Alberta alone boasts nearly as much farmland as all of France, Europe’s farmland leader.

“Just to simply copy policies and the goals of meeting climate change targets doesn’t mean that it’s going to be effective in helping us meet our goals,” says Coles. “What we need is a regional approach, with significant levels of thought and consideration, for solutions that are practical, grounded, relevant and regionally specific.” FS



2022 Overview

PARTNERSHIPS

Farming Smarter recognizes the value of partnerships to our industry and are always open to collaboration for the common good. In 2022, we had Knowledge & Network partners and post-secondary students.

- 33 industry partners
- 14 scientific researchers
- five academic institutions
- 69 post-secondary students

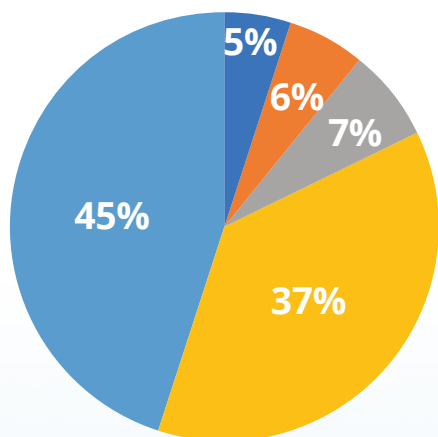
2022 RESEARCH OVERVIEW

Primary research locations: Lethbridge, Enchant, Bow Island, Brooks, Sterling, and Medicine Hat

- 131 projects
- 167 individual trials
- 20 farmer partners
- 184 research sites
- 11 project reports
- one article published in peer reviewed scientific journal

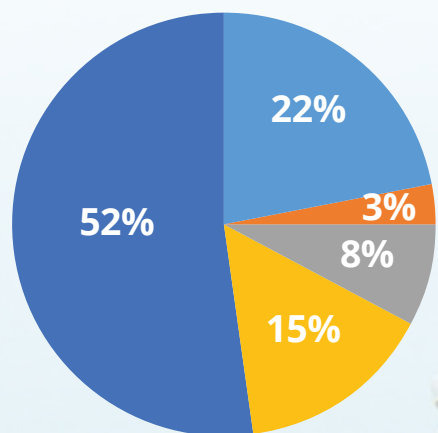
STAFF LONG SERVICE AWARDS

Claudette Lacombe	18 years
Elizabeth Tokariuk	16 years
Ken Coles	15 years
Jamie Puchinger	12 years
Mike Gretzinger	12 years
Toby Mandel	10 years



2022 REVENUE

- Miscellaneous Grants
- Knowledge & Network Revenue
- AB Base Funding
- Leveraged Grants
- Commercial Innovation



CUSTOM RESEARCH TRIAL CATEGORIES

- Crop Input
- Management Practices
- Other
- Variety
- Pesticides

COMMUNITY INVOLVEMENT

4-H Youth

Farming Smarter enjoys working with the community and fostering youth involvement in agriculture. Each year, we invite 4-H members to speak at our Conference & Trade Show and host a virtual auction with proceeds going to the club. In 2022, we hosted eight speakers and raised \$8,797.95 to donate to 4-H!

Alberta Open Farm Day

Alberta Open Farm Days is a collaborative, province-wide, two-day event that gives Albertans an opportunity to experience the farm and understand local food production.

Farming Smarter began participating in 2016 by opening its farm to urban residents. Our event involves local community organizations and industry. The 2022 event had 17 partners from the Lethbridge community. They ran the barbeque, hosted Learning Centers and populated booths that allowed 374 attendees to learn the intricacies of agriculture.

Lethbridge College Students

Through a partnership with agriculture programs at Lethbridge College, agriculture students visit Farming Smarter to get hands on learning about working in research. In 2022, college professors and Farming Smarter researchers involved 25 third year students and 29 first and second year students in hands on learning.

Students also get a discount to attend our winter conference and hear research results from our projects.

Nuffield Scholarship

The Nuffield Canada Scholarship is a prestigious rural leadership program available to anyone mid-career and involved in agriculture in any capacity of primary production, industry or governance.

Farming Smarter hosts Nuffield Scholars every year from around the world to show them agriculture research taking place in southern Alberta.

In 2021, executive director Ken Coles became a Nuffield Scholar and began his travels in March 2022. He visited the British Isles, Zimbabwe and eastern Canada. In 2023, his travels will take him to New Zealand.

Staff Community Service

Ken Coles

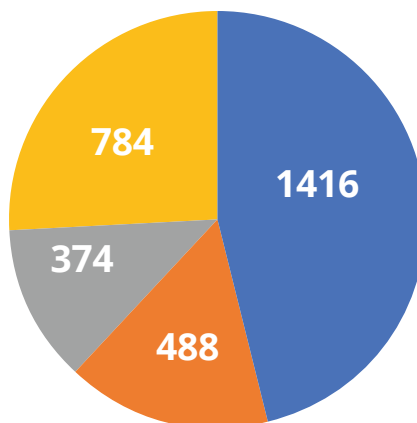
- 2022 Nuffield Scholar
- Lethbridge County Agriculture Service Board

Gurbir Dhillon

- Adjunct Professor U of L Dept. of Biological Sciences
- Reviewer Canadian Journal of Plant Science & Agriculture Ecosystems & Environment

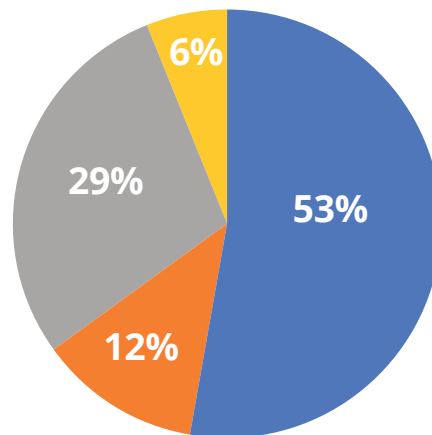
Claudette Lacombe

- Chair Lethbridge College Digital Media Program Industry Advisory Committee
- Program Director Southern Alberta Chapter, Association of Fundraising Professionals



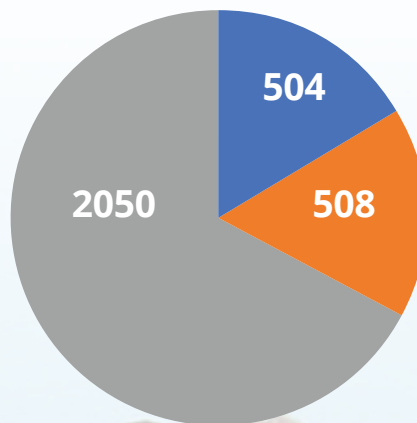
TOTAL PLOTS IN EACH CATEGORY

- Fertility/Agronomy
- Industry
- Novel Crop
- Sustainability



PARTNERS ON FIELD TESTED TRIALS

- Farmers
- Researchers
- Industry
- Other



NUMBER OF IRRIGATED OR DRYLAND PLOTS

- Both
- Dryland
- Irrigated

Knowledge & Network achievements in 2022

We change the way people farm with enriching and interactive learning experiences



Dr. Brian Beres presents on his ultra early durum project at a Farming Smarter field event.

ECONOMIC IMPACT ANALYSIS

Farming Smarter calculates its impact at \$173 Million in 2022.

- Digital print extension \$17 Million
- Research program \$39 Million
- Public media impressions \$45 Million
- Event participants \$72 Million

Digital extension

Obtained from digital analytics with the assumption of 2,000 acre farm size and \$0.01/acre impact

Research Program

Calculated by using average return on investment from the following studies 40:1

1. Review study of 292 studies. Most common return was 30:1 mean was 82:1



The Ask a Farmer booth is always popular at Open Farm Days.

- Source: Alston, J.M., C. Chan-Kang, M.C. Marra, P.G. Pardey, and T. J. Wyatt. A Meta-Analysis of the Rate of Return to Agricultural R&D: Ex Pede Herculem. IFPRI Research Report No. 113, 2000.
2. Book Persistence Pays: U.S. Agricultural Productivity Growth and the Benefits from Public R&D Spending. J.M. Alston, M.A. Andersen, J.S. James and P.G. Pardey, Spinger January 2010. 32:1 return.
 3. The returns to WGRF cereal research 1994-2030 – Gray Nagy, Guzel (2012) 36:1 return
 4. Zero till research 52:1 Gray and Nagy (2011)
 5. Regional Variety trials 1971-2010, 63:1 benefit cost returns
 6. Sask pulse growers 24.6 to 1

Public media impressions

Calculated based on reach of publications with the assumption of 2,000 acre farm size and \$0.01/acre impact.

Event participants

Information obtained from farmers directly.

EVENTS

Farming Smarter saw a healthy recovery in event attendance almost reaching the pre-covid levels of 2019. We retained our most successful virtual events that add value to

the people that follow us and welcomed back the interactive events in the field and at the conference. We expect to see even more growth in 2023.

- Farming Smarter Conference – Feb 16 & 17, 2022 (135 people)
- Pesticide Applicator Online Workshop – March 24, 2022 (74 people)
- Field School – June 23, 2022 (78 people)
- Plot hop – July 21, 2022 (37 people)
- Open Farm Days – August 13, 2022 (347 people)
- Global Crop Production Virtual Conference (55 people)

CONTINUING EDUCATION CREDITS

Certified Crop Advisors received 33 credits and licensed Pesticide Applicators received 7 credits through our events.

43 research presentations at events

Pulse diseases, deep banding immobile nutrients, soil moisture sensor arrays, potato production and soil health, nutrient management, integrated pest management, winter crops, biostimulants, ultra-early durum, strip tillage, intercropping, etc.

MEDIA COVERAGE

Farming Smarter values our relationships with media who help us extend the learning from our research. We also publish our own magazine in partnership with Glacier FarmMedia.

- Farming Smarter press releases – 22 stories, event invitations and advocacy articles
- Popular press stories – 78 articles shared by over 20 outlets including Global News, CTV News, Real Agriculture, Top Crop Manager, and Western Producer.
- Farming Smarter Magazine – 2 editions (spring & fall) contained 30 articles relevant to crop production in southern Alberta.

VIDEO PRODUCTION

Farming Smarter released 68 videos - 15 subscriber plot shots videos, short form videos from the field and video presentations from events.

- We gained 251 YouTube subscribers – now at 2,376
- 37,064 YouTube video views
- 3,265 HOURS of video watched

INTERNET PRESENCE

Farming Smarter takes advantage of internet tools to broaden and connect with our audience. We maintain several



2022 staff orientation for students by senior team leads. Each year, Farming Smarter hires around 15 students for the summer providing them with further education in our fields.

social media accounts and in 2022, began to update the information hub farmingsmarter.com after more than a decade of service.

- Website www.farmingsmarter.com
 - Research project pages
 - News posted twice a week
 - Event listings

- Video library

- Publications

- Staff directory

- 700,000+ Social Media impressions through Twitter, Instagram, LinkedIn, and Facebook
- External information sharing – Spotify, YouTube

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2023 Event Schedule

Save the Date!

- ▶ **February 15 & 16**
Farming Smarter Conference & Trade Show
- ▶ **March 23**
Pesticide applicator workshop
- ▶ **June 15**
Field School
- ▶ **July 13**
Plot Hop
- ▶ **August 19**
Open Farm Day
- ▶ **December 13**
Global Crop Production Conference



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Agronomy Research Program

The Agronomy Research Program provides regional innovative science-based solutions tailored to southern Alberta's growing conditions. Our program focuses on agronomic management practices of annual crop production systems. We seek to improve productivity and profitability of farms while improving environmental sustainability and soil health.

Farming Smarter leads or collaborates with partner institutions on 20-25 research projects. These projects contain 75-80 trials annually on a range of crops.

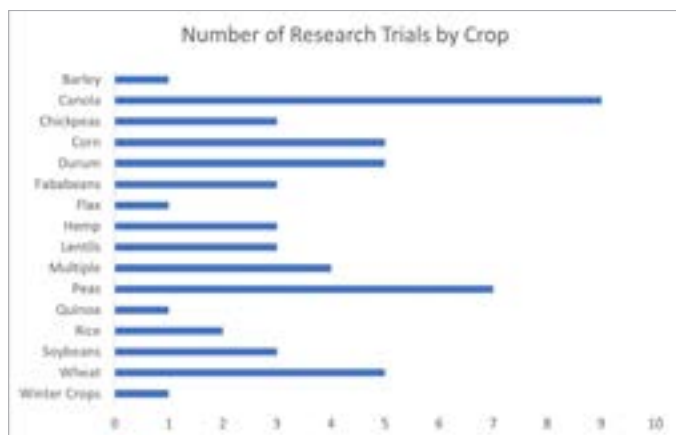
Project partners benefit by working with us to leverage grant funds, access diverse geographical trial locations and obtain project execution and data management by a professional team.

AGRONOMY RESEARCH TEAM

- Dr. Gurbir Dhillon (Research Scientist)
- Mike Gretzinger (Research Coordinator)
- Carlo Van Herk (Research Technician)

2022 AGRONOMY/FERTILITY TRIALS

- Perfectly Placed: adapting row-crop planters for enhanced crop production (Farming Smarter; 2019-2022)
- Comparison of traditional crop inputs and biostimulant application on wheat, canola and peas (Farming Smarter; 2020-2023)
- Maximizing feed barley yield while minimizing lodging (Lakeland College; 2022-2024)
- Crop sequence study of Fusarium Head Blight of cereals (University of Saskatchewan; 2018-2022)
- An ultra-early CWAD seeding system (Agriculture Agri-Food Canada) 2020-2023
- Effect of seed size and seeding rate on canola performance (Pioneer)
- Flax variety trials (Sask. Flax Development Commission)
- Industry demonstration trials and product efficacy trials with FMC, and SeCan



Farming Smarter depends on grant funding to execute research projects and typically must contribute matching funds and/or in-kind services to every project. Grant sources vary as do the matching requirements.

Continues on next page ►



Agronomy Team 2022 summer students, L to R back Emma Vissers and Austin Dennis. Front: Melanie Zumbuehl and Carlo Van Herk, set the air drill spacings to match the strip tillage rows. This project looks at a solution to precision planting into heavy residue in minimum tillage systems. It combines strip tillage with precision planting and compares production to conventional seeding methods under zero or conventional tillage. Strip tillage creates a residue-free strip for the seeding rows while conserving inter-row residue. We observed higher levels of moisture throughout the season in the strip tilled rows compared to cultivated rows. Strip tilled rows were also about 2 C to 3 C warmer leading to better seedling emergence.

2022 SUSTAINABILITY AND SOIL HEALTH TRIALS

- Saving Soils: Sustainable management practices for irrigated, high-value cropping systems (RBC Tech for Nature; 2022-2024)
- Saving Soils II: Improving soils through fall-seeded cash and cover cropping (Weston Soil Health Foundation; 2023-2027)
- Effect of strip tillage and precision planting on canola emergence, seed yield and quality (Farming Smarter; 2021-2024)
- Testing the cover crop hypothesis across Prairie Canada (University of Manitoba; 2018-2022)
- Corn intercropping strategies for extended winter grazing of beef cattle (University of Manitoba; 2020-2024)
- Winter Cereal Sustainability (Ducks Unlimited) 2020-22

2022 NOVEL CROP ADOPTION TRIALS

- Herbicide screening for broadleaf and grassy weed control in hemp (Farming Smarter; 2022)
- Quinoa variety trials (NorQuin Quinoa)
- Hemp variety trials (Canadian Hemp Trade Alliance)
- Evaluation of upland rice production in Southern Alberta (University of Lethbridge)

Farming Smarter leads the adoption of novel, specialty crops to enhance crop diversification and promote the value-added crop industry. In 2022, we evaluated the potential of novel crops including hemp, quinoa, rice, and fall-seeded crops such as camelina.

These projects often take a decade or more to become viable crops in our region. However, there was a time when people thought minimum till and pulse crops were crazy ideas! *FS*



Measuring corn and intercrop (covered in snow) biomass and for feed value a grazing study with Dr. Yvonne Lawley and Dr. Emma McGeough. LtoR: Austin Dennis, Carlo Van Herk, and Morgan Hetesy

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2017	\$520	\$390	\$13,000
2018	\$485	\$495	(\$1,000)
2019	\$540	\$480	\$6,000
2020	\$515	\$485	\$3,000
2021	\$645	\$665	(\$2,000)

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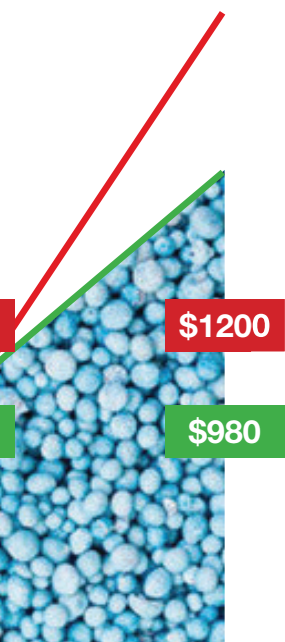
Each 1620 holds approximately 100 tons of Urea. Price per ton based on numbers in Alberta. Numbers based on beginning of month prices, not peak highs or lows.
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Dr. Michelle Korschuh, University of Lethbridge, works with students to prepare Seed Film Cultivation (SFC) plastic rolls used for seeding rice in the southern Alberta upland rice production project.



Multiple seeders plant in tandem for the precision planter trials and strip till trials to evaluate the best seeding practices in a range of crops including pulses, hemp, corn, canola, and durum. Precision planters promoted more uniform crop establishment compared to conventional air seeders in various crops. This can help with weed suppression, increased yields and crop establishment. See full article in this issue: *The precision planter works* by Lee Hart



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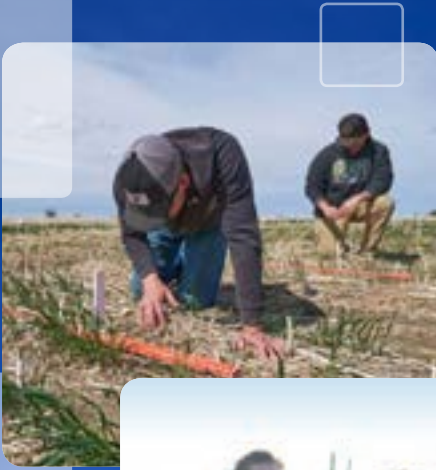
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All offers = * Restrictions may apply.
See full details on farmingsmarter.com



20/20 Seed Labs offers Farming Smarter subscribers 25% off a complete diagnostic start up package on one sample for either cereals or peas. Plus 10% off disease testing to a maximum of \$500 in savings.

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2020seedlabs.ca/



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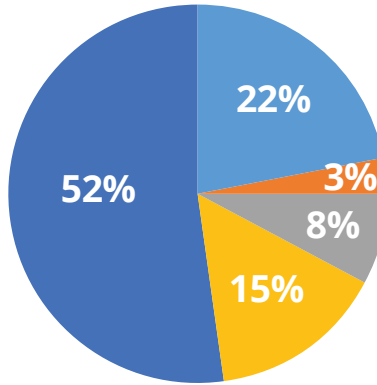
2022 an intensive custom research year

The Custom Research team got used to traveling across southern Alberta this summer as they managed sites in Lethbridge, Brooks, Bow Island, and Enchant.

As this program grows, Trevor Deering works to change the way people farm by delivering unbiased, trusted results that empower companies to deliver the best products to farmers. Farmers can have confidence in the science behind the products they use knowing companies invested in painstaking unbiased research.

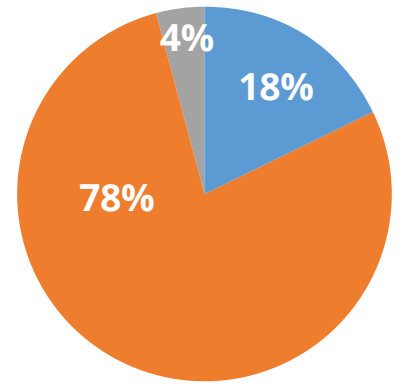
It's important for us to get farmers the products that work, so we make sure to put in the effort!

- 103 trials totaling 120 individual trials when adding all locations across southern Alberta
- 28 industry partners, completed proprietary product and crop management research
- Check out the winter crop adaptability and replenish soil health studies!



CUSTOM RESEARCH TRIAL CATEGORIES

- Crop Input
- Management Practices
- Other
- Variety
- Pesticides



CUSTOM RESEARCH PESTICIDE TRIAL BREAKDOWN

- Fungicide
- Herbicide
- Insecticide

In 2022, the custom research team conducted 54 pesticide trials, 78 per cent of them were herbicide trials. We can't share specifics but the industry conducts a ton of amazing work to produce outstanding herbicides. Farming Smarter proudly engages in the process of finding the right products for farmers, while remaining unbiased and trustworthy. Shoutout to Morgan Hetesy for all her great evaluation work in 2022 to make this part of our program a huge success.



Left an untreated herbicide plot and Right a soil applied herbicide plot showing very good control of redroot pigweed, volunteer canola, and kochia.

“Farming Smarter provides excellent customer service and is quick at responding to our questions and/or requests. They provide a quick turn around on data which is very important to us. In addition, they are willing to put in the extra effort to find the pests (weeds) that we are looking to test our products on.”

Mark Oostlander

*Senior Research Manager –
Herbicides, BASF Canada Inc.*

Crop inputs and variety trials made up 37 per cent of the custom research trials. The year included nutrient trials such as sulfur products in canola, nitrogen stabilizers and inhibitors in wheat and canola. Microbials in canola, lentils, wheat and corn is another example. Replenish nutrients teamed up with the Custom Research team to conduct trials testing two products and assess crop and soil health affects in a wheat, canola and faba bean three-year rotational study.



Left is a canola sulfur trial and right is a corn variety trial.

Continues on next page ►

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Winter Crop Adaptability trial: This one year study, fall 2021 to fall 2022, is complete. Findings show promising benefits from winter crops including comparable yields to spring crops, water use efficiencies, and soil health benefits.



Right: Mature Camelina on July 29, 2022, seeded in fall of 2021. The black circle shows very immature Camelina seeded in the spring of 2022 that didn't fair near as good.

The Rolling Cereals trial first year is complete. It's observed results are similar to its previous counterpart the Rolling Barley trial. Damage to the crop appears in the late tillering stages sometimes and always in the two node stage. Further results to come.



Barley in Bow Island, foreground and background showing plots that were rolled in the 1-2 node stage. We visually observed stunting.

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The Custom Research team grew to four summer students with diverse and well-rounded skills to tackle all the tasks. Ryan got thrown into the fires of equipment operation, seeding, mowing, rolling and more. He rose to the challenge and learned lots. Morgan used her college courses to evaluate trials, knowing her crops and weeds was a huge asset to our team. Michaela sprayed her way to victory. She was a solid pillar and applied all she learned from the previous two years. Isabel wrangled trial tasks with Trevor such as data collection, soil sampling, and keeping things in order in general (especially Trevor). Farming Smarter was grateful for such an amazing team. Thank you all. The Custom Research team also thanks all of Farming Smarter staff for a great season because we all work together to make it happen! FS



Custom research team of 2022 standing between the Rolling Cereals plots. From left to right: Trevor, Morgan, Ryan, Michaela, and Isabel.

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- The Simpson Centre for Agriculture and Food Innovation and Public Education, University of Calgary School of Public Policy Pre-Publication Series, July 2021

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BE READY.

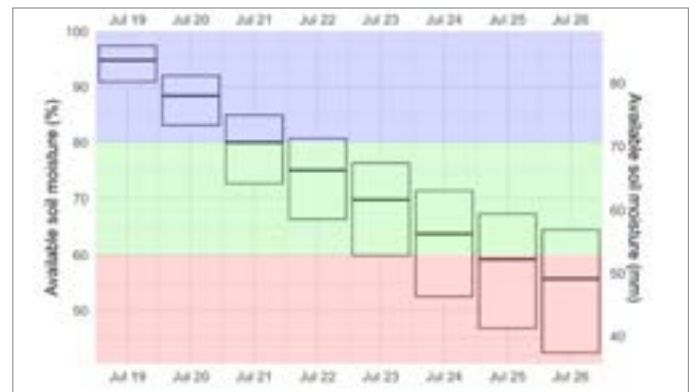


Committed farm partners are integral to the success of Field Tested. For our chickpea planter trial, the farmer set aside a bin of seed for when both planter and air drill could be at field at the same time.

Field Tested Program

Farming Smarter's Field Tested program supports innovation by working with farmers, in their fields, with their equipment. On-farm research is the final proving ground for new practices and ideas. It is a critical step in the innovation process bridging the gap between exploratory research and adoption by crop growers.

Field Tested's on-farm experiments pair Farming Smarter field researchers with forward-thinking crop farmers interested in seizing on the benefits of new products, practices and technologies. By executing rigorous scientific trials and collecting data and observations, our technicians can provide an accurate assessment of performance. This process validates real-world outcomes, paving the road for growers to adopt beneficial new practices. Field experiments also provide insight into where practices and technologies can be adapted and developed to maximize impact.



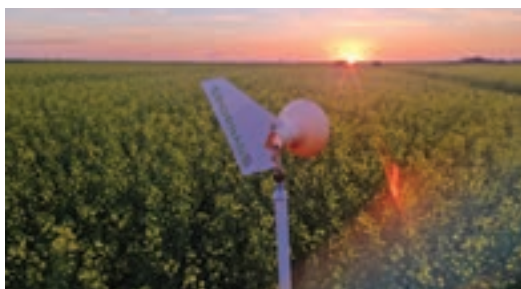
This is an example of the daily report irrigated farmers can receive through the smart irrigation system.



These two pictures show some of the difference in soil disturbance and row spacing between a planter and air seeder. Farming Smarter explored chickpeas with this research, an interesting fit since fertilizer requirements are minimal, and most planters are not equipped to apply fertilizer.



Sharing results of our trials is a big part of why we do what we do. Here Lewis Baarda and Morton Molyneux record a Plot Shot video summarizing the key outcomes of an on-farm experiment.



This research helped to identify how best to deploy spore trapping technology, including where in the field to set up the collectors, how to integrate the technology into farmer workflow, and efficacy of spore trap supported disease scouting



Installation of soil moisture sensors for smart irrigation research. We used sensors to build a decision support system for irrigators, making VRI systems easier to use effectively.



Timely Study of Hemp Herbicides

BY KRISTI COX



Hemp swathing at Specialty Seeds Ltd. PHOTO: WILL VAN ROESSEL

Weed control is important in hemp whether it is used for seed, food, or fiber production. A one-year study spanned three Alberta regions and looked at both broad leaf and grassy weed control.

Farming Smarter in Lethbridge, InnoTech in Vegreville, and SARDA Ag Research in Falher collaborated on the study to look at efficacy of different herbicides in different varieties of hemp.

Will Van Roessel, co-owner of Specialty Seeds near Bow Island, Alberta has grown hemp since 2010 for both pedigreed seed and food production. He explained that if the hemp crop is for fiber, weeds at harvest can decrease the fiber quality. If it's grown for grain or seed, then all the weed seeds must be cleaned out before it can be used for planting or human consumption. Many weed seeds are similar in size, shape and colour to hemp seed making it difficult to separate.

"We've got a couple of weed pests that tend to be an issue in hemp crops," said Mike Gretzinger, research coordinator at Farming Smarter. "Volunteer canola can be an issue. If it survives into the grain sample it's hard to separate. Buckwheat can be an issue and we're starting to have issues with group one and two resistant wild oats."

Currently, only Edge and Assure II are registered for hemp. It's important to have a broad selection of herbicides to choose from to reduce the risk of weeds becoming resistant to certain types of herbicides.

"(Hemp is) a relatively new (commercial) crop in Canada com-

pared to other crops," said Van Roessel. "Some other relatively new crops might have significant acres in the U.S., so we can draw on their experiences and their list of herbicides that worked well for them for weed control. But that's not the case with hemp. In Canada, we're probably 20 years ahead of the U.S. in terms of hemp production."

Gretzinger explained that the herbicides for the trial were chosen after going back through literature to see what had been tested before and what hadn't been tried. They also wanted to look at new combinations or ways of using some products. "The intention was to evaluate some potential options we've seen because of our other hemp research, the new herbicide options available as well as new cultivars on the approved list."

They chose two cultivars for testing, Silesia, a grain cultivar and Katani, a fiber or dual-purpose cultivar. "Unfortunately many cultivars have different tolerance to herbicides, so one might have 0 per cent injury, while another has 30 per cent or more injury under the same conditions," said Gretzinger.

They split the trial in two sub-trials, one for broadleaf weeds and one for grassy weeds. They tested in all three locations with planted weeds and used Canadian Weed Science Society scales for measuring crop tolerance and weed control at intervals up to 40 days after application. They also looked at grain yield for grain crops and fiber biomass for fiber crops. Gretzinger explained they wanted to ensure that herbicides appearing to be well tolerated didn't adversely affect yield. They had an untreated control to compare results.

“It was a lot weedier than I think a commercial field would be,” said Gretzinger. “I think farmers are a little more careful to make sure they’ve got a good three four-year rotation and clean fields before they grow hemp.”

BROADLEAF WEEDS

For broadleaf weeds, they evaluated 12 herbicide treatments using four herbicides at differing rates. Pardner and Authority showed the least damage to both the Katani and Silesia cultivars while Odyssey and Pursuit showed the most.

Pardner appeared to be the best option for broadleaf weed control. It did not damage the cultivars and offered sustained efficacy.

Gretzinger explained that farmers often use Authority as a pre-seed treatment in front of many crops, including peas, flax, and chickpeas and it’s known for good control against kochia. However, it doesn’t give extended control.

“Any time we plant peas after our hemp in rotation, we noticed we have hemp escapes,” said Gretzinger. “We noticed if we spray Odyssey on peas after hemp, the hemp survives it.”

Pursuit is the imazethapyr component of Odyssey.

Odyssey and Pursuit damaged both cultivars, though that effect faded over time. Gretzinger noted that fibre and grain yields may still be adequate, despite the initial damage.

“But visually it would be alarming, and I’m quite confident that the companies wouldn’t support anything like that,” he said.

GRASSY WEEDS

For grassy weeds, the team looked at 10 different herbicide treatments, all with different products. Select, Poast Ultra, Avadex, Treflan, Fortress and Focus did not show any toxic effects when compared to Assure II and the untreated control.

Everest and Simplicity, both Group 2, significantly damaged the cultivars.

“Those hurt the crop quite sufficiently,” explained Gretzinger. “They did recover, but it took about three weeks in some cases, and in many cases the plants were too far gone.”

The plants turned yellow but recovered back to green leafy plants and even flowered, but they were severely stunted. In some cases, they didn’t produce any grain.

“It’s important to note that at this stage we haven’t gone through any of the policy frameworks to move any of this forward to make it onto label,” said Gretzinger. “That part will require a lot more documentation, calls and approvals. This stage is just the preliminary stage of screening things out.”

RDAR provided 50 per cent matched funding for this one-year preliminary study. Farming Smarter wants to continue this study and will submit a proposal to refine the study to the products that provided the best broadleaf control. It hopes to include Pardner and Authority and collect data on approximately 10 leading hemp cultivars. Besides the chemical control, they want to include other integrated weed control options such as shoulder season cover cropping or intercropping. **FS**

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The precision planter works

Four-year research project shows planter can do more than seed corn and soybean row crops

BY LEE HART

You can't go too far wrong using a precision planter to seed grain, canola and pulse crops, according to a four-year research project completed by Farming Smarter.

Precision planters aren't perfect and may not work for every farm in every growing season, but this four-year evaluation of precision planters for commonly grown field crops showed crops seeded with a precision planter performed just as well and, in many cases, better than crops seeded with a conventional air seeding system.

According to Gurbir Dhillon, Farmer Smarter research scientist, the take home message is farmers with easy access to a precision planter will find it generally does a better job of getting a uniform, evenly spaced crop established.

With even stand establishment, comes a crop with even growth stages that helps to suppress weeds, improve the effectiveness of crop protection products, and can result in higher yields.

"There was plenty of variability over the four years due to a number of factors," says Gurbir who is still analysing study data. "But overall, the precision planter outperformed a conventional air drill seeding system in stand establishment and often plots seeded with the precision planter had improved yield, although yield was less consistent."

He says there are still questions to be answered that will help to fine tune recommendations, so he's hoping funding is available to continue the research through 2023 and beyond.

Precision planters have long been commonly used for row crops such as corn and soybeans, but this study evaluated them for seeding grain, oilseed and pulse crops.

"The focus was to look at how well a precision planter worked in seeding canola, a range of pulse crops, as well as hemp and durum," says Gurbir. "We hoped to increase farmer interest in growing some novel, less traditional crops. We included durum because it is a cereal that grows well, but we really haven't seen a significant yield increase in recent years. So, we wanted to see if a change in seeding practices might result in a yield increase."

The four-year research project saw crops seeded in small research plots and field scale trials in various southern Alberta locations from Lethbridge, to Medicine Hat and to Brooks. For pulses and hemp, all sites were dryland. For canola, both dryland and irrigated sites were included, and for durum, all sites were irrigated.. Two of the growing seasons during the study had more normal precipitation, while two seasons were extremely dry.



The Monosem planter at work. PHOTOS: FARMING SMARTER



Precision planted faba beans emerge.

FIELD SCALE CONCERNS

While generally the research results favoured the precision planter, Gurbir says a couple of the issues arose in field scale trials. Precision planter performance in heavy crop residue, such as corn, made seed bed preparation necessary. Also most of the commercial precision planters don't have capacity to apply a full rate of fertilizer at time of seeding, so fertilizer application needs to be a separate operation.

Lewis Baarda, manager of Farming Smarter field-scale research projects says, "work is required to better adapt planters to zero tillage and high residue systems to ensure the benefits of seed placement and singulation are fully realized. Furthermore, equipping these planters with capacity to apply fertilizer would broaden the range of environments in which they are a competitive alternative for conventional seeding equipment."

Here's a snapshot of research results for various crops:

CANOLA

Overall, canola seedling emergence for the narrow row precision planter (12") was higher compared to the air drill at both irrigated and dry land sites.

From a yield perspective, canola yields under irrigation or in higher moisture growing conditions were better (as much as 10 per cent higher yields) in crops seeded with the precision planter compared to the air drill. Under dryer growing conditions, the canola yield, however, did not show a statistically significant difference. Yields weren't necessarily any worse, but on average about the same.

PULSE CROPS

The pulse crop trials included chickpeas, faba beans, lentils, peas and soybeans.

All performed as good as if not better when seeded with the precision planter except lentils.

Lentil seedling emergence was about the same with either seeding system, which Gurbir suspects may be due to the cylindrical seed shape of lentils that may not be as compatible with the planter plates.

Otherwise, Gurbir says precision planters led to a significant increase in the seedling emergence for all other pulse crops. They seeded pulse crops at two different seeding rates — a more normal rate of 100 seeds per square meter for peas and lentils; 50 seeds per square metre for faba beans, soybeans, and chickpeas, compared to a low rate of 50 seeds per square metre for peas and lentils; and 25 seeds per square metre for faba beans, soybeans, and chickpeas.

Although results varied, for the most part seedling emergence rates, at the normal or higher seeding rate were 20 to 30 per cent higher for pulse crops seeded with the precision planters compared to air drill.

Research showed there was improved canopy closure in all pulse crops seeded with the precision planter and improved spatial uniformity of seeds/plants in the seed row. The crop staging was more uniform with precision planters and that may help with weed suppression and efficient application of pesticides and growth regulators that need to be applied at a specific growth stage.

The average increase in yield ranged from three to five per cent higher with the precision planter compared to the air drill. Pulse crops generally showed higher yield at the normal seed rates compared to lower seed rates.



Precision planted faba beans in mature stands.

DURUM WHEAT

The study included durum seeded at two different seeding rates — 150 and 300 seeds per square metre — with both seeding systems. The study applied fertilizer at normal and maximum rates and compared durum plots treated with plant growth regulator (PGR) and fungicide to untreated plots.

Although the seedling emergence and resulting plant density improved for precision planted durum compared to the air seeder, there was quite a bit of variability in crop performance in yield with different combination of treatments.

"Overall, the interaction between different treatments was not found to be statistically significant," says Gurbir. "This indicates that treatments are affecting wheat yield independent of each other."

However on plots where durum got the full meal deal of inputs, there was a measurable difference in crop performance.

"There was an additive effect of treatments on yield when durum was precision planted at the higher seeding rate and also received maximum fertilization, growth regulator and fungicide application," says Gurbir. "There was approximately a 15 per cent yield increase on average, compared to the control treatment that was seeded using the air drill at lower seeding rate, and with low fertilizer rates and no growth regulator and fungicide application."

Gurbir says the four-year research project shows that precision planters can produce successful grain, oilseed and pulse crops. However, more research could look at the effect of different input rates, under variable growing conditions, eventually leading to more consistent agronomic recommendations. **FS**

Winter cropping options grow

BY ANNEMARIE PEDERSEN



Two winter pea varieties (Spectre and Goldenwood) at flowering July 8, 2022. PHOTOS: ERIC BREMMER



Barley on Nov. 4, 2021.

Alberta farmers may have a few more choices the next time they consider adding a winter crop to their rotation. Farming Smarter tested six different crops, in four different seeding windows on three different plots from fall of 2021 through to spring 2022 with some promising results.

Results Driven Agriculture Research (RDAR), Farming Smarter and Western Ag Group of Companies funded the Winter Crop Adaptability project, overseen by Trevor Deering, Farming Smarter Custom Research Lead. Deering worked with Western Ag Group of Companies to identify winter crop varieties that are successful in Europe and the United States. They tested small plots in Lethbridge, Bow Island and Enchant to see how well they would grow in local conditions. Soil quality and climate conditions provided variability across the small plots.

The trials included varieties of wheat, oats, barley, lentils, camelina and peas. A Western Ag project grew some of the oat varieties the previous year. There was hope that the ones that survived had begun to adapt and may have even more success the following year.

“We wanted to use the model and then track how close our predictions were to the actual outcomes for this winter crop project. Considering the good range of winter conditions we had last year, the results were fairly accurate”

Eric Bremmer

Head of R&D, Western Agricultural Seed Innovations

Western Agriculture Seed Innovations has 30 years experience in winter crops and a few years working with Farming Smarter. Eric Bremmer, Head of R&D with the organization, wants to find ways to give growers tools to help with the decision making. One such tool is the Winter Crop Survival Model (<https://wheatworkers.ca/wcsm.php>), a comprehensive application that allows growers to evaluate the risk in their region based on past results over a number of years.

“We wanted to use the model and then track how close our predictions were to the actual outcomes for this winter crop project. Considering the good range of winter conditions we had last year, the results were fairly accurate,” said Bremmer.

For last year’s trials, seeding took place in Lethbridge in September and November 2021, as well as March and April of 2022. Enchant and Bow Island seeding happened in September of 2021 and April 2022. The spring seeded plots provided a comparison for the fall and winter-seeded crops.

The one-year trial had the same challenges growers faced in many parts of Alberta; dry conditions and not enough rain when needed.

“We lost all the fall-seeded crops in Enchant but had better results in Lethbridge because we had some irrigation. Camelina isn’t a winter variety but survived pretty well. In all three areas the spring-seeded

crops did alright,” said Deering. However, some regions were so dry that even spring-seeded crops had a challenge getting started. Deering considers it a proof point for fall-seeding because with that bit of a head start, the plants competed better with weeds.

Other considerations are the ways some of these crops could be used on the farm depending on how well they survive the winter. Could it be a cover crop or green manure? Could it be a cash crop? Deering wants to source new funding for some cover crop trials in the future.

“I think we got off to a really good start. The primary conclusion is that there are other options aside from the typical winter wheat and fall rye; crops like camelina, winter lentils, winter peas and barley all had varieties that did well,” said Deering. But they aren’t there yet and Deering feels that there is a need for further work in this area. “There is more work to be done but this is a step in the right direction,” said Deering.

Farming Smarter subscribers can find a complete report on the Winter Crop Adaptability project on the website. **FS**



Winter barley (Thunder) on May 13, 2022.

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Lots of folks had fun reviving 1920s fashion! LtoR: Loveleen Dhillon, Shelly Barclay, Willow Baarda and Dana Coles sharing laughs.



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