

Alberta Seed Guide

ADVANCING SEED IN ALBERTA

FALL 2017
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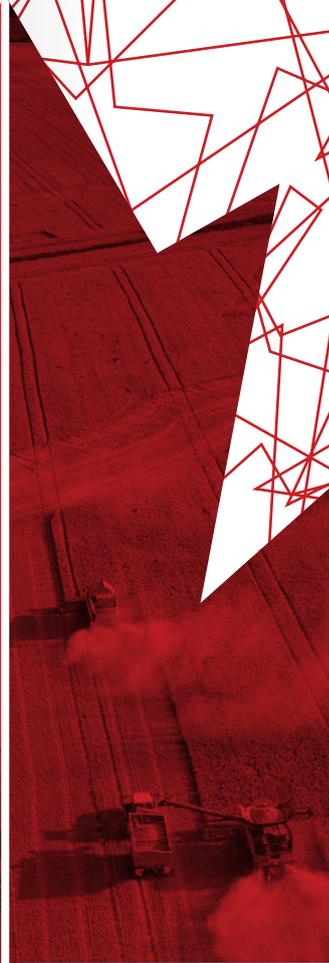
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ON THE COVER: The Fall 2017 issue of *Alberta Seed Guide* investigates several important subjects growers should know about, including crop advances, research funding, certified seed and public versus private breeding. The cover image pays homage to the 150th anniversary of Confederation, and the second-from-left image comes from the Glenbow Museum: Glenbow Archives NA-1234-5.



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ON behalf of the Government of Alberta, it is my pleasure as Minister of Agriculture and Forestry to extend greetings to the readers of the *Alberta Seed Guide*. This edition focuses on the theme A future for the industry: Ensuring the tools are in place for growth – a foundational direction for our industry that is reflected in programs that support innovation, research and development, environmental stewardship and sustainability.

Producers benefit from valuable tools like the *Alberta Seed Guide*, where they can stay connected and up-to-date on the latest developments in crop science and agricultural practices that can result in enhanced quality and efficiency of production.

Alberta’s agricultural sector continues to be one of the pillars of our province’s economic diversification. Expanding the yield of our agricultural production while elevating the quality of the crops grown begins with the seeds selected for planting.

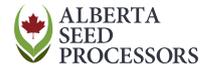
The *Alberta Seed Guide* is a vital tool for our producers. In addition to critical information for our farming community, the guide also helps showcase the depth and quality of our seed system, which is an essential part of maintaining the sustainability of our agriculture sector.

Thank you to the Alberta Seed Growers and the Alberta Seed Processors for their dedication to Alberta’s agricultural producers, and my sincere wishes for your continued success.

Oneil Carlier
Minister
Agriculture and Forestry

Alberta Seed Guide

Fall 2017



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DAVID BISHOP



CELEBRATING Canada’s 150th anniversary had many of us looking back at key events that helped shape this great diverse country and, at the same time, wondering what the future holds. Canada’s agriculture sector continues to evolve from the subsistence level of the sodbusters of the Prairies, to being a global leader in the canola and pulse sectors. Considering the aspects that have helped shape Canada’s strong agricultural industry, one thing that is as true today as it was in the past 150 years is the agriculture sector’s investment in constant improvement. The spirit of working together to courageously adapt to whatever the many market, environmental and political forces throw at us will continue to ensure success for this industry in the future.

The quest for a “better way” has always been an ag industry-leading force. Research continues to be the key to unlocking opportunities of crop production. Research is ongoing in the many facets of this industry. The quest for a better way of plant breeding to develop crops that will not only tolerate, but thrive in the ever evolving environment, is just the tip of the “research iceberg.” Plant breeders not only have to take varietal performance into account, but also market acceptance, be it at the growing boutique brewing industry here in Alberta, or the requirement of a government to supply cost-effective protein to a mass population on another continent.

The adaptation of new technologies shall continue to strengthen the industry in ways that some of us cannot yet imagine. A balance of the old with the new continues to ensure sustainable advancement of the industry. Be it on our farms, or at board of director’s tables, a blend of what we know works with what we predict to better keep the industry heading in the right direction.

Change, be it subtle or drastic, always requires adaptation in all facets of the industry. The slow culture change of how we view ourselves as producing a commodity to visualizing our crops on someone’s table is being quarterbacked by Cigi, and will ensure that we connect with consumers in the long term. Articles in this issue will discuss how new methods of funding research that use a combination of private, public and producer resources show how projects can move forward with collaborative energy.

Everything that happens in this industry is because of people. How we collaborate is also evolving. Provincially and nationally, a plethora of organizations exist, some that represent special interest groups, others that have a broader scope. Consolidation is a part of organizational evolution; as the old cliché of “less is more” rings true in the case of lobby efforts. Having a clear message, with a coalesced group has more impact than several slightly different messages by fractionated industry groups. Hats off to all the farmers who have taken a formal role in some of the many agriculture-related organizations, be it your local seed processing co-op, or provincial or national commodity groups. Stepping up to be a director on a board is crucial to the future success of the industry at large. This synergy of effort has been imperative for our past accomplishments, and continues to be a hallmark for OUR BRIGHT FUTURE.

We can’t change the past, but we can certainly influence the future. Enjoy this issue of the *Alberta Seed Guide*.

David Bishop
President
Alberta Seed Processors
Email: bisdvd@aol.com





WARD OATWAY



WELL everyone, we made it! With the harvest now completed (for most of you), we now shift our mindset to clean-up and marketing as the days get shorter and the ground gets whiter.

As we look back on the year that was, it is important to reflect on what crops worked well and whether a new variety might be the way to go. As you go through this journey, I am pleased to say that you are holding one of the most valuable resources you can have – the *Alberta Seed Guide*.

In the following pages, you will see how the new varieties stack up against the older ones in the compiled regional variety trials. If you like what you see, you can call a grower who carries that seed. The growers in these pages have already experienced the variety you're looking for and can provide some first-hand advice on its performance. Why not start the 2018 planting season with a variety that provides better crop vigour and the pest resistance you are looking for? These pages and the growers featured in them have the varieties and solutions you are looking for.

Speaking of looking ahead, on the policy side, your seed grower representatives, the Alberta Seed Growers' (ASG) board of directors, have spent much of the year working on the future of our industry by contributing to discussions on the Seed Synergy Project.

We feel strongly about contributing to the development of the seed industry to ensure Canadian farmers are competitive globally and they can provide a viable future for successive generations. A healthy seed industry maintains the quality standards expected from all customers. It also encourages investment from industry and government. It's all about finding the right balance for all stakeholders, and patience will provide the best outcome. We will continue to provide updates on these discussions as they come available.

In other news, *Fusarium graminearum* (Fg) continues to spread throughout the province and ASG, along with others in the crop

and seed industry, are working hard to ensure the full suite of management tools are available to farmers. Many farmers were concerned that with the high moisture we experienced in 2016 we would have a major infestation of Fusarium head blight (FHB). However, the hot, dry weather during cereal flowering spared most cereal acres in the province.

In the war against FHB, we would like to extend a thank you to the Alberta Wheat Commission and Alberta Climate Information Services for launching a new web-based tool to help with Fusarium management decisions. This tool, available via the Alberta Agriculture and Alberta Wheat Commission websites, lets you determine the probability of FHB development in your area based on current maps of FHB detection, and weather from a station in your area.

As we move into the winter, I hope you find time to attend a meeting of your local commission or producer group to network and learn about the changes that are facing our industry. The best way to stay informed or to have your say is to get involved or participate in a crop sector farm meeting.

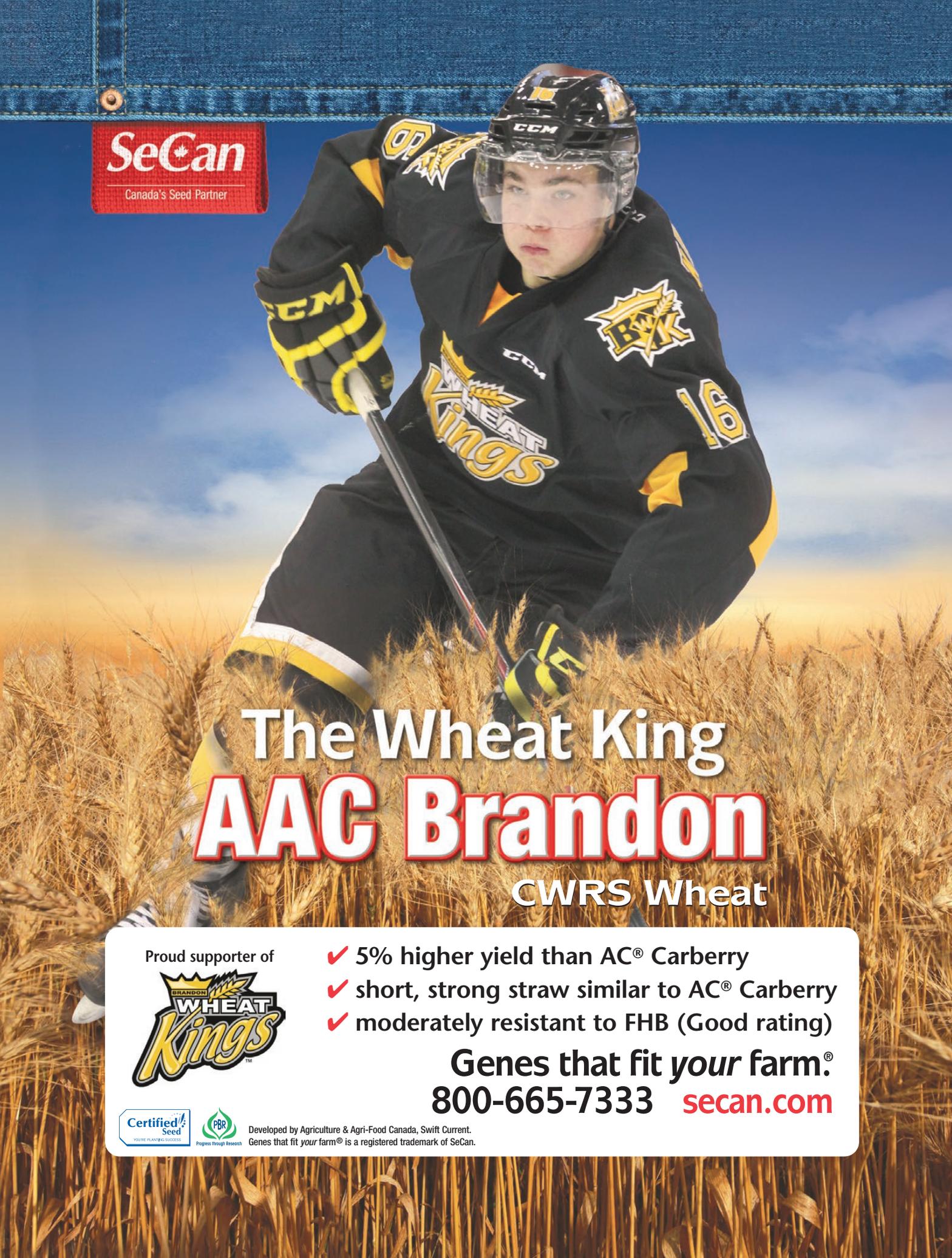
Speaking of farm meetings, consider adding FarmTech to your calendar for 2018. As one of the partners of the event, ASG will be there putting on informative workshops and providing further updates on our organization and industry. Plus, it's a great opportunity to network and see the latest from ag companies and our fellow commodity organizations.

Have a safe, happy and healthy winter season.

Ward Oatway
President

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WGRF's funding is all about benefitting western Canadian crop growers.

FARMER-FOCUSED. Research-focused. Multi-crop. Inter-provincial. Cross-cutting. Independent. Collaborative. Unique. That's the Western Grains Research Foundation (WGRF). Building on more than 35 years of experience, this crop research funding agency is poised for the challenges ahead.

"We are a farmer-funded and farmer-directed organization. Our focus is on funding research; we're not involved in policy or advocacy or market development. We're an independent organization, and we're incorporated as a non-profit charity, which makes us unique in Western Canada," says Garth Patterson, WGRF executive director. "And our focus is interprovincial, looking at research that will benefit crop producers in Western Canada."

Since its inception in 1981, WGRF has invested over \$148 million into crop research. It is probably best known for its investment of wheat and barley check-offs into variety development.

"Through that investment, over 200 new wheat and barley varieties have been released since 1995," notes Patterson. "We fund public crop breeding institutions, and their varieties really dominate western Canadian acreage." For instance, over 88 per cent of CWRS acres and 94 per cent of CWAD acres are seeded to WGRF-funded wheat varieties.

In addition, WGRF supports research projects on many field crops from its Endowment Fund. "We fund research into all crops – canola, wheat, pea, lentil, chickpea, dry bean, barley, corn, soy, canaryseed, flax, oats, even forages – you name it."

Collaboration is key to WGRF's approach to project funding. "The benefits of research don't stop at provincial borders, so we work with the organizations in Western Canada that are interested in crop research, including producer organizations, provincially based organizations and Agriculture and Agri-Food Canada (AAFC)," says Patterson. "Instead of running our own call for proposals, we consider the proposals that come in on their calls and look at ways to co-fund with them."

According to Patterson, WGRF looks for three key elements in a research proposal. One is the potential to benefit crop produc-

ers in Western Canada. "That doesn't mean we don't invest in upstream research, but we want to have an understanding of how it might contribute in the end to profitability on the farm." The other two elements are good science, and a strong likelihood that the researchers will accomplish the project's objectives.

The WGRF's research committee consists of experts representing various aspects of agriculture including: research, market development and agri-business; and WGRF board members. The research committee makes recommendations to the WGRF board of directors, which makes the final decisions on project funding. The board is composed of farmer representatives from each of the 18 member organizations, which include provincial, western Canadian and national farm organizations.

A Look at WGRF's Current Projects

WGRF is currently funding (or has committed to fund) more than 235 research projects valued at \$76.9M from all funds (Endowment, Wheat and Barley).

The current projects cover an amazing array of topics such as: enhancing clubroot resistance in canola; improving faba bean, pea and alfalfa varieties; screening and managing Fusarium head blight in cereals; investigating novel ways to tackle herbicide resistance; managing pea leaf weevil in faba bean and field pea; and optimizing fertilizer management in flax. Most projects are co-funded with other agencies, enhancing the impact of WGRF dollars.

AAFC research scientist Neil Harker is leading a project on herbicide resistance. "Weed resistance to herbicides is increasing rapidly and jeopardizes important herbicide tools," he says. "Cropping systems that effectively manage weeds with less herbicide applications are urgently required to decrease the selection for more herbicide resistance, and to provide management tools in the face of new resistance issues."

This project involves developing integrated weed management (IWM) strategies that reduce selection pressure for herbicide resistance. Harker explains: "In this project, we combine chaff



The farmer-directed WGRF board tours field plots in Lacombe in 2016.

Photo courtesy WGRF

collection (to remove harvested weed seeds) with some of the best cultural weed management techniques – high seeding rates, winter cereal crops, early-cut silage, perennial forage – in canola-wheat and more innovative crop rotations. This five-year experiment (2016-2020) is being conducted at six western Canadian locations under direct-seeding conditions.” Weed control tools such as chaff collection have more subtle effects than herbicides and require multiple years to determine their impact.

This research will introduce crop growers to new IWM strategies that reduce herbicide use and herbicide resistance selection pressure. “Combining chaff collection with previously proven IWM tools provides an opportunity to decrease the reliance on herbicides. With many weed seeds passing through the combine in the chaff fraction, collection of the chaff prevents many of the seeds from supplementing the seed-bank, thereby reducing weed populations,” says Harker.

“Chaff collection has the potential to reduce populations of many grassy and broadleaf weed species, and in combination with other weed-suppressing agronomic practices, can preserve the efficacy of herbicides.”

In addition to WGRF funding, this project is supported by the Alberta Canola Producers Commission, Saskatchewan Wheat Development Commission (Sask Wheat) and Alberta Barley.

Another current WGRF project concerns the pea leaf weevil. Many pea growers in southern Alberta are all too familiar with the yield losses due to pea leaf weevil larvae feeding on pea root nodules and the adults feeding on pea foliage. Now this pest is spreading into new regions and a new host.

“The pea leaf weevil has recently expanded its geographic range to the Parkland agricultural regions in central Alberta and Saskatchewan where it threatens to damage faba bean, in addition to peas,” says Héctor Cárcamo, a research scientist with AAFC who is the project’s principal investigator. “This project aims to learn more about the interaction between the pea leaf weevil and faba beans to determine if the weevil reduces yield in this crop and to assess potential management strategies. Another major objective is to improve our knowledge of the overwintering biology of this pest to enhance our ability to forecast local populations.”

This research will help faba bean growers determine if the weevil is a concern and how to manage it. “Faba bean is the best crop for nitrogen fixation and it may be able to compensate for pea leaf weevil feeding on the foliage (expected) and the larval feeding on root nodules,” notes Cárcamo. “The study will also provide objective data on the potential yield benefits of using seed treatment and foliar insecticides for the pea leaf weevil. The information on overwintering could help refine forecasting tools so we all have a better idea of the size of weevil pest populations to expect given certain winter conditions.”

WGRF and the Alberta Pulse Growers are funding this project. The University of Alberta, Alberta Agriculture and Forestry, and especially AAFC are providing substantial in-kind support.

Fusarium head blight (FHB), one of the most important wheat diseases on the Prairies, is the focus of a current spring wheat project. FHB lowers yields and results in downgrading because the fungus can produce toxins that limit the grain’s use. Fungicides can suppress the disease, but they only give up to about 50 per cent control. So cultivar resistance is a very important tool.

Unfortunately no single gene confers strong resistance to FHB. Breeders have to bring in several resistance genes, and even then most wheat varieties are only moderately resistant at best. So Randy Kutcher, a professor at the University of Saskatchewan, is working with AAFC’s Plant Gene Resources of Canada and the National Research Council to find new sources of FHB resistance in spring wheat. These three agencies are part of the Canadian Wheat Alliance, a partnership to develop new wheat varieties that produce stable and increased yields, and have stronger resistance to stresses including FHB.

The researchers are screening for FHB resistance in Plant Gene Resources’ 14,000 accessions of wheat collected from all over the world. “In a Fusarium head blight nursery, we screened about 4,000 lines in 2016 and 2017,” says Kutcher. “We have picked many promising lines and will now begin intensive rescreening of them in the field and growth chamber.” After that, they will do some further work with the best lines to confirm the resistance and to see how easy it would be to cross that resistance into adapted germplasm. They will pass along any useful new sources of FHB resistance to wheat breeders.

This project is supported by the Agriculture Development Fund of the Saskatchewan Ministry of Agriculture, Sask Wheat and WGRF.



Photo courtesy Neil Harker, AAFC

A WGRF-funded project is testing chaff collection devices to remove harvested weed seeds, one of several methods to reduce the need for herbicides.

Growth and Transition for WGRF

In 2016, WGRF invested over \$18 million in breeding and other crop research, about a three-fold increase since 2011. WGRF has seen significant changes in its revenue sources over its history.

The WGRF Endowment Fund got its start in 1981. “At the time, the Prairie Farm Assistance Act [an early version of crop insurance] was wound down. It had \$9 million that came from farmers, so the federal government put that into kick-starting the Endowment Fund to fund research in a wide variety of crops,” explains Patterson.

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Then in 2000, the Endowment Fund got another important source of funds. "The federal government named WGRF as the recipient under the Canada Transportation Act with respect to the Rail Revenue Entitlement. Anytime the railways exceed that Entitlement, the amount they exceed it by is awarded to WGRF," Patterson says.

"It is bittersweet because it means farmers have been overcharged for grain transportation. On the other hand it would be administratively very complex and costly to try and return that to farmers, so the federal government decided to put the money into WGRF to benefit all farmers."

Of the \$18 million invested in research by WGRF in 2016, about \$7.5 million was from the Endowment Fund.

WGRF began receiving the wheat and barley check-offs for variety development in 1994. A 2012 return-on-investment study commissioned by WGRF found that, on average, for every check-off dollar invested in variety development, producers receive \$20 in value for wheat and \$7.50 for barley.

The Western Canadian Deduction (WCD) was a five-year measure put in place by the federal government on Aug. 1, 2012 with the ending of the Canadian Wheat Board's monopoly. This transitional measure allowed the then newly formed provincial wheat and barley commissions and associations time to take responsibility for the wheat and barley check-offs going forward.

Patterson notes, "The western Canadian wheat and barley commissions have now assumed the check-off as of Aug. 1, 2017. Farmers really won't notice a difference."

WGRF felt it was crucial to prevent any funding gaps in wheat and barley variety development programs, so it took steps to ensure a smooth transition with the full support of the provincial commissions and associations. "Even though the check-off that WGRF received expired on July 31, 2017, we had enough in our wheat and barley reserve funds to commit to new agreements that go to 2020 with the public institutions," Patterson states.

"So there is stability for public breeders. And the wheat and barley commissions have time to put their plan together for how they would like to continue that."

Renewing Agronomic Research Capacity

One of WGRF's current initiatives involves reinventing agronomic research capacity in Western Canada. This initiative had its beginnings about three years ago, when a number of producer groups expressed concerns to WGRF about declining capacity.

To get a better handle on the issue, WGRF commissioned a study of the current and projected agronomic research capacity to 2020. The resulting report, Fertile Ground: Agronomic Research Capacity in Western Canada, was released in 2014. It confirmed the declining capacity, including loss of scientific expertise due to retirements, a lack of adequate equipment, land and buildings, and insufficient staff and funding.

So WGRF, wanting to develop a vision of future agronomic research capacity, held a workshop in April 2015 to consult with stakeholders. This generated Shaping the Future, a report that details changes expected in crop production and the research needed.

By fall 2015, a technical working group provided input on the capacity that would be required to address the research

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needs. That led to WGRF developing a two-phase strategy for reinvigorating agronomic research capacity. The strategy was finalized in spring 2016, and phase 1 is now being implemented.

Phase 1 involves rebuilding human resources research capacity at the main public institutions involved in agronomic research in Western Canada – AAFC, University of Alberta, University of Saskatchewan and University of Manitoba. AAFC has already started filling several positions, and WGRF is working with each of the three universities. Phase 2 will target capacity issues around infrastructure and equipment and at other research organizations. As the various capacity issues are addressed in phases 1 and 2, WGRF is also looking at how it can increase its agronomy-related project funding.

Where to From Here?

WGRF has built a strong tradition of supporting an impressive range of research, all targeted towards benefits to western Canadian crop producers. Researchers recognize WGRF’s valuable role.

“WGRF is a very important organization whose support is key to much of the field crop research in Western Canada,” says Kutcher.

Cárcamo agrees. “The funding from WGRF is instrumental for crop researchers such as entomologists in Western Canada to allow us to continue to improve the economic and environmental sustainability of farming.”

What’s next for WGRF? “WGRF is in transition with the ending of the wheat and barley check-offs. But we’ve created a very stable situation as far as the support for wheat and barley variety development out to 2020. WGRF research expenditures will remain near \$18M annually out to 2020, but revenues will decline by about 50 per cent,” says Patterson.



Left: Funds from WGRF are helping researchers to assess ways to manage the pea leaf weevil in faba bean, another host for this pest. Photo courtesy Henri Goulet, AAFC (retired)

“So, as we transition we are looking at what we can do in the Endowment Fund. [With] our strengths and our uniqueness – being western Canadian, multi-crop, farmer-focused and an independent charity – we can play a leadership role in cross-cutting issues.”

Many of today’s cross-cutting issues are vitally important to the success of crop production in Western Canada. Patterson highlights some examples: “Agronomy research capacity is one. We’ve also got issues related to climate change, whether it is crop adaptation to wetter, to drier, to warmer conditions. We’ve

got the issue of what agriculture can do to mitigate climate change, for example by capturing carbon. We’ve got issues that cut across all crops like nutrient management, herbicide-resistant weeds and changing weed populations, and pest monitoring and management. And there are things like genomics capacity and tools that can benefit multiple crops.”

According to Harker, it is crucial agencies such as WGRF fund agronomic research that focuses on multiple crops. “Growers do not grow a single crop on their farm. These projects provide growers with tools to manage challenges such as herbicide resistance in their entire crop rotation and not just in a single crop. In this regard, WGRF provides a unique service to growers when compared to individual crop funding agencies.”

Patterson adds: “No other farm funding organization is focusing on a multi-crop, whole farm, integrated approach to western Canadian crop production. We think that is a very good role for WGRF to play moving forward.” **Carolyn King**

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Industry Consolidation

Industry consolidation opens the door to new research and development opportunities.

THE face of the many large agri-business companies in Canada is changing. Dow and DuPont recently concluded their merger, ChemChina is currently finalizing their purchase of Syngenta and Bayer is working through the regulatory hurdles as part of their acquisition of Monsanto.

With fewer chemical and seed companies on the horizon, it's expected growers will benefit from the kind of high dollar investment in research and development that other big technology industries have seen in recent years.

"Consolidation can be good thing, but we need to explain and demonstrate the benefits to our customers," says Marcus Weidler, head of seeds with Bayer Canada. "It is becoming more and more challenging to bring innovation to market, and companies have to invest heavily to bring new technologies to customers."

The costs to introduce new technologies are often so high due to the amount of time it takes to bring products to market. Bayer's successful pod shatter reduction technology was launched in 2014, but the company first started work on the technology in the late 1990s. And as a non-GM trait, this technology wasn't as complex as much of current seed trait research.

"We have invested billions in research and development, but not only is science becoming more complex, the regulatory environment can be unpredictable, and that also means more time and more investment," says Weidler. "We sell to many countries that have different rules and regulations and those rules are constantly evolving. Once a product has been developed, it then requires more money to conduct the number of studies necessary to satisfy the needs of the grower [and] the consumer, and also meet government requirements."



Jeff Nielsen, president, Grain Growers of Canada



Trish Jordan, public and industry affairs director, Monsanto

Jeff Nielsen, president of the Grain Growers of Canada, doesn't see that there will be much change from a seed grower or a farmer perspective following this round of consolidation.

"These combined companies will need good local seed growers, and as they bring new seed products to market they will be relying on local seed production



Marcus Weidler, head of seeds, Bayer Canada

to even greater levels," he says. "Most growers already have established strong connections with all of these companies and even with consolidation, I don't see them reducing their levels of service. It wouldn't make business sense."

He says the agriculture industry has been consolidating for the past two decades, and so far, the strong public



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“New entrants into the business are continuing to change the way the business of agriculture works.”

—Trish Jordan

breeding programs have remained intact, and heavy regulation has meant that competition remains strong. He hopes these larger entities could also have increased power in lobbying for increasing government funding for research.

“More research is needed to find solutions to problems that we are currently struggling with in Canadian farming, such as Fusarium in wheat,” he says. “We don’t have a solution to Fusarium right now and it is possible that solution will come from seed. We hope that these merged companies will have the means to invest in research at a more intense level.”

Trish Jordan, public and industry affairs director with Monsanto, agrees. “The merger between Monsanto and Bayer is driven by the need for investment, and to continue to drive research and development on both the seed and the chemical sides of the business,” she says. “This industry has always balanced competition with collaboration. Agriculture still has more than 3,500 companies across North America that provide goods and services, and the change from six to three big life sciences

companies is really just allowing for greater investment into the industry.”

Jordan says Bayer and Monsanto have very little overlap, and any duplication will be addressed through global regulatory networks in advance of finalizing the deal. She admits growers worry about having fewer choices – but in fact they could have more choice as the combined products and services offer a larger combination of solutions.

“New entrants into the business are continuing to change the way the business of agriculture works,” she says. “There are countless startups in the business of digital farming and analytics that will enhance some of the products we offer to help improve farming. While there is a lot of change right now, the agriculture businessplace is not shrinking.”

Jordan adds it would not be in any business’s best interest to alienate their customers, and their research is completed with the end customer in mind.

“If we create \$1 of a benefit on a new product innovation, then a farmer needs to see a portion of it, the retailer needs to have their share, we need to secure a percentage and then we reinvest it

into bringing the next innovation to the market,” she says. “If we aren’t offering the options that growers are asking for, then we won’t be successful as a business.”

For growers concerned about competition, Jordan stresses the global competition process is very demanding, and that each country’s regulatory body looks at individual pieces of the combined business and it decides if it is adding or detracting to competition in the marketplace. “If they see that a company has too much impact in a certain area, they may ask them to divest that interest,” she says.

Weidler says for Bayer and Monsanto, in the short-term growers won’t really see any change as the new business’s number one focus will be on serving their customer.

“At the end of the day, we have to make sure that our business relationships are intact and that we are able to provide the same level of service as we have in the past,” he says. “Our number one principle going forward is no interruption in service. It will then be up to us to prove to the grower and to consumers how these combined companies will be better for them in the long term.” **Jennifer Barber**

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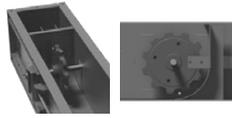
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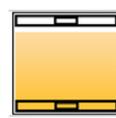
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There are many different ways to evaluate bread quality as Combine to Customer participants discovered during a stop in Cigi's pilot bakery. Photo courtesy Cigi

Cigi Enters a New Era

A new board and revitalized funding model bodes well.

THE Canadian International Grains Institute (Cigi) works with the entire grain and field crop value chain within Canada and internationally to drive the development and utilization of Canadian crops.

The independent, not-for-profit organization was established in 1972, and today more than ever, Cigi is moving forward in its mission.

For instance, development activity of the Combine to Customer program, first launched in 1999, is ongoing.

"The purpose of the program nowadays is to give growers an overview of the different organizations involved in the wheat value chain, more information on the quality of Canadian wheat and hands-on experience in Cigi's technical facilities learning about the functionality of wheat in baking, noodle-making and pasta," says Cigi CEO JoAnne Buth. "We believe it's really important for growers to know where their wheat is exported and the quality characteristics that customers want."

Cigi board chair Kevin Bender adds that the Combine to Customer program is also an opportunity for growers to ask questions of Cigi technical staff who have first-hand knowledge of customer requirements, so they can better understand how things like protein content, gluten strength and quality, and

the different grading factors affect the processing of end-products in markets around the world. It also gives Cigi staff the opportunity to ask growers questions about issues on their farms.

There have been over 80 Combine to Customer programs held so far, and participation has remained consistent over the years, with 15 to over 20 growers per program, and strong interest and participation from Alberta growers. A number of different industry people have served as presenters, and Buth says one of the popular presentation topics added in recent years are the crop mission reports.

"Farmers who have travelled on the new after-harvest missions to various countries report back to other growers about their experiences," she says. "Participants hear what kinds of information international customers are seeking from farmers, from farming practices, quality control methods and sustainability to what the growing season is like in Western Canada.

"Overall feedback about Customer to Combine is consistently positive," adds Buth, with growers often taking to social media to share what they've learned. "If you search the hashtag #CombineToCustomer on Twitter, you'll get a good sense of how participants feel about the course, including one earlier this year who described it as an 'awesome ag learning experience.'"

New Funding Formula

This past June, Cigi announced its new board of directors at the same time it introduced a new funding model and board structure. There are now five growers and five grain company representatives on the board, including chair Kevin Bender (Alberta Wheat Commission), vice chair Brent Watchorn (Richardson International), secretary Jim Smolik (Cargill Canada), and directors Drew Baker (Manitoba Wheat and Barley Growers Association), Harvey Brooks and Bill Gehl (Saskatchewan Wheat Development Commission), Trent Rude (Viterra), Jean-Marc Ruest (Richardson International), Gary Stanford (Alberta Wheat Commission) and Ward Weisensel (G3 Canada Limited).

The new board structure is a reflection of Cigi's new funding formula, wherein the three wheat commissions and seven grain exporters/handlers provide Cigi with core funding totalling \$7.7 million over the next two years. The Alberta Wheat Commission, Saskatchewan Wheat Development Commission and Manitoba Wheat and Barley Growers Association will fund Cigi through their respective single wheat check-offs, taking the place of the farmer check-off funding Cigi received through the Western Canadian Deduction (WCD), which ended July 31, 2017. The grain

companies funding Cigi are Viterra, Richardson International, Cargill Canada, Parrish and Heimbecker, Paterson Grain, G3 Canada Limited and Inland Terminal Association of Canada.

"This new sustainable funding framework is an important milestone in Cigi's 45-year history and we look forward to working with the new board to ensure Cigi remains a strong asset to the Canadian grain industry," says Buth.

Prior to June 29, 2017, Cigi was funded through the Western Canadian Deduction, which was a regulation put in place after the marketing changes. This levy was \$0.48 per tonne of wheat delivered in Western Canada to licensed grain facilities, of which Cigi received \$0.15, and the remaining funds went to the Western Grains Research Foundation to support variety development with a small amount going to administration.

In the past, Cigi had also received some funding from grain companies, but it was limited to some specific projects that Cigi conducted on a fee-for-service basis.

The WCD regulation expired on July 31, 2017, so Cigi had been working closely before that point with the new wheat commissions to ensure they understood Cigi's role in the wheat value chain and would continue to feel it important to support the organization.

"At the same time, we recognized that the grain companies were also benefiting from Cigi's work, so we approached them to contribute directly," says Buth. "Now the grain companies and growers are contributing core funding on a 50:50 basis, and it's a significant step to have growers and grain companies share equally in the funding and governance of Cigi to ensure we continue to respond to the needs of the industry."

Cigi is also funded by the federal government through the Agriculture and Agri-Food Canada AgriMarketing Program, the AgriInnovation program and a special project in Morocco with Global Affairs Canada funding.

While there is much activity at Cigi, contrary to some rumours, there is no activity happening that involves merging Cigi and Cereals Canada, nor are there any plans in place at this point to do so.

Cigi works closely with all value chain organizations including the provincial wheat commissions, pulse growers, WGEA

[Western Grain Elevator Association] and so on, and we work closely with Cereals Canada since they are working on policy, research and market development issues related to wheat," Bender explains. "The recent media headline referring to a merge was not accurate, and if you look at the interviewee comments, there was no mention of amalgamation, just working closely together." **Treena Hein**



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PUBLIC VERSUS PRIVATE CROP BREEDING

A look at the past, present and future of wheat breeding.

THERE are some important differences between public and private breeding – and how these differences affect seed growers and crop farmers is often a matter of hot debate in Canada.

Until the 1990s, seed development in Canada was primarily public, and continuing public crop breeding still provides a high return on investment, according to Dr. Rob Graf, a winter wheat breeder at Agriculture and Agri-Food Canada in Lethbridge, Alta. Indeed, it's been estimated that every dollar invested in public cereals breeding provides at least 20 times the return in the form of better crops, spin-off industry jobs, check off investments in additional research and so on. With private-bred seed, many argue most of the profits often go to company shareholders who may not even be Canadian.

Dr. Stephen Morgan Jones agrees that private plant breeding is conducted to make a profit. "Public plant breeding is primarily carried out to produce improved varieties with the adoption of the new variety being more important than the return on investment," explains the owner of Lethbridge-based consulting firm Amaethon Agricultural Solutions. "There is also a general feeling that private breeding programs, such as the ones for canola, soybean and corn, are very well capitalized, with excellent equipment and other resources, whereas public breeding programs tend to generally have resource issues."

Public wheat breeding is wholly directed towards finished cultivars that are vital to the industry, and Graf says that while public breeders have been very effective in increasing yield, productivity traits and disease resistance through long-term, stable breeding programs, there is also ample room for private sector involvement.

Morgan Jones notes wheat producers are very much already involved in partnerships with public plant breeding, with millions of producer dollars invested in it on an ongoing basis through the wheat check-off. He also points out that the Western Grains Research Foundation (WGRF) and the wheat commissions (Alberta, Saskatchewan and Manitoba) have developed long-term partnerships with universities and government, and these arrangements often include the sharing of royalty revenue from producer-supported varieties. Like Graf, he notes there are some 4-P arrangements (public/private/producer partnerships) already in place, and that these could be enhanced.

Cost and Risk

Some crop farmers have concerns about the present cost of private-bred seed and that those costs will only rise. The cost of private-bred canola is certainly high, but farmers have found that with this crop, a good profit is still achievable due to factors like high yield and strong market demand. However, some farmers wonder if the same situation will occur with cereals.



Photo courtesy Robert Graf.

Experimental winter wheat lines at AAFC Lethbridge.

Morgan Jones says although Syngenta has been involved in wheat breeding in Western Canada for many years, and other companies such as Bayer and Canterra Seeds have recently begun investing in it, companies have rightly had concerns about recovering costs.

"For large acreage crops such as CWRS [Canada Western Red Spring] wheat, there is a sufficiently large seed market to justify investment," he says. "But if you compare the economics for wheat and canola, with wheat seed planted at about 20 times the rate of canola seed, there is the issue of handling quite a large amount of seed and producing it in a way that makes any profit viable. There is thus little interest in cereal crops with less than five million acres."

Morgan Jones acknowledges that private company development of proprietary traits such as herbicide or insect resistance requires a large investment and that this ultimately results in higher seed prices. On the other hand, public breeders, in most cases, take a royalty on the future sales of their variety by the seed company, but the royalty is usually less than five per cent of the seed price.

"This means that private companies will tend to focus on traits that have an immediate positive impact on farmer profit, such as increased yield and lower input costs or lower cost production systems," he says. "In contrast, public investment in plant breeding tends to be for the longer term, with more attention given to finding new sources of disease and insect resistance, and maintaining and improving wheat quality."

Morgan Jones also points out that while private companies dominate the canola seed market, there is still a large public

investment in canola genomics, pre-breeding new lines and sources of disease resistance. "I think it's important to have a balance of public and private investment," he notes.

However, in his view, this does not apply in cases where there are multiple private companies competing to provide similar seed that meet farmers' needs.

"In that situation, there is little justification to continue public investment in variety development, and public investment is better to shift to a more basic, longer-term approach to ensure the genetic variability is available for the future," Morgan Jones says. "At the same time, there is no doubt that using current methodology, the current private focus of developing hybrid wheat varieties will be more expensive to produce and market, and the extra performance will have to be very evident for farmers to be motivated to spend more on the seed."

Moving Forward

In terms of how private and public wheat breeding will play out in the coming years, Graf would like to see germplasm exchange encouraged and simplified.

"Germplasm is the 'life-blood' of plant breeding, and if we are to meet the challenging requirements of the future, we need to work together, building on each other's successes," he says.

According to Jones, for germplasm exchange to work effectively, it requires breeders who receive material to reciprocate with others. "Some universities in the U.S. strictly control their germplasm and want a share of any future revenues that may result from their germplasm being used in future crosses. This tends to

limit exchange of germplasm. In the case of wheat in Canada, the best germplasm is currently held by public plant breeders, although this may change in the longer term as private companies invest more in wheat."

Graf also believes the current strong, transparent and merit-based registration system should continue, with its balanced approach to sector requirements that include disease and pest resistance. He says it works for the benefit of the entire industry and it encourages quick uptake of new cultivars because there is less risk to the entire value chain, from the pedigreed seed producer to the commercial farmer and end-use customer.

Morgan Jones, however, thinks the current process of government-controlled variety registration adds years to the time a new variety could be released to the industry. He suggests the possibility of a hybrid registration system, where a producer could get very early access to advanced breeder lines in which traits were reliably expressed, and work with a grain company to commercially test them. The farmer and grain company would jointly take the risk and in some cases the breeding line would be rejected, but the ones that were successful would likely be able to be commercialized two to three years sooner.

Whatever the future holds, Graf believes there will always be a need for public breeding. For example, he says there has been little private interest in developing new durum varieties, minor spring wheat classes or winter wheat, so public breeding of these classes will therefore need to continue if the industry sees value in Canadian production of these commodities. **Treena Hein**



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Working together sets the Carmangay Seed Cleaning Plant apart.

MANAGERS and staff of the Carmangay Seed Cleaning Plant, located about 60 km north of Lethbridge, count themselves lucky – they love their jobs. That may explain why turnover at the plant is rarer than a seed cleaning issue they can't solve.

Since they opened their doors in 1959, they've only had five general managers. The first held the position for two decades, and the current general manager, Rod Blenkin, has been on the job for 23 years. And as he nears retirement, his son Chris is taking the reins as plant manager.

"My dad and I are a good team," said Chris Blenkin. "He manages operations and employees and I focus on the bookwork as well as future expansion."

With 15 years of experience at the plant, Chris Blenkin is a relative rookie; but then, he's only 34 years old, and he likes what he sees so far.

Advantage: Alberta

"Our plant is the 'Alberta advantage' in action. Other provinces have privately-run seed plants so they charge the customer more. As a co-operative, we are here to benefit the farmer and keep their costs as low as possible."

That has always been the goal of the Carmangay Seed Cleaning Plant, whether processing 150,000 bushels annually in 1995 or 600,000 in 2016.

Today, the bulk of their business is cleaning cereals and pulses for farmers to re-plant the following year. Most of that business comes from word-of-mouth, thanks to clients who appreciate their knowledge.

"We try and add value to a farm operation wherever we can. Our 40 years of combined experience gives us a unique viewpoint where we can clean just about anything from hemp to rice to safflower," notes Blenkin. "We even get calls from farmers who aren't in our area asking us to problem solve for them."

The Royal Treatment

Not content to rest on their laurels, however, they are rapidly building the seed treatment part of the business.

"It's a key area of growth. We used to treat 6,000 to 12,000 bushels of grain per year and we now do around 70,000, all in April and May. We wanted to find a way of assisting farmers at seeding time, so we bought a mobile seed treater and went to work. Now we're exploring ways of boosting those numbers even more," says Blenkin.



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Part of their success stems from a commitment to always having the latest equipment and technology in their plant.

"We're constantly modernizing to be more efficient and do a better, faster and more affordable job for the farmer. Our new mobile treater is a perfect example as it's fully automated and provides proper application and amazing coverage at an extremely fast rate," says Blenkin.

The automation brings error rates down from 10 per cent, which is typical in the industry, to a measly 0.5 per cent. No wonder father and son talk about embracing technology.

A Co-operative in the Truest Sense

Not only do they look ahead, they look around and gather input from many sides.

"We are currently working with our board on five- and 10-year plans and discussing a number of ideas," notes Blenkin. "We're also sitting down with farmers to get their opinions on where they'd like the plant to go from here. As much as we're a seed cleaning plant, we're really owned by the farmers and here to benefit them."

While those plans may include a new plant at some point, they're considering other areas where they could be of service, such as exporting and blending of seed for feed.

Their collaborative approach to planning for the future also extends to dealing with the present.

"I think one of the reasons we've had such continuity of staff is our board of directors," says Blenkin. "They're very supportive and strike a good balance, giving us the freedom to run the plant and offering plenty of guidance when it's needed."

"As a co-operative, we are here to benefit the farmer and keep their costs as low as possible."

—Chris Blenkin

The plant is a co-operative in the truest sense, in that customers have their input as well.

"Our local clients are fantastic. They're so encouraging and really want the plant to succeed which only gives us more passion to make that happen. We're truly here to help each other and work together," adds Blenkin.

Their building may be long in the tooth, but there's no shortage of youthful enthusiasm inside.

"This operation is filled with energy. We have a young board and a solid foundation backed by the Alberta Seed Processors. Most importantly, we have managers and staff who love what they do: giving farmers the best product and service they can to help them grow their business."

When it comes to job satisfaction, this is one group that truly found its calling, and its customers are indeed lucky to deal with such a caring and enthusiastic group. **Geoff Geddes**



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Keeping Up with Alfalfa Advances

There's a lot happening in the alfalfa seed market. Here's a snapshot of the latest advances and what's coming down the pipe.

In the world of forage seed, alfalfa is getting a lot of press these days, due in part to a GE variety that has sparked renewed interest in the world of alfalfa seed.

Even before the U.S.-based Forage Genetics International (FGI) began selling its HarvXtra alfalfa seed with Roundup Ready technology to farmers in Eastern Canada in 2016, the alfalfa industry was split on the issue of whether doing so was a good idea.

On one side, alfalfa seed producers in the West feared contamination risk they said could pose a danger to alfalfa seed exports. In the East, growers wanted the ability to grow herbicide tolerant alfalfa for livestock feed.

In the end, FGI decided to go ahead and launch the product in the East for hay production only. It's currently not being sold in Western Canada. Despite the controversy, the issue served to put alfalfa back in the spotlight.

"It's what often gets lost when people talk about alfalfa — the conventional side and some of the strides being made

there," says Erick Lutterotti, general manager of Gold Medal Seeds in Brooks, Alta., (a subsidiary of FGI) and vice-chair of the Canadian Seed Trade Association's Forage and Turf Committee.

Winter Hardiness

Especially exciting for Lutterotti are new varieties of multifoliate alfalfa that have been bred to be very winter hardy. "That's the big thing in conventional alfalfa."

Winter hardiness is determined by an alfalfa variety's ability to withstand cold temperatures. The lower the rating for winter hardiness, the greater the ability of the plant to survive the winter months. Winter hardiness ratings indicate the potential longevity of the alfalfa stand.

Lutterotti notes that although fall dormancy is related to winter hardiness, the latter is separate from fall dormancy. In recent years, breeders have been successful at separating winter hardiness from fall dormancy.

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Alfalfa from the breeding program.

“In the past, multifoliolate alfalfas came with a 4 or 5 fall dormancy rating, meaning it wakes up early and goes to bed late. For people south of Lethbridge, you’d get three or four cuts per year, maybe a fourth,” Lutterotti says.

“Inherently, creeping-rooted alfalfa was the most winter hardy there was, but those varieties were best suited for lower-yielding two-cut systems. Now we have a very high-quality alfalfa — dairy quality — that’s still at that 4 fall dormancy rating, but you have a winter hardiness below 2, which is as good or better than any creeper on the market. This gives you lots of options as to your farming system, and it can be used in many different regions.”

Regional differences are the key to knowing what alfalfa variety is best for Western Canada, Lutterotti adds. If the alfalfa crop is meant for short-term growth, moderate winter hardiness

is usually adequate. For long-term stands, a lower winter hardiness rating is often a good idea, but it can depend on a couple factors, he notes.

“In regions with more snow, a lower winter hardiness rating may not provide much additional protection, but you never know. You don’t want the grower to just assume that they’re going to get a lot of snow cover next winter. You might not get as much snow in a given year, so it might be a good idea to go with an alfalfa that can withstand exposure to the cold better.”

He recommends retailers work with their customers to determine the variety that is the best fit for their specific situation. Popular varieties include Compass, with ultra-winter hardiness and fast regrowth.

GE alfalfa isn’t the only product FGI is working on. It’s also making strides with conventional alfalfa, an example being an attempt to offer stronger resistance to Anthracnose stem rot.

Anthracnose of alfalfa is caused by *Colletotrichum trifolii*. This fungus can attack leaves, but most characteristically attacks stems and crowns. While resistance has been built in to many varieties of alfalfa on the market, Peterson notes it’s beginning to break down in some lines. The disease is rare in Western Canada, but is more prevalent in the eastern United States and Eastern Canada.

“Even with *Aphanomyces* root rot, which has been around for over 20 years, the industry is finding there’s still a lot to be gained by breeding new varieties resistant to additional races of this important disease,” says Mike Peterson, global traits lead for FGI.

Improving Yield, Persistence and Quality

The advances in alfalfa products like high-quality winter hardy varieties are due in part to the hard work of people like Annie Claessens, forage breeder at Agriculture and Agri-Food Canada’s Quebec Research and Development Centre.

Claessens is part of a multidisciplinary team of researchers constantly working to improve the forage crop on a number of fronts.

Like breeders of most other crops, alfalfa breeders are working to boost yields. The key to doing so is lowering the dormancy,

Alfalfa Market a Shifting One

Todd Hyra remembers the days when the alfalfa seed market looked a lot different than it does now.

“At one point in time, SeCan was quite involved with several forage crops, but the market has shifted over the last 10-15 years,” says Hyra, Western Canada business manager for SeCan, the largest supplier of certified seed to Canadian farmers. “Now, the industry has consolidated and there are fewer forage seed companies. The dominant ones have their own proprietary forage products.”

Still, SeCan continues to offer a handful of conventional alfalfa seed varieties that Hyra says are worth noting: AC Blue J, a traditional trifoliolate, tap rooted alfalfa variety; AC

Dalton, which has improved verticillium wilt resistance compared to Beaver and Barrier; AC Yellowhead, which has a higher protein content than Beaver, Rambler or Heinrichs; and Peace, also high in protein. The latter two varieties are extremely winter hardy.

“Trying to break the winter hardiness/fall dormancy split has been a major driver of innovation in alfalfa for awhile now,” Hyra says. “There’s been a huge shift in the alfalfa industry over the years, and while SeCan doesn’t play as big a role as we used to, it’s great to see the investment in the potential of the crop. It’s a fun crop to work with and it’s encouraging to see that innovation happening.”

but doing so can have unwanted effects on alfalfa persistence. It's an interesting conundrum that Claessens and her team are challenged with.

"We're trying to help growers extend the alfalfa growing season from late summer through to early winter, so we want less dormant cultivars. However, when they're less dormant, they generally have lower winter survival."

Some significant gains have been made in recent years, like the kind Lutterotti refers to, where winter hardiness has been improved while keeping fall dormancy the same. But there's a ways to go, Claessens notes.

"Those two traits can be improved simultaneously. We've developed an indoor selection method to decrease dormancy but increase freezing tolerance, which is one of the most important factors in lowering winter survival under our climatic conditions."

Breeding for better freezing tolerance involves creating plants with perennial organs (crown and roots) that are able to withstand freezing temperatures. She reports that they have been able to increase the freezing tolerance of alfalfa by 5 C.

Claessens and her colleagues are also working at disease resistance, which is the second-most important factor lowering winter survival. Breeding efforts are focusing on Phytophthora root rot and Aphanomyces root rot, thereby helping alfalfa to be less affected by cold and wet soil conditions.

Phytophthora root rot, caused by a fungus-like pathogen, is believed to survive for many years in the soil, and may attack alfalfa after long rotations to other crops. Aphanomyces root rot, caused by a pathogen very similar to Phytophthora, attacks both seedlings and adult alfalfa plants and can dramatically reduce yield and vigour of established stands.

"We've developed an indoor selection method to identify which plants are highly and moderately resistant to those diseases. We can select plants with greater resistance and breed them to rapidly develop lines that are better able to resist those pests."

Boosting quality also remains the mission of alfalfa breeders like Claessens.

"Our goal is to have cows produce more milk from the alfalfa they consume, either by increasing alfalfa's digestibility or energy content so the microorganisms in their stomach can have more energy to process the protein," she says. "By increasing the

energy content, we can increase milk production from forages, increase protein content of the milk, and reduce nitrogen loss in the environment at the same time."

Exciting new alfalfa varieties don't just appear overnight, though. Claessens notes that breeding programs are expensive, and new sources of germplasm and funding are always being sought. It can take many years for a new alfalfa variety to hit the market. **Marc Zienkiewicz**

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ACCESSING NEW SEED VARIETIES

New tools and techniques influence how new varieties are developed and can also shave a little off the timeline.

THE development of new crop varieties in Canada and elsewhere is a matter of what farmers want and need, but also what consumers want and need. So says Trent Whiting, marketing representative at SeCan.

“You have to listen to what farmers want, and of course they want everything – great disease package, high yield, strong straw and so on – and we also have to look at end uses,” he explains. “We are always looking to provide the best performance we can for farmers, and there are also regional differences in how a variety will perform as well. We try to work with breeding partners to address that too.”

Canterra Seeds also gathers information from numerous sources in the process of selecting new varieties, including industry information such as variety performance records, data from breeders and input both from seed growers and farmers.

“Canterra Seeds has made it a priority to determine the needs of our customers, which include both farmers and end-users, as you need to meet everyone’s needs to be successful,” says Colette Prefontaine, pedigreed seed territory manager with Canterra. “If a variety is high-yielding, for example, but doesn’t have the quality that processors are looking for, they won’t buy it. Conversely,

if a variety has a unique quality attribute but has terrible standability, farmers won’t grow it. Both sets of needs matter.”

While the breeding process is very similar to what it was decades ago, it has also changed in some ways over the last few years.

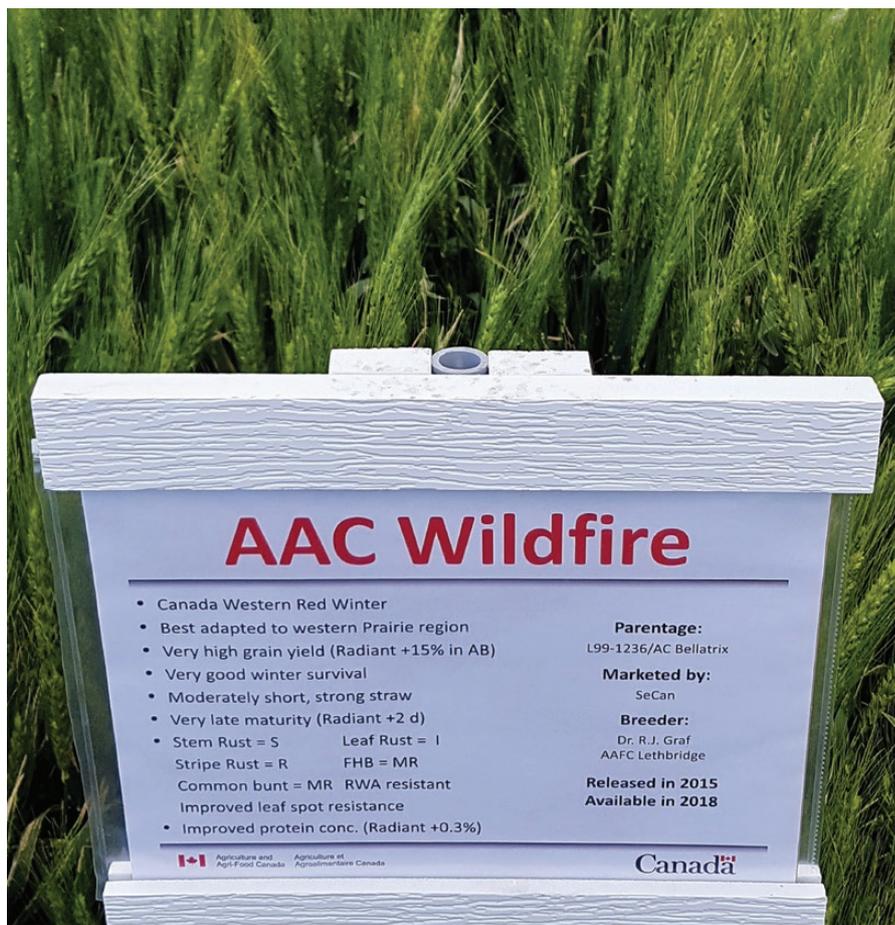
“The change that stands out for me is that breeders are able to communicate directly with farmers through social media and the internet,” says Whiting. “Information flow is so much better, with real-world feedback coming in from farmer or end-use customers faster than ever. I saw a tweet the other day from one of our members praising a new winter wheat variety he was growing and



the breeder responded directly to him right away. It's amazing to see that direct communication. It's unprecedented. It's fantastic that we are all working together to fine-tune the right variety for the right place, working together to make a variety succeed... with breeders getting feedback right from early stage germplasm through all the other stages."

Prefontaine agrees there has been a definite shift to more direct connection and two-way influence. "There is a lot of communication between all parties, and in fact, at Canterra, we have staff dedicated to fostering these relationships and ensuring a constant information flow," she notes. "I was sitting on a combine the other day with a seed grower who is connected directly with a processor in his area. This type of direct connection results in a greater level of specialization and the existence of more variety-specific attributes, all of which helps meet the needs of both the grower and the end-user."

Caroline Lafontaine, managing director of communications and member services with the Canadian Seed Growers' Association (CGSA), notes there has also been a change in the last decade in the



SeCan's new winter wheat AAC Wildfire.

Photo courtesy AWC

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way food companies are working to a greater degree with breeders on end-use attributes.

“Food companies are working with plant breeders, and investing in research to develop seed varieties that will create ingredients that can reliably deliver improved texture, flavour, nutritional characteristics and appearance to help them distinguish their food product from their competitors,” she says. This could include “different barley varieties to provide different flavour profiles for beer, specific wheat varieties for increased crisp in crackers, or different soybean varieties to produce varying textures, firmness and flavour profiles for tofu.”

Breeding to Commercialization

Commercialization of a new variety is quite a long process with many stages. The selection process can start with over one million lines, notes Whiting (see graphic) and typically lasts 12 or more years. Part of that process takes place after breeder seed release. After that point, says Prefontaine, it typically takes



Trent Whiting, marketing representative, SeCan



Colette Prefontaine, pedigreed seed territory manager, Canterra

three or four years of multiplication in the certification process before seed gets to the certified stage and is available for widespread commercial release.

“At the very beginning, you do lots of crosses and then select again and again from those crosses as you go along,” says Whiting. “The more crosses you have,

the more you have to select from; but the more crosses you have, the more you have to manage and the costs are higher. It’s getting common nowadays to speed up the process through contra-season growing trials in places like California and New Zealand, and that’s costly in terms of shipping germplasm and staff and can



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be complex in working out arrangements for land use, but can be cost-effective in the end. It can shave down the entire process to nine or 10 years instead of it taking 13 or 14.”

The other costly requirements that go into the development of pedigreed seed are not likely to change. “The cost involves the innovation with the genetics and then the actual production of the seed, the land use requirements, cleaning, all that and a little bit of margin for doing that,” Whiting notes.

Adds Lafontaine: “To an outsider, seed production may seem like growing any other crop, but seed growers must ensure that their seed crop meets high standards for varietal and mechanical purity. This involves continuous monitoring and quality management in the field as well as rigorous cleaning and grading post-harvest. It also involves significant regulatory oversight, including third-party inspection, establishment audits and post-harvest testing before the official blue certified seed tag can be applied.”

“Information flow is so much better, with real-world feedback coming in from farmer or end-use customers faster than ever.”

—Trent Whiting

She says seed growers work tirelessly to ensure their seed crops are as pure and true to its varietal identity as it can be, which can mean rogueing the crop to remove other crop kinds, impurities or weeds, sanitizing seeding and harvesting equipment between varieties to remove possible contamination from other crop

kinds, or segregating different varieties and classes of pedigreed seed in separate storage bins. The entire process must also be well documented for traceability purposes.

“While market demand and supply ultimately determine the price of all seed, the generally higher cost of pedigreed seed reflects, among other factors, the significant investment of seed growers in quality control and in meeting regulatory requirements,” says Lafontaine. “This, in turn, buys the farmer a guaranteed level of quality assurance, backed up by the blue tag, and provides one of the best risk management tools available.”

Prefontaine echoes the sentiments. “When you buy pedigreed seed, you are investing with that purchase in technology, quality and traceability,” she says. “You are contributing to the entire investment required in bringing new innovations forward, and playing an important role in ensuring a strong future for Canadian crop production for years to come.” **Treena Hein**



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Taking APG's Research Pulse

Alberta Pulse Growers invest millions in pulse research. Where do those dollars go, and why?

AS pulse acres in Alberta continue to rise, so does Alberta Pulse Growers' (APG) investment in research, with \$9 million tied up in more than 40 projects.

The province's 6,000 pulse growers support the non-profit organization through a levy on pulse sales. The money raised is used to fund many initiatives, including marketing, extension, advocacy and administrative activities.

However, research is the organization's cornerstone, says Leanne Fischbuch, APG's executive director.

"Research is a key aspect of everything we do with our organization for our growers," she says. "We're focused on doing the right research — the research that will work for us and our industry."

Research initiatives are aimed at growing genetics, yield and sustainability in pulse production, and crop utilization and health benefits are also focus areas. These five research divisions provide a balance of grower- and consumer-focused research, says Fischbuch, because building demand for pulse products is as vital as improving yields.

The organization proportionately reinvests in the pulse crops Alberta producers are growing, says D'Arcy Hilgartner, APG's chair. "We try to allocate based on where our levy dollars are

flowing from," he says. "Because we're a producer-funded commodity commission, we try to be very reflective of the needs and wants of our producers."

And as an Alberta pulse producer, Hilgartner has a vested interest in where APG invests its research money.

"It's my money — it's producer money," says Hilgartner. "We're all producers around that table, so we're aware we need to be very responsible about how we spend our money. We want to give producers the best bang for their buck, addressing their concerns and their needs," he says.

Growing Genetics

Many Canadian institutions and organizations are currently carrying out pulse research for APG, including Agriculture and Agri-Food Canada (AAFC), Alberta Agriculture and Forestry (AAF), University of Alberta (U of A), University of Toronto, University of Saskatchewan's Crop Development Centre (CDC), Northern Alberta Institute of Technology, Alberta Agriculture and Forestry's Food Processing Development Centre, Farming Smarter and Western Ag Innovations.

According to Fischbuch, APG consistently funds research on genetic improvement, a top priority for the organization. At



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present, 11 breeding projects are being funded, worth 25 per cent of the total research budget.

For example, AAFC research scientists Deng-Jin Bing and Parthiba Balasubramanian are working on developing field pea and dry bean varieties, respectively, with improved disease resistance and harvestability as well as increased yields.

“These scientists are continually putting out fantastic genetics that are very Alberta focused. Our industry is seeing the benefits of those varieties. It’s exciting to see that work in commercial production,” says Fischbuch.

In the future, APG wants to see an increase in the number of varieties available to Alberta producers suited to the province’s growing conditions. Thus, the organization allocates generous funds for pre-commercialization research, says Hilgartner.

“That’s where companies tend not to put money in because they don’t see a [return] next year or the year after. If it’s a new variety, it’s ready five to 10 years from now. That’s where we thought we’d look at putting our support,” he says.

Last year, the APG board decided to end its agreement with Saskatchewan Pulse Growers (SPG) whereby Alberta’s Select Status seed growers could access breeder seed through the SPG’s Variety Release Program.

“We were in that agreement for numerous years where we provided some funding that allowed [Select Status] seed growers access to that program. When the program was initiated, there were indirect benefits to APG members via the Select Seed growers, and recent evaluation determined the program was no longer meeting the organization’s objectives,” says Fischbuch.

“When we look at Alberta, we would like to see more pulse varieties targeted for Alberta growers focused on Alberta’s environment. So, testing in the province of Alberta and focusing on selections that would be key for our growers. We’re not the same environment as other parts of Canada,” she says.

Furthermore, Fischbuch says SPG is currently reviewing the way it commercializes its pulse varieties outside of Saskatchewan, and is exploring options for marketing those varieties.

“There will be opportunity to have varieties here from CDC and elsewhere. I think it’s all changing. There are many breeders out there and they’re producing great varieties. We want to see that benefit come to Alberta. And if there are CDC varieties that excel, that’s great — they’ll eventually be here,” she says.



Photo courtesy D'Arcy Hilgartner

D'Arcy Hilgartner, APG’s chair, says the organization tries to be reflective of the needs and wants of producers.

Fischbuch also believes the ratification of the International Union for the Protection of New Varieties of Plants (UPOV '91) convention will also spur investment in varietal development.

“With UPOV '91, I think there’s opportunity to move forward and see more companies bring their genetics here for testing and establishment. Look at the numbers of varieties that have been introduced since the legislation passed. You’re getting a whole bunch of plant breeders protecting their varieties now when they’re bringing them into Canada,” says Fischbuch.

“If the [varieties] are showing good yields, farmers will find them and use them. And we’ll continue with our investments in research because, really, that’s where we’re focusing and trying to make sure that our growers are able to grow their pulses, market their pulses, and really be profitable and sustainable for the industry.”



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As pulse acres in Alberta continue to rise, so does APG's investment in research.

Growing Yields and Sustainability

Currently, 16 projects utilizing 36 per cent of the research budget is devoted to growing pulse yields in Alberta. And when it comes to boosting yields, work on pea leaf weevil is essential, says Fischbuch. "We've seen pea leaf weevil creep across the province from the south, moving northward," she says.

AAFC researcher Héctor Cárcamo is assessing management strategies, such as cultural practices and insecticide applications, to control pea leaf weevil in field pea and faba bean crops.

Meanwhile, Maya Evenden, a U of A entomologist, has devised an early warning system using semiochemical-baited traps to monitor pea leaf weevil on the Prairies.

Funds have also been allocated for at least three separate studies on Aphanomyces, a soil-borne water mould that poses a serious risk to Alberta pea crops.

"Aphanomyces could destroy our pea industry," says Fischbuch. "This is going to be huge for our producers and we need to get a handle on it."

AAFC researcher Syama Chatterton estimates Aphanomyces euteiches, which causes pea root rot, is present in up to half of Alberta fields, says Fischbuch. A leading scientist on Aphanomyces research, Chatterton is working on ways to address the issue through APG-funded studies, and further research is projected.

"Our continued work on Aphanomyces is a real priority when it comes to making sure we're going to be able to have pulses here in the province of Alberta for a long time. The more we can learn about that disease, the better off we'll be. It's absolutely critical for us," says Fischbuch.

Research that increases pulse crops' long-term sustainability as



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a viable choice for producers has been allocated seven per cent of APG's funds. Projects focus on capturing pulses' rotational benefits, and fertility and water-use management attributes, and can be either producer or consumer focused. For example, an ongoing study is examining the agronomic and economic benefits of including pulses in a Brown soil zone crop rotation.

Utilization and Health

Utilization and health are both consumer-focused categories and are allocated 16 per cent each of APG's research budget. These research projects raise awareness of pulses' health benefits, such as lowering blood sugar and LDL cholesterol.

APG is also supporting the Change Cancer Alberta initiative, which studies the effects of increasing pulses in the diets of primary care patients. Fischbuch says growers may not realize how research is affecting pulse awareness and demand.

"One of the big messages we want to spread is pulses are healthy. There's a variety of things that are different from what a grower might consider impacts him," says Fischbuch.

Last year, 2016, was International Year of Pulses, and it proved beneficial in raising awareness about pulses' health and environmental benefits. To celebrate, APG partnered with AAF's Food Processing Development Centre and industry partners on a project called "The Alberta Pulse," to create 10 prototypes of food products incorporating peas, beans and faba beans.

From ravioli to chocolate cake and dog treats, the food products were created to showcase the use of pulse ingredients



Photo courtesy D'Arcy Hilgartner

Currently, 16 projects utilizing 36 per cent of the research budget is devoted to growing pulse yields in Alberta.

to the processing side of the industry.

"Having these companies experience the use of pulse ingredients where they never thought of using them before was a real opportunity for us to raise awareness that these ingredients are out there now," says Fischbuch.

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Other utilization projects currently on the go include the development of pulse protein-based pet food kibble, a line of pulse-based gluten free ready-meal products and the use of pea flours in food products with improved nutrition and taste, among others. There will always be a market for pulses, says Fischbuch, especially through recent efforts to increase utilization.

And although there are many agronomic reasons for producers to add pulses to their rotations — for example, pulses fix their own nitrogen, make soil healthier by putting nutrients (including nitrogen) back into the ground, help break disease cycles in the field, and give yield boosts to canola and cereals planted after them — it’s the bottom line that counts. Producers will find that pulses pencil out.

“Pulses have been good business for many growers for many years,” says Fischbuch. “It’s a crop for which there is always a market, and it’s one we’re trying to develop more.”

National Alliance

To further increase the pulse market, APG has aligned its research efforts with the national pulse organization, Pulse Canada.

“That’s to grow the industry; to add 25 per cent utilization of pulse ingredients by 2025 in areas where you may not have seen them before,” says Fischbuch.

Although the ways in which producers benefit from APG-funded research are many and varied, tangible outcomes are ongoing, says Hilgartner, such as better varieties, agronomic practices and recommendations. Also, he says, market demand for pulses has grown substantially over the last few years.

However, producers demand research that is broad in scope, from highly technical laboratory-based research to field trials where production is carried out under the same conditions growers experience, says Hilgartner.

“We try to spread our research across the board, so that it helps producers throughout the [entire] process. You can develop a product that works well in a sterile environment, but doesn’t work in a commercial setting — to the producer that has no value,” he says.

As demand climbs and producers increase pulse acres, APG is growing as well. Hilgartner says the organization is working hard to meet the needs of its members, and he encourages producers to be part of the commission and part of the process. He’s

excited about his role in pulse production and the opportunities available to his fellow Alberta producers.

“I look at pulses, not only in Alberta, but Western Canada, as a great story economically and environmentally, as to what we can produce here and what we can provide, not only to North American markets, but to the world. A lot of that is because of the research and the high-quality products that come out of here,” he says. **Kari Belanger**

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BOARD MEMBERS EAGER TO GET GROWING

These two seed growers are new Alberta Seed Growers board members. Both have farming in their blood, and are pumped about their new role.

UNLIKE many industries, farming is one where most kids don't roll their eyes at the prospect of following in dad's footsteps.

That is certainly the case for two new members of the Alberta Seed Growers (ASG) board who were both eyeing a farming career from an early age.

Such is the story with Richard Hallett, a seed grower and cattle producer located 15 km west of Carstairs.

"My dad started growing pedigreed seed in the 1980s, so I was born into it. I've grown pedigreed seed my whole life."

Hallett took an eight-month break after high school and



Tracy Niemela

travelled to New Zealand, but all roads led back to the farm.

"When I returned, I went to Olds College and studied farm and ranch management, and I've been working on our seed business ever since."

Family Values

The business is truly a family affair. Hallett's young son and daughter are involved, and his 91-year-old grandfather still lends a hand.

That concept of continuity is a big part of the seed growing appeal for Hallett.

"I love seeing things through. As a seed grower, I hear about new varieties coming down the pipeline and I can choose

the ones I think will be good for our customers," he says. "It's satisfying to follow the seeds through their lifecycle and find the varieties that best suit a specific area and client."

The only challenge comes at peak times when he's selling seed while trying to get his own seed in the ground. Of course, a knack for overcoming obstacles is a good quality for a new ASG board member.

"I just joined at the end of January, so am quite new to this. I've attended the general meetings over the last four years, and when the past president approached me I decided to get involved."



Richard Hallett



SeedNet

Who is SeedNet?

Members: SeedNet's core is made up of 13 well-established seed growers in southern Alberta; together they have over 400 years of seed growing experience. Their multigenerational farms bring the experience and energy to grow of many varieties of seed under irrigation and dryland conditions.

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Shaping the Future

Hallett was keen to meet people and learn more about the workings of the seed industry. As well, he saw the board as playing a key role.

"Seed growers are at the leading edge of the latest varieties and technologies in crop production, and the board is a great spokesperson in representing the industry and guiding it forward."

In the process, the board must deal with issues unique to the industry. It's a good time to have board members with different viewpoints, as "everyone's perspective is valuable".

Rooted in Success

One of those perspectives belongs to fellow new board member Tracy Niemela. Along with her parents, husband and other family members, she operates a seed farm near Sylvan Lake.

Like Hallett, the business has deep roots in her family tree.

"My sisters and I are the fifth generation on the farm and I am a third-generation seed grower. I guess you could say it's in

my blood. It's a lifestyle that I grew up in, fell in love with and want to raise my child in. I hope to keep the operation going for generations to come."

A University of Alberta graduate with a Bachelor of Science degree and an agronomy certificate from Olds College, Niemela worked for the health region as a systems consultant while helping on the family farm. Eventually she quit and went back to the farm full time.

She finds the seed business challenging and rewarding at the same time and one that is constantly changing. That suits her just fine as it really keeps her on her toes.

Also fitting well is her place on the ASG board. Although Niemela was hesitant when first asked to run, fearing she lacked the time and the knowledge of what the board did, she finally took the plunge.

"All boards benefit from fresh ideas. I'm excited about being at the forefront of information, networking and helping to shape the future of seed growers in Alberta and possibly throughout Canada. It will not only benefit me and our seed farm, but others as well."

Moved to Action

Part of that shaping includes addressing movements like gluten-free, organic and chemical reduction.

"These aren't necessarily bad things, but there is a lot of wrong and misleading information out there," notes Niemela.

"We need to stay ahead and promote what we do before all of this explodes and starts dictating the future for farmers and possibly seed growers."

Niemela has seen a lot of industry changes over the years, such as the increasing role of big business in taking control and ownership of varieties while "more and more seed is grown under contract. The questions going forward are critical: Where will pedigreed seed be in the future? Will the seed system still exist? Will it need to exist?"

There's a lot to tackle, but with farming in the blood and their hearts on their sleeves, Hallett and Niemela are pumped to take it on. **Geoff Geddes**



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Agricultural Research Up in the Air

Provincial research review concerns industry.

WHEN the Alberta government released its provincial budget in March, it was met with mixed emotions by those in the agriculture sector.

While the budget contained an increase of one per cent in overall agricultural spending, it prompted questions about the level of funding for certain key areas in the sector.

One of the biggest concerns of many producers was a lack of commitment to adequately fund agricultural research in the province, including an absence of funding for the Alberta Crop Industry Development Fund beyond 2018.

Those concerns have only increased since, as the Alberta government has begun a review of provincial services including the province's agricultural research program. While the results of this review aren't expected until next April, some fear it could result in a significant cut to provincial funding for agricultural research.

"In my mind, it's very likely that cuts will come," says Ross McKenzie, a retired research scientist who worked for Alberta Agriculture and Forestry for 38 years.

"It's easy to cut research. When research is eliminated it's often not very obvious immediately, but it does have repercussions down the road if farmers are looking for information and that work is not being done. That puts Alberta farmers at a huge disadvantage."

McKenzie says one of the challenges for researchers is that the value of their work often isn't appreciated until many years down the road. He cites the example of soil research with phosphate fertilizer and phosphorus soil testing that was conducted in the province in the 1990s; it cost nearly \$400,000 at the time, but has provided millions of dollars in benefits to growers each year.



Caroline Sekulic, vice-chair, APG



Ward Toma, general manager, ACPC



Ross McKenzie, retired AAF research scientist



Jason Lenz, chair, Alberta Barley

"It might sound like a lot to spend \$300,000 or \$400,000 on a research project," he says. "[But] that work is now used by all the soil testing labs to help farmers decide how they should be spending \$300 or \$400 million a year on phosphate fertilizer. That's a huge benefit."

This is hardly the first time concerns have been raised about the fate of agricultural research in the province. In 2001, a research review resulted in about half of Alberta ag researchers either being cut or shifted to other departments, and extension work was curtailed – a huge loss for Alberta farmers. More recently, in 2014, the provincial government eliminated the Agriculture and Food Innovation Endowment Fund.

Jason Lenz, chair of Alberta Barley, says one of his concerns is that any potential cuts to provincial funding for research will place pressure on producer groups like his to help fill the void.

"Without government funding, it puts the onus on producer groups to fully fund the future of research and innovation, and it becomes [more] difficult," Lenz says. "We've demonstrated that we can and will work with any government in order to give Alberta's farmers a competitive advantage. Everyone benefits when we work together with government and public breeding institutions to give farmers a chance to have success."

Terry Young, chair of the Alberta Wheat Commission's research committee, says the cost of agricultural research can be extremely high and that makes it prohibitive for producer groups to go it alone. He says it's vital that groups can leverage government funds to get the biggest bang for their research buck.

One of Young's biggest concerns about potential cuts to ag research funding is that it could slow research into new technologies which could then have a trickle-down effect on farms.

"What I can see is that some of the newer technology may not get accepted or adopted as readily. It would take a longer time for the research to happen and for the technology to become part of best management practices," he says.

Young uses the example of recent research on Fusarium head blight in cereal crops as an example of how producer groups working with the province has benefitted growers.

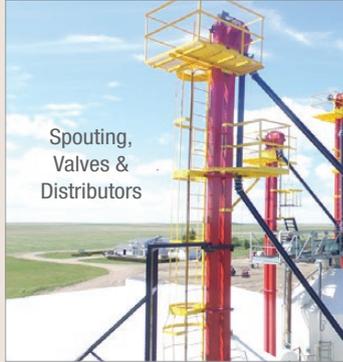
"It's expensive, expensive research," he says. "[But] because there's been an emphasis to actually understand it a whole lot better, the research there will



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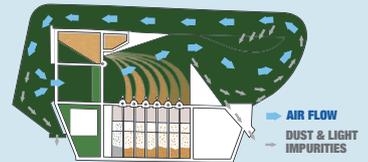
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Ward Toma, general manager of the Alberta Canola Producers Commission, says it would be virtually impossible for producer groups to stay ahead of the curve when it comes to fighting disease and adopting new technologies without government research dollars. He cites past work done to develop blackleg resistance by University of Alberta researchers as an example, as well as the ongoing fight against clubroot.

“Some of the estimates are that [the cost] is in the tens of millions of dollars. Growers can’t afford that. We don’t even have the money to survey and monitor to see if clubroot exists across the province or not. We just wait for it to show up in our fields,” he says.

Caroline Sekulic, vice-chair of the Alberta Pulse Growers Commission, says while cuts to agricultural research might not be noticed immediately, they could have long-lasting consequences. She fears reduced government funding could result in more scattered results for regional variety trials and prompt some

of the province’s best researchers to go elsewhere.

“If we can’t provide opportunities and research for them in this province... we could lose them,” says Sekulic, who is also a seed grower with Prestville Farms in Rycroft.

Sekulic says she and other pulse growers have benefitted enormously from working in partnership with the province. Two recent research projects – an investigation into agronomic practices to remove barriers for growing faba beans, and improved resistance to sclerotium disease in edible dry beans – might not have been possible without government support, she adds.

While some have suggested turning over this type of investigation to applied research associations could resolve any cash crunch, McKenzie suggests doing so isn’t without risk. He says one of the greatest concerns with research associations is they tend to work in isolation – they often don’t work together to conduct research projects on a province-wide basis. And, he adds, research associations don’t have their results posted

on Alberta Agriculture’s website, so it’s difficult to find out who is doing research and what their results are showing.

“One of the reasons why I like to see the provincial government do it or the federal government is the research is done by unbiased people. They have no vested interest in how the results turn out,” says McKenzie. “You get a good, full picture as opposed to sometimes getting a skewed or biased perspective from an industry person.”

The challenge for many producer groups at the moment is they have already begun planning how to spend research dollars in 2018 but likely won’t know until spring what, if any, provincial government funding will be available.

“That is a concern,” Young says. “We’re going to need to know pretty quick. The funding cycle starts in January. The commitments are starting to be made by then for the next year so we need to know exactly what’s going on.”

Jim Timlick

Ed. note: Alberta Agriculture and Forestry declined to comment for the story.



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THE NEXT-GENERATION SEED SYSTEM

The CSGA and CSTA are two of six associations working to revamp how the industry functions.

IF the seed regulatory system were an ocean, the Seed Synergy Collaboration Project can be thought of as a ship built to navigate that vast and sometimes perilous sea.

Aboard that ship are members of all six associations that make up the seed industry — the Canadian Seed Institute (CSI), Canadian Plant Technology Agency (CPTA), CropLife Canada, Commercial Seed Analysts Association of Canada (CSAAC), Canadian Seed Trade Association (CSTA), and the Canadian Seed Growers' Association (CSGA).

The project is currently developing a proposal for an industry-led and government enabled "Next Generation Seed System" in which competition encourages choice for producers and supports seed quality, while maintaining the commitment to safety that has always been inherent to the seed system in Canada.

For CSGA executive director Glyn Chancey, the Government of Canada's decision to support the creation of the CSGA in 1904 laid the foundation for the "industry led, government-enabled seed system" vision underpinning Seed Synergy, which seeks to develop a next-generation seed system for the country.

"The problem was we didn't update our vision back then for how the seed regulatory system was going to evolve. While CSGA, the Canadian Food Inspection Agency (CFIA) and CSI have managed well to sustain and improve the current system, the seed industry has long needed a new vision, new investment and possibly new institutions to support its goals."

That vision is taking form, and discussions on what industry would like a next-generation seed regulatory system to look like are ongoing. In this regard, some important conversations took place at the CSGA's annual meeting in Halifax, N.S., back in July, where a broad cross-section of industry stakeholders met to hear a progress report and provide feedback on work to that point.



Glyn Chancey, CSGA executive director



Dave Carey, CSTA executive director

"As it broadens its basis of support, the Seed Synergy Collaboration Project is showing its potential to build consensus across industry and government for a more market-driven and industry-led seed regulatory system," Chancey says. "In this context, CSGA sees an opportunity to contribute more fully and do so in partnership with others. We're changing, but in a way that will remind people of the importance of what it is we do."

The Seed Synergy project kicked into full gear after a series of annual meetings in 2016, at which the boards of all six associations gathered to discuss the project and how to move forward.

It will culminate in a series of recommendations that will be provided to the CFIA for the end of 2018, a tentative date set in March when the CFIA announced it is opening up Canada's Seeds Regulations for review in order to "reduce overlap and redundancy, increase responsiveness to industry changes, address gaps, weaknesses and inconsistencies, and provide

clarity and flexibility to affected regulated parties for seeds imported, conditioned, stored, tested, labelled, exported and sold in Canada.”

Dave Carey, who took the reins on July 7 as the CSTA’s new executive director, says Seed Synergy is a key priority for him in his new role. Prior to assuming his new role, Carey was CSTA’s government affairs and policy director.

“We need to provide increased value to the membership as we head down the Seed Synergy path and be an important voice in the discussion,” he says.

Carey takes over the executive director role from Crosby Devitt, who was a big proponent of the Seed Synergy initiative. Prior to leaving CSTA to serve as vice-president of the Grain Farmers of Ontario, Devitt said the project allows CSTA to “create its future” and reach out to other associations and figure out how to better work together.

Carey agrees, but emphasizes the importance of CSTA moving forward as an independent entity while the Seed Synergy discussion goes on.

“Our first priority will continue to be our members. I think Seed Synergy will ultimately provide benefits to our members, but in the meantime CSTA still has a lot of our core work to do.”

The six associations involved in Seed Synergy are realizing there’s a convergence of many issues — communication, public trust, the need to have an influence over the industry’s future and the need for an efficient regulatory system. **Marc Zienkiewicz**

The Rundown on Seed Synergy

The Seed Synergy Collaboration Project as a concept originated among five of the current project partners at a meeting in April 2015. CropLife Canada joined the discussion in December of that year.

As part of the Seed Synergy project, there is agreement among the six associations on many of the key questions that need to be asked in relation to such a regulatory system redesign, including:

- What is the purpose of the seed regulatory system?
- What type of “next-generation” system is best suited to fulfill that purpose?
- What are the respective roles of industry and government in any future seed regulatory system?
- What institutional arrangements will be required to support such a system?

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"With certified seed, there are very definite and deliberate procedures put in place to make sure that within relatively tight tolerances the variety that's being purchased is true to type," says Graf, an Agriculture and Agri-Food Canada research scientist and wheat breeder at the Lethbridge Research and Development Centre in Alberta.

It's these requirements, he adds, that ensure producers get the enhanced traits they expect when they purchase a specific variety of certified seed. Improvements in such areas as yield, pest resistance and drought tolerance can take millions of dollars and years of R&D, and it is only through certified seed that they can be reliably accessed.

"I'm a wheat breeder, and we're constantly looking at developing varieties with higher yields and good agronomic characteristics and improved disease resistance," says Graf.

"Pedigreed seed is the avenue by which you can legally acquire seed which has these new genetics."

Ron Markert is a certified seed producer in Vulcan, Alta. The president of Markert Seeds Ltd., who also serves on the Canadian Seed Growers' Association (CSGA) board, says those who grow and process pedigreed seed are always striving to provide growers with the highest performing products.

"If you want to keep on top of the game now in farming, you have to have the best of everything in terms of genetics," Markert says. "Margins are very tight in the agricultural sector and you have to be as efficient as you can. One way to do that is to seed the best genetics. Newer varieties can offer a higher yield, disease resistance, insect tolerance and many other agronomic characteristics that will help increase your bottom line."

"As growers of certified seed... we are expected to meet very stringent standards, rules and regulations to ensure that the purity of that variety is maintained," Markert adds. "Farmers are after a quality product, so if we can't deliver that, they won't continue to buy."



"We're constantly looking at developing varieties with higher yields, good agronomic characteristics and improved disease resistance."

—Rob Graf

How is Certified Seed Produced

According to the CSGA website, the pedigree of a certified seed crop is documented on paper from the breeding establishment to commercial sale. Testing by the Canadian Food Inspection Agency (CFIA) accredited seed labs is used to confirm the seed purity and germination of all certified seed crops.

Pedigreed seed producers must follow strict standards for isolation distances and land-use history, as well as maximum levels of off-type varieties, other crop kinds and weeds. Years of planning which crop will be planted where is also required, as well as cleaning seeders and combines between plots and fields, cleaning augers and storage facilities between varieties, and weeding and roguing plots and fields to remove off-types and weeds from the pedigreed seed crop.

In the field, third-party inspections overseen by CFIA verify the isolation of the seed crop and that it was produced from a higher-level progeny. The absence of volunteer crops and off-type varieties is also confirmed. In addition, random sampling is conducted in pedigreed seed processing plants to ensure seeds are free from weeds and other crop kinds.

HOW IS CERTIFIED SEED PRODUCED?



1 Variety Development
In labs and fields, Plant Breeders develop new seed varieties with new traits and improved yields. Certified seed sales help develop new varieties.



2 Parent Seed Multiplication
Most Breeder seed is produced in small amounts and CSGA seed growers multiply this seed.



3 Field Selection
Seed growers carefully select fields which meet strict previous land use requirements of CSGA.



4 Planting Equipment Sanitation
During planting, seed growers protect quality by investing extra time cleaning machinery and planters to remove seed of other varieties, difficult-to-separate weeds or other crop kinds.



8 Certification
After passing the field inspection and meeting all CSGA standards, the seed grower receives an official crop certificate.



7 Field Inspection
Seed crops are inspected at a specific stage of maturity during the growing season by third-party inspectors licensed by the Canadian Food Inspection Agency (CFIA).



6 Roguing
Seed growers inspect their crops throughout the growing season and remove off-types, other varieties, problem weeds and other crop kinds that have emerged during the season.



5 Isolation
Certified seed production fields are carefully isolated from other crops to prevent contamination from other varieties or crop kinds.



9 Harvesting Equipment Sanitation
Before and during harvest, seed growers protect quality by investing extra time cleaning their harvesting, transfer and storage equipment.



10 Harvesting
At the proper stage of maturity, the seed crop is harvested by the seed grower.



11 Separate Seed Storage
To preserve varietal purity and provide a traceability record, Certified seed requires separate storage bins to preserve unique genetic identities.



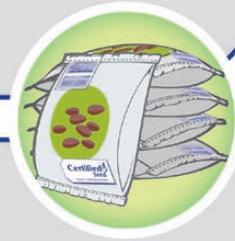
12 Testing and Grading
Federal Seeds Regulations require CFIA-accredited graders to verify that pedigreed seed is tested by CFIA-accredited labs for compliance with standards for germination and physical purity.



15 Food Processor
Food processors who demand grains and oilseeds grown from Certified seed get the assurance of starting with identity-verified ingredient characteristics to ensure consistent, high quality, premium products.



14 Commercial Farmer
Certified seed is planted by commercial farmers to produce their large commercial crops of grains and oilseeds.



13 Bagging and Tagging
Certified seed is packaged and labeled by variety name with an official blue Certified seed tag.



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Graf says the result of all this is that growers know that what they're putting into the ground is quality seed.

"It's inspected for purity, it's inspected for germination, it's inspected for weed seeds, and here in Alberta there's a zero tolerance for *Fusarium gramineum*," he says. "All of these factors make certified seed a value proposition for farmers."

Growers who choose to buy common seed or use farm-saved seed often do it to try to save money, but Graf says that strategy can be short-sighted. Not only is there the expense of cleaning farm-saved seed to consider, but the price for not using certified seed could be lower-performing crops and weed-infested fields in the future.



"If you want to keep on top of the game now in farming, you have to have the best of everything in terms of genetics."

—Ron Markert



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AC Morgan
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"If a farmer is growing several different varieties of the same crop and they're not cleaning their combine out and so on, over a number of years you will get some contamination that you may not even be aware of. The same goes for the amount of weeds," Graf says.

Markert agrees that certified seed provides excellent value for growers.

"I can certainly tell you that over the years that we've been growing certified seed, farmers are getting a bargain because of all the work that we have to do," Markert says. "There's a lot that goes into producing that pure crop. Everything has to be very meticulously controlled to make sure farmers get what we tell them they're going to get."

Markert says he's found that more and more growers, especially the larger ones, are recognizing the benefits of certified seed.

"They just realized that, 'you know, I could use bin run seed to save a buck but it's just not worth it. I might as well buy certified seed. Then I know I'm getting quality seed, and in return I'm going to get a better price in the end when I market my product.'"

Mark Halsall

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The Alberta Seed Guide New Varieties List is your heads up to what will soon be available in a field near you.

Some varieties may only be available in limited supply, so make sure you call your local representative for more information. The companies that were asked to supply information are responsible for any claims contained within the list. Always remember that variety performance may vary from region to region. Visit the seed.ab.ca website for company links.

abbreviations

DISEASE RESISTANCE

S - Susceptible
MS - Moderately Susceptible
MR - Moderate Resistance
R - Resistant
I - Intermediate
OTHER
HU - Heat Units
HM - HarvestMax (Pod Shatter Resistance trait)
CHU - Crop Heat Units
CPT - Canola Performance Trials
SCN - Soybean Cyst Nematode
WCC/RRC - Western Canada Canola/ Rapeseed Recommending Committee

TRAITS

CR - Clubroot Resistance
GENVT2P RIB - Genuity VT Double Pro RIB Complete
GENRR2Y - Genuity Roundup Ready 2 Yield
GENRR2X/SCN - Genuity® Roundup Ready 2 Xtend
HX1 - Herculex® I
LL - Liberty Link
RR - Roundup Ready
RR2 - Roundup Ready 2
RR2Y - Roundup Ready 2 Yield
SCL - Sclerotinia Resistance
SS - SmartStax
YGCB - YieldGard Corn Borer

WHEAT

CNHR - Canada Northern Hard Red
CPSR - Canada Prairie Spring Red
CWAD - Canada Western Amber Durum
CWHRW - Canada Western Hard Red Winter
CWRS - Canada Western Red Spring

ALFALFA

ALFALFA

Company	Variety Name/Type	Use (Hay or Grazing)	Winter Hardiness	Merit Tested in Canada (Y/N)	Highlights
 BrettYoung 1-800-665-5015 brettyoung.ca	Foothold Wide Deepset Crown Multifoliate	Hay and pasture	Excellent	Yes	Long lived variety developed with an oversized deepset crown Tolerates traffic well with a more spreading prostrate growth habit Good disease resistance and winter hardiness

ANNUAL RYEGRASS

ANNUAL RYEGRASS

Company	Variety Name/Type	Use (Hay or Grazing)	Winter Hardiness	Merit Tested in Canada (Y/N)	Highlights
 PICKSEED 1-800-265-3925 pickseed.com	Firkin Italian Tetraploid	Hay	N/A	Yes, Replicated Private Trials	High yielding Will not set seed in the year of sowing High disease resistance

BARLEY

BARLEY

Company/Logo	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
 CANTERRA SEEDS (204) 988-9750 canterra.com	AAC Connect Malt 2-Row	Equal to AC Metcalfe	111% of AC Metcalfe	MR to FHB MR to Stem Rust	High yield potential with plumper kernels Excellent standability due to its short strong straw Excellent malting quality - similar profile to AC Metcalfe
 SeCan 1-800-665-7333 secan.com	CDC Bow Malt 2-Row	1 day later than Metcalfe	109% AC Metcalfe	MS to FHB MR to Leaf Rust	Strongest straw of any two row malt Improved straw strength allows more intensive management Under malt market development

CANOLA

CANOLA

Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
 Bayer 1-888-283-6847 CropsScience.Bayer.ca	InVigor L255PC Pod Shatter Reduction and clubroot resistant* LL	One and a half days later than average of the checks	109% of the checks (InVigor 5440 and Pioneer 45H29) in 2016 WCC/RRC trials	Clubroot Resistance R for Blackleg	Featuring InVigor's® patented Pod Shatter Reduction technology plus clubroot resistance* Outstanding yield protection and exceptional harvest flexibility for all mid- to long-growing zones in Canada Excellent standability <i>*To predominant clubroot pathotypes identified in Canada at the time of registration</i>
 BrettYoung 1-800-665-5015 brettyoung.ca	6090 RR	+ 1.4 days	104% of checks 45H29/InVigor 5440	R-CE for Blackleg R of Clubroot 2, 3, 5, 6 & 8	Top performer for yield, standability and harvestability Industry leading blackleg performance Adapted to the mid and long season zones
 CANTERRA SEEDS (204) 988-9750 canterra.com	CS2400 Hybrid <i>napus</i> RR	Early	98% of 74-44	R-CX to Blackleg R to Fusarium Wit	New high yielding early season hybrid with unique multigenic blackleg resistance Medium height Multigenic blackleg resistance: R-CX
 Nexera 1-800-667-3852 nexeracnola.ca	1024 RR Roundup Ready	Mid-Long season	107% of 1012 RR	R to Clubroot R to Blackleg R to Fusarium Wit	High yielding variety with excellent early season vigour Clubroot resistant Excellent lodging resistance and standability

 <p>Dow AgroSciences 1-800-667-3852 nexeracanola.ca</p>	2026 RR Roundup Ready	Mid-Long season	107% of 1012 RR	R to Clubroot R to Blackleg R to Fusarium Wilt	High yielding variety with excellent early season vigour Clubroot resistant Excellent lodging resistance and standability
	2024 CL Clearfield	Mid-Long season	100% of 2020 CL	R to Blackleg R to Fusarium Wilt	Multi-genic blackleg resistance Pod shatter reduction. Can be considered for straight cut Medium height
	2026 CL Clearfield	Mid-Long season	107% of 2020 CL	R to Blackleg R to Fusarium Wilt	Multi-genic blackleg resistance Excellent early season vigour and standability Medium height
 <p>DuPont Pioneer Western Canada (306) 385-3001</p>	45CM36 Hybrid <i>napus</i> RR/HM/CR	Mid Maturity	1.9 bu/acre increase over Pioneer® hybrid 45H29 in 54 large- scale trials across Western Canada (2016-2017), with 72% Wins	R to Clubroot R to Blackleg R to Pod Shatter R to Fusarium Wilt	Contains a new source of clubroot resistance - resistant to variants of race 2 and 3 along with resistance to races 2, 3, 5, 6 and 8. Exceptional early growth and yield potential Stable and durable adult plant resistance to blackleg Very good lodging reduction score - can be used in swathing or straight cutting situations Available through Pioneer Hi-Bred sales representatives
	45H37 Hybrid <i>napus</i> RR/CR	Early-Mid Maturity	102% of Pioneer® hybrid 45H29 in 2016 DuPont Pioneer research trials across Western Canada	R to Clubroot R to Blackleg R to Fusarium Wilt	Early maturity canola hybrid with excellent early growth and built-in resistance to Clubroot races 2, 3, 5, 6 and 8 Stable and durable adult plant resistance to blackleg Very good lodging reduction score Earlier maturing than Pioneer® hybrid 45H29
	45M38 Hybrid <i>napus</i> RR/HM	Early-Mid Maturity	102.6% of Pioneer® hybrid 43E03 in 2016 large-scale, grower managed trials in Western Canada	R to Blackleg R to Pod Shatter R to Fusarium Wilt	Early maturity canola hybrid with good yield potential and harvest flexibility Superior blackleg resistance - stable and durable adult plant resistance to blackleg Very good lodging reduction score - can be used in swathing or straight cutting situations Earlier maturing than Pioneer® hybrid 45H29 Available through Pioneer Hi-Bred sales representatives
	D3156M Hybrid <i>napus</i> RR/HM	Mid Maturity	0.9 bu/acre increase over Pioneer® hy- brid 45H29 across 49 DuPont Pioneer research trials in Western Canada (2014-2016)	R to Blackleg R to Pod Shatter R to Fusarium Wilt	New canola hybrid with very good yield potential and harvest flexibility Very good lodging reduction score - can be used in swathing or straight cutting situations Stable and durable adult plant resistance to blackleg Available through select independent and coop retailers

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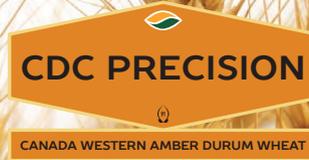
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CORN

Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
 <p>Elite/BrettYoung 1-800-665-5015 brettyoung.ca</p>	E4412 R GENVT2P RIB Dual Purpose hybrid	2100 CHU Grain 74 days rel maturity	Excellent	VT Double PRO RIB Complete Tolerant to Eyespot MT to Smut, Fusarium and Gibberella Ear Rot	Yield performance in an early hybrid Very good stalk strength in a medium short hybrid Very good drydown and bushel weight
 <p>Dow Seeds 1-800-265-7403 dowseeds.ca</p>	DS79C56 Grain	2300	Excellent	PowerCore Enlist	Tall early flowering hybrid with excellent grain yield and dual purpose silage/grazing utility Large flex type ear with good stalk quality and late season plant intactness Contains new PowerCore insect protection trait as well as tolerance to new Enlist weed control system
	DS81R65RA Grain	2400 CHU	Excellent	PowerCore RR2	New hybrid featuring the PowerCore trait which provides broad spectrum, above-ground insect pest control Consistent sized ears down the row with good tip fill, fast grain drydown and good grain quality Excellent emergence and early vigour make this hybrid well adapted to early planting
	TMF81H46 Silage	2400	Excellent	PowerCore Enlist	Large hybrid with dense canopy and top forage yield potential Strong agronomic package including excellent stalks and roots Contains new PowerCore insect protection trait as well as tolerance to new Enlist weed control system
	BMR90B94 Silage	2600	Excellent	Herculex Extra RR2 LL	Brown Mid Rib technology for exceptional forage digestability and NDFd scores Excellent standability and stress tolerance Solid plant agronomics will support high plant densities and narrow row width
 <p>DuPont Pioneer Western Canada (306) 385-3001</p>	P7227R GM Hybrid Food/Feed	2125 CHU	Excellent grain and silage corn yield potential	Goss's Wilt Resistance RR2	Excellent hybrid for grazing, grain or silage end uses Average Goss's Wilt resistance score Exceptional drought resistance score
	P7527AM™ GM Hybrid Food/Feed	2150 CHU	Excellent yield potential	Optimum® Acre-Max Traits Liberty Link RR2 YGCB HX1** Goss's Wilt Resistance	Early corn product with excellent drought tolerance and protection against corn borer Excellent hybrid for grazing, grain or silage end uses
	P8700AM™ GM Hybrid Food/Feed	2600 CHU	High silage yield potential	Optimum® Acre-Max Traits Liberty Link RR2 YGCB HX1** Goss's Wilt Resistance	New high yield potential product with very good Northern leaf blight tolerance and excellent drought tolerance Provides excellent silage yield and whole plant digestibility Good Goss's Wilt resistance score
 <p>Maizex Seeds Inc 1-877-682-1720 maizex.com</p>	MS 6902R RR2 Silage/Grazing	1950 CHU 69RM	Very Good	Roundup Ready Corn 2 (GT)	Ultra early with impressive ears Strong agronomics Increased silage palatability and increased starch availability
	MS 7420R RR2 Silage/Grazing	2300 CHU 74RM	Excellent	Roundup Ready Corn 2 (GT)	Increased starch availability Aggressive seedling vigour Robust plant stature
	MS 8088R Agrisure GT Silage	2400 CHU 80RM	Excellent	Agrisure GT	Large ears with soft kernel texture Proven genetics Allows for flexible harvest
 <p>PICKSEED 1-800-265-3925 pickseed.com</p>	PS 2333RR Grain/Silage	2275CHU 77RM	Very Good	RR2	Early flowering hybrid with a flint kernel grain type Uniform, consistent ear development down the row Medium-tall plant height
	PS 2420RR Grain/Silage	2300CHU 80RM	Very Good	RR2	Early flowering hybrid with a flint kernel grain type Impressive silage option with very good stay green Tall plant height

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- CDC Amarillo
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- CDC Ræzor
- Cooper
- Thunderbird
- AAC Carver
- AAC Barrhead

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 - AAC Connery
 - AAC Viewfield
 - CDC Landmark VB
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 - CDC Plentiful
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	 PRIDE SEEDS 1-800-265-5280 prideseed.com	A4477HM Conventional Hybrid Food/Feed	2150-2250 CHU	Excellent silage, grazing and high moisture yield	Outstanding health, standabil- ity and disease resistance, including Goss's Wilt	New introductory conventional hybrid for silage, high moisture and grazing usage. Very unique genetic product family. Features slow grain drying rate that preserves reliable and consistent feed quality at ideal moisture content. Ears are very girthy, exceptionally consistent ear size, producing packed heavy kernels on white cob
	 Thunder Seed Canada 1-888-6Thunder thunderseed.com	TH 6875 VT2P	2100 CHU	Excellent	GENVT2P RIB	Good early vigour Excellent drydown Recommended in medium and heavy soils

FLAX	FLAX					
	Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
	 SeCan 1-800-665-7333 secan.com	CDC Plava	-2 days CDC Bethune	104% of CDC Bethune		Unique combination of early maturity and high yield, for the first time a variety shows higher yield than CDC Bethune and with two days earlier maturity

OATS	OATS					
	Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
	 CANTERRA SEEDS (204) 988-9750 canterra.com	CS Camden Hullless	Similar to AC Morgan	108% of CDC Dancer	MR to Smut	Shorter than average Best suited for areas 2, 3 & 4 Highest straw yields over 3 years
	 SeCan 1-800-665-7333 secan.com	CDC Norseman Milling Oat	-3 days of AC Morgan	102% of AC Morgan	MR to Crown Rust	Height similar to Morgan Currently under market development

PEAS	PEAS					
	Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
	 CANTERRA SEEDS (204) 988-9750 canterra.com	AAC Carver Yellow Pea	Early	108% of CDC Meadow	Fair to Mycosphaerella Blight Fair to Fusarium Wilt	Excellent yield, early maturity Good seed coat breakage

SOYBEAN	SOYBEANS					
	Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
	 Elite/BrettYoung 1-800-665-5015 brettyoung.ca	Nocoma R2 GENNRR2Y	2250 CHU 000.8 RM	Excellent	Very good toler- ance to White Mould	Very early maturity with excellent yield Very good podding height Ideal for very early soybean areas of Western Canada

GLD AGVentures

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OATS:
CS Camden
AC Morgan

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Providing canola with complete nutrition from the moment the seed is sown throughout the entire growing season is the best way to improve the health and increase the yield of each plant. Proactively planning for the plants' needs ensures yields are optimized at the end of the season. With so much on the line, it makes sense to depend on the most advanced fertilizer product on the market. MicroEssentials® S15™ is proven to increase yields and provide balanced crop nutrition. In fact, research conducted from 2004–2013 found that MicroEssentials S15 increased yield by 1.5 bushels per acre compared to MAP + AS and 2.7 bushels per acre compared to MAP.

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S Sulfur

P Phosphorus

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Built on more than 10 years of research, The Mosaic Company's line of premium fertilizer products, including MicroEssentials S15, provides a balanced combination of nutrients. Each granule of MicroEssentials S15 (13-33-0-15S) contains nitrogen, phosphorus and sulfur to ensure the right balance of nutrients is available to the plant. The MicroEssentials-patented Fusion® technology provides the most efficient delivery of crop nutrients on the market, and can be part of your customized fertilizer plans.

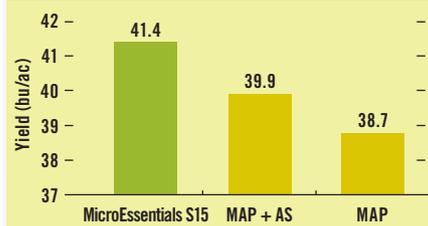
The Benefits of MicroEssentials S15

Each granule of MicroEssentials S15 is the same, so when it is applied, the nitrogen, phosphorus and sulfur are all delivered at a uniform rate across the field. This means each plant has the right level of key nutrients available to it. MicroEssentials S15 eliminates the risk of nutrient segregation, as can happen with traditional blends, and has demonstrated superior seed safety compared to conventional P and S fertilizers.

The unique technology used to develop MicroEssentials S15 also gives every granule an identical chemical makeup that promotes interaction between the different nutrients, which in turn encourages nutrient uptake. MicroEssentials S15 also balances the pH around each granule in the soil, allowing increased phosphorus uptake across diverse soil conditions.

Sulfur is another nutrient critical to strong canola yields, and is required throughout the entire growing season. However, sulfur is relatively immobile in the canola plant, so two types of sulfur are recommended

Canola Yield Response



MicroEssentials® S15™ outperformed MAP + AS by 1.5 bu/ac (3.6%) and MAP by 2.7 bu/ac (7%), on average, across all locations.

This data represents a summary of field studies conducted by university and/or third-party independent researchers in replicated small-plot trials completed from 2004–2013. Averages for each treatment are based on a balanced data set of 56 separate trials. Nutrient rates were balanced between treatments each year, with rates ranging from 33–40 lbs P₂O₅/ac.

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	<p>DuPont Pioneer Western Canada (306) 385-3001</p>	<p>P0007A43R Glyphosate Tolerant</p>	<p>2200 HU</p>	<p>Excellent yield potential</p>	<p>Built in (1a) phytophthora resistance</p>	<p>New ultra early soybean with excellent yield potential and strong field emergence Excellent harvest standability for ease of harvest Very good anti-shattering score</p>
<p>P000A87R Glyphosate Tolerant</p>	<p>P000A87R Glyphosate Tolerant</p>	<p>2275 HU</p>	<p>Excellent yield potential</p>	<p>Built in (1K) phytophthora resistance</p>	<p>New ultra early soybean with very good field emergence Excellent harvest standability for ease of harvest Good anti-shattering score Narrow canopy soybean</p>	
<p>P002A63R Glyphosate Tolerant</p>	<p>P002A63R Glyphosate Tolerant</p>	<p>2325 HU</p>	<p>3.4 bu/acre increase over Pioneer® variety P002T04R across 12 large-scale trials in Western Canada in 2016, with 83% Wins</p>	<p>Built in (1c) phytophthora resistance</p>	<p>New early soybean excellent field emergence and exceptional yield potential Narrow canopy soybean Excellent harvest standability for ease of harvest Very good anti-shattering score</p>	
<p>P002A19X Roundup Ready 2 Xtend®</p>	<p>P002A19X Roundup Ready 2 Xtend®</p>	<p>2325 HU</p>	<p>Excellent yield potential</p>	<p>Built in (1K) phytophthora resistance</p>	<p>New early maturity soybeans with RR2X technology for improved control of some key weeds Very good harvest standability for ease of harvest Provides an additional herbicide option for tough to kill weeds</p>	
<p>P005A27X Roundup Ready 2 Xtend®</p>	<p>P005A27X Roundup Ready 2 Xtend®</p>	<p>2400 HU</p>	<p>1.9 bu/acre increase over Pioneer® variety P006T78R across 5 large-scale trials in Western Canada (2016-2017), with 80% Wins</p>	<p>Built in (1c) phytophthora resistance Good White Mould resistance score</p>	<p>New variety with RR2X technology that offers excellent field emergence Strong harvest standability for ease of harvest Very good anti-shattering score Provides an additional herbicide option for tough to kill weeds</p>	
<p>P007A90R Glyphosate Tolerant</p>	<p>P007A90R Glyphosate Tolerant</p>	<p>2450 HU</p>	<p>2.6 bu/acre increase over Pioneer® variety P008T70R across 9 large-scale trials in Western Canada in 2016, with 78% Wins</p>	<p>Built in (1c) phytophthora resistance</p>	<p>New high yielding 007 maturity group soybean variety with excellent harvestability Excellent field emergence Taller plant with moderate canopy width</p>	
	<p>NorthStar Genetics (204) 262-2425 northstargenetics.com</p>	<p>NSC Leroy RR2Y</p>	<p>2225 HU</p>	<p>Very Good</p>	<p>Good Resistance to IDC and White Mould</p>	<p>Super ultra-early maturing variety Great for new growers in Alberta Tall and upright plant structure</p>
<p>NSC Watson RR2Y</p>	<p>NSC Watson RR2Y</p>	<p>2250 HU</p>	<p>Exceptional</p>	<p>Very Strong Resistance to IDC</p>	<p>Ultra ultra-early maturing variety Very strong early-season vigour Very good height due to extended lower internode, cluster pods for exceptional yield</p>	
<p>NSC StarCity RR2X</p>	<p>NSC StarCity RR2X</p>	<p>2275 HU</p>	<p>Excellent</p>	<p>Good Resistance to IDC and White Mould</p>	<p>Tall growth habit Dicamba tolerant trait to manage glyphosate resistance Ultra early maturity Does well in reduced tillage</p>	
	<p>PRIDE Seeds 1-800-265-5280 prideseed.com</p>	<p>PS 0044 XRN RR2Xtend</p>	<p>MG 00.4 2375 CHU</p>	<p>Outstanding</p>	<p>SCN, Phytophthora, IDC and White Mould Tolerance</p>	<p>New introductory PRIDE Seeds XRN Roundup Ready 2 Xtend™ soybean variety. This variety presents an opportunity for the early to mid MG 00 maturity market areas. Has very good stress tolerance, white mould resistance and semi tolerant IDC rating. Value added SCN and Phytophthora Rps 1k root rot protection. Features strong emergence and vigour Provides tolerance to dicamba and glyphosate herbicides</p>
	<p>Quarry Seed 1-888-274-9243 quarryseed.com</p>	<p>Dario R2X RR2Y Xtend</p>	<p>2250 CHU</p>	<p>Very Good</p>	<p>Great White Mould Tolerance</p>	<p>Very good yield potential for maturity One of the earliest varieties on the market Great vigour and bushing</p>
<p>Torro R2 RR2Y</p>	<p>Torro R2 RR2Y</p>	<p>2375 CHU</p>	<p>Excellent</p>	<p>Excellent IDC Tolerance</p>	<p>Excellent yield potential Above average standability Great pod clearance</p>	
<p>Dylano R2X RR2Y Xtend</p>	<p>Dylano R2X RR2Y Xtend</p>	<p>2425 CHU</p>	<p>Excellent</p>	<p>Great White Mould Tolerance</p>	<p>Extremely high yield potential Unsurpassed standability in all growing conditions Great adaptability to all row spacings</p>	
<p>Kosmo R2 RR2Y</p>	<p>Kosmo R2 RR2Y</p>	<p>2450 CHU</p>	<p>Very Good</p>	<p>Great IDC Tolerance</p>	<p>Very good vigour at the start of the season Very tall plant with great standability Highest pod clearance on the market</p>	



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	Domingo R2X RR2Y Xtend	2525 CHU	Excellent	Great White Mould Tolerance	Very good vigour at the start of the season Excellent yield potential Great bushing capacity to fill in a wide row
 SeCan 1-800-665-7333 secan.com	Footo R2	2400 HU	104% McLeod R2	Semi Tolerant to IDC	A medium maturing R2 soybean with a solid disease package
 Thunder Seed Canada 1-888-6Thunder thunderseed.com	TH 37004 R2Y	2375 CHU	Excellent	Above Average IDC Tolerance Excellent White Mould Tolerance	Excellent yield potential Good disease resistance SCN tolerance
	TH 88005 R2X	2425 CHU	High Yield Potential	Very Good White Mould Tolerance	Good standability Great pod clearance Fits in all soil types

WHEAT

WHEAT

Company	Variety Name/Type	Maturity	Yield	Disease/Pest Resistance	Highlights
 Alliance Seed 1-877-270-2890 allianceseed.com	AAC Redberry CWRS	-3 days than Carberry	115% of checks through registra- tion trials 4% higher yielding than Unity	FHB similar to Carberry Low FHB and DON levels in MCVET FHB trials	Semi-dwarf Excellent grading results Efficient harvest
	CDC Precision CWAD	Similar to Strongfield	116% of Strong- field Highest yielding line in all SK pro- duction zones	MR or R on all Rusts Reduced FDK incidence and severity*	Significant step forward in yield Strong standing Grade protection <i>*vs Strongfield throughout registration trials</i>
 CANTERRA SEEDS (204) 988-9750 canterra.com	AAC Cameron VB CWRS	-2 days AC Carberry	110% AC Carberry	I to FHB S to Stripe Rust MR to Leaf and Stem Rust	Very high yield potential Significantly better standability over current midge tolerant varieties Low DON accumulation
	AAC Concord CNHR	+0 days Lillian	120% Lillian	MS to FHB R to Rust	Significant yield improvement over current solid-stemmed varieties Excellent standability Best milling quality in its class
	AAC Congress CWAD	+0 days Strongfield	100% Strongfield	MS to FHB R to Rust	High yield potential with low DON accumulation Medium plant height High pigment concentration
	AAC Connery CWRS	-3 days AC Carberry	100% AC Carberry	MR to FHB R to Rust	The only awnless semi-dwarf in its class Strong straw Excellent milling and baking qualities
 FP Genetics Inc. 1-877-791-1045 fpgenetics.ca	AAC Viewfield CWRS	-1 day of Carberry	117% of AC Barrie	R to Stem Rust R to Stripe Rust I to FHB	Very high yield Good sprouting resistance Very good lodging resistance
	CDC Alloy CWAD	+1 day of Strongfield	113% of Strong- field	R to Leaf Rust R to Stripe Rust MS to FHB	Good disease package Very high yield Good standability
	CDC Landmark VB CWRS	-1 day of Carberry	113% of Carberry	Midge Tolerant R to Stem Rust I to FHB	Very good sprouting resistance Best lodging resistance of VBs Excellent yields
 SeCan 1-800-665-7333 secan.com	AAC Cabri CWAD	+1 day AC Strongfield	108% AC Strong- field	MS to FHB R to Stripe Rust	High yielding Solid stem for sawfly tolerance
	AAC Indus VB CWSWS	+3 days AC Andrew	106% AC Andrew	R to Stripe Rust MS to FHB Midge Tolerant	High yielding soft white wheat with midge tolerance
	KWS® Alderon CWSP	+7 days AC® Carberry	129% of AC® Carberry	R to Leaf Rust MR to Stripe and Stem Rusts	Very short, strong-strawed Exceptionally high grain yield Suited to long cool season growing regions
	KWS® Charing VB CWSP	+8 days AC® Carberry	129% of AC® Carberry	R to Leaf Rust MR to Stripe and Stem Rusts Midge Tolerant	Ideal for intensive management Strong straw Suited to long cool season growing regions
	KWS® Sparrow VB CWSP	+7 days AC® Carberry	132% of AC® Carberry	R to Leaf Rust MR to Stripe and Stem Rusts Midge Tolerant	Excellent lodging resistance Large kernels Suited to long cool season growing regions

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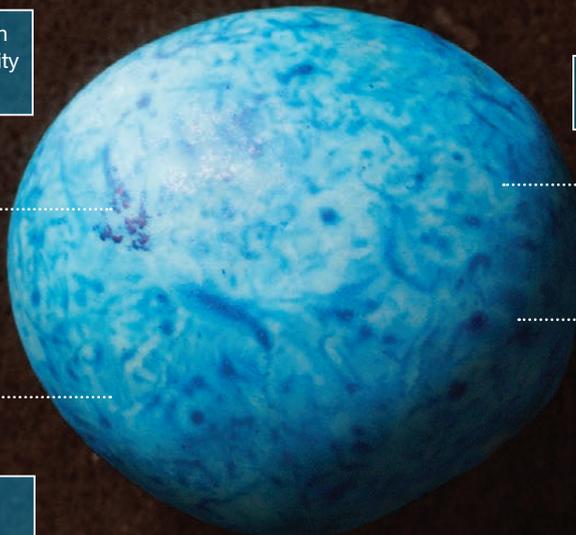
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Alberta Regional Variety Trials

Staying competitive in the industry means testing is crucial.

THE Alberta Regional Variety Testing program (RVT) is the most trusted source of variety information for producers in Alberta. Farmers need accurate, regional and the most current variety information to stay competitive.

The Alberta Regional Variety Advisory Committee (ARVAC), the official body that establishes policy for the variety-testing program, takes this responsibility very seriously, and constantly strives to present the data in the most appropriate and understandable manner.

According to Alex Fedko, RVT program coordinator and crop research technologist with Alberta Agriculture and Forestry, the goal of the RVT is to provide cereal, flax and pulse crop growers, and industry and extension specialists with scientifically valid crop variety performance information under different agro-climatic conditions. Data is published in the *Alberta Seed Guide* and in Alberta Agriculture's Varieties of Cereal and Oilseed Crops for Alberta pamphlet.

"There are many sources of variety information for producers," says Fedko. "However, this program is unique because the data comes from two independent sources: the co-op trials where new crop cultivars are tested before registration and data from post-registration (regional) trials. For example, the spring wheat co-op data that is reported in the Varieties of Cereal and Oilseed Crops for Alberta factsheets includes days to maturity, resistance to lodging, shattering and sprouting, and resistance to five different diseases. It is hard to find a third-party source of information that would have all the relevant material in one package.

"Free access to independent variety performance information helps producers

to select varieties that perform well in their commercial fields, and also this data is helping seed growers to choose a cultivar that will meet their customers' needs," adds Fedko.

Accurate Data

The RVT program is responsible for generating unbiased post-registration information for varieties of wheat, barley, oat, rye triticale, flax, field pea, chickpea, lentil, dry bean and faba bean.

Good field trials are required to generate reliable data, and several quality control steps are in place to achieve this. Fedko annually reviews test protocols with collaborators to detail the conduct of the trials and the expectations. All of the field trials are also inspected; cooperators receive 35 per cent of the plot payment for seeding, but unless the trial passes a July inspection, no further payment is made.

Crop specific coordinators, individuals who are experts in the crop, review the raw data prior to analysis. After the data are approved, statistical analysis is performed and measures of variability similar to those used in crop registration trials are used to determine the reliability of the trial prior to entry into the database. Finally, the crop specific coordinators review the tables prior to presentation before the committee, where they are discussed and ultimately approved for publication.

"We constantly strive to present the data in the most pertinent and understandable manner. As examples, in recent years we've changed the method of yield data presentation, used actual ratings to report disease resistance and added various columns of new information," notes Fedko. "And finally,

producers have asked us to enter a few more cultivars that they may be able to relate to more readily. The entries in the trials changes every year and it is made up of new varieties that producers are likely to see within the next two to three years.”

The inclusion of some older “benchmark” cultivars that are well known to producers started this season and Fedko says that should help producers make better-informed decisions. The selection of the benchmark varieties is based on the most popular varieties from data published in Yield Alberta. It means that wheat, barley and oat trials now have three to four checks instead of one.

Understanding Cereal Variety Data

When comparing varietal performance data, growers should find as much information as they can from various sources.

“The RVT tables done by independent cooperators is really just another set of data to compare the results producers are seeing from company data, variety registration data, crop insurance data or their own field trials,” says Fedko. “Consistency among

the different sources of data sets is the key. If a variety is repeatedly coming out in the top, the confidence that it will perform well goes up.”

However, in case there are substantial differences among those different data sets, it doesn’t necessarily mean a grower should stay away from a variety, but rather it should be the signal to do more research. In this case, digging deeper into background of those trials may help. Protocols used, weather conditions, or other growing season stresses may have caused the poorer performance at some locations.

Looking at other factors besides yield is important to get a complete picture. In many cases, the varieties included in the trials are top performing varieties from various programs, so the yield differences may be small. In this case, a variety that has a larger number of station years can increase confidence.

Other factors that may be as important as yield data are maturity, lodging and disease ratings. Growers have many options at their disposal, however, spending a lot of money on good genetics will not compensate for poor

agronomic management. Starting with good genetics is a foundation to have a successful crop, but it can’t make up for poor management down the road. It is still important to get adequate plant population established early, sufficient nutrients for an appropriate target yield, and then protect the yield potential from pests and harvest losses.

Funding

Conducting regional variety testing for numerous crops over the large agricultural area of Alberta is a huge undertaking. The RVT program is funded in four ways: industry funds via annual entry fees for lines in the regional trials; Government of Alberta contribution of the RVT coordinator; funding from parties with interest in regional crop performance data for Alberta producers; and in-kind contributions of time/seed/trial coordination/plot data from collaborators who do not receive monetary compensation. There are some differences in funding between the cereal and pulse crops.

According to Fedko, in 2017, the cereal and flax RVT program under ARVAC

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expects to generate \$76,700 through a \$1,300 annual testing fee charged for each variety being tested, excluding checks. In addition, a major contribution from the Alberta Wheat Commission along with funding from the Alberta Barley Commission, the Oat Growers, the Alberta Seed Growers and the Alberta Seed Processors (half goes towards ARVAC) helps to defray modest expenses to deliver the program.

"This revenue is used to fund regional variety trials at nine to 11 core sites in Alberta," notes Fedko. "A few additional unfunded sites are also grown by interested parties, largely for extension purposes, and those data are available to us, provided that all quality controls are met."

Fedko adds that in recent years, it has been generally accepted that \$50 per plot is required to defray the direct costs of growing small plot variety trials. "We are not quite there yet, however. Thanks to the very generous contribution from the Alberta Wheat Commission, we are much closer to the goal than two years ago."

The pulse crops regional variety-testing program has been sustainable thanks to



The pulse crops regional variety-testing program has been sustainable thanks to \$100,000 funding through the Growing Forward II program.

\$100,000 funding through the Growing Forward II program. The funding is a contribution from the industry and Alberta Pulse Growers, and is matched on a 3:1 basis by the federal government.

"Finally, the funds we receive are solely for the benefit of Alberta producers and do not leave the province," says Fedko. "Moreover, of the \$278,000 collected last year for the RVTs, less than \$15,000

or five per cent was used for seed setup, shipping, administering the funds and maintaining the crop information system database."

At the end of the day, industry contributions, including those from Alberta Barley, Alberta Oat, Alberta Seed Growers and Alberta Seed Processors are priceless, contributing to the inherent success of the RVTs. **Janet Kanters**

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Taxation Stress Builds

Rebecca Sanford explains recent taxation changes that affect Alberta farmers.

TAXATION changes in Alberta and across Canada continue to cause confusion and stress with farmers. To help make sense of it all, *Alberta Seed Guide* turned to Rebecca Sanford, CPA, CA, a senior manager and tax specialist with KPMG in Lethbridge. Rebecca works with farmers and their families on taxation matters, including advising them on personal and corporate tax, and estate succession and business planning.

Alberta Seed Guide: How has taxation for farmers changed over the past three years?

Rebecca Sanford: A lot has changed for farmers over the past three years. Almost every year, the federal government adjusts the personal income tax brackets slightly. When I think of big changes, however, I immediately think of 2015. That year, the Government of Alberta decided to implement a graduated personal tax rate for all Albertans. Before this was introduced, a farmer who reported his/her income as a proprietor or a partner would have a combined federal and provincial tax rate of 39 per cent. In 2017, this income tax rate has increased to 48 per cent. Likewise an increase in personal tax rates on non-eligible dividends paid from a privately owned farm corporation increased from 30.8 per cent in 2015 to 41.2 per cent in 2017.

Additionally, Alberta's farmers have seen an increase in the personal tax they pay when they sell assets like farmland and realize a capital gain on the sale.



Rebecca Sanford a senior manager and tax specialist with KPMG in Lethbridge.

“Alberta’s farmers have seen an increase in the personal tax they pay when they sell assets like farmland and realize a capital gain on the sale.”

—Rebecca Sanford

While the capital gains deduction was increased in 2015 from \$813,600 to \$1 million, if a farmer owns more than \$1 million in farmland, he or she will need to pay tax on the portion of the capital gain that is not sheltered by his/her capital gains deduction. In 2015, a farmer with a capital gain of \$304,000 or more could expect to pay federal tax and provincial tax at 20.13 per cent. In 2017, the same \$304,000 capital gain would be subject to tax at 24 per cent. This is a 3.87 per cent increase over the past three years.

On the corporate side, in 2015 the federal government stated it would decrease the small business tax rates from 11 per cent to nine per cent by 2019. The federal government has worked towards doing this, with a decrease to 10.5 per cent effective Jan. 1, 2016, and further decreases proposed as per Finance’s Oct. 16, 2017 press release (10 per cent effective Jan. 1, 2018, and nine per cent effective Jan. 1, 2019). Additionally, the provincial tax rate for small businesses has been decreased from three per cent to two per cent effective Jan. 1, 2017. This means that farmers are now paying 12.5 per cent on the first \$500,000 of income their corporations earn. For farm corporations that earn \$500,001 or more, the combined corporate tax rate has increased from 26 per cent in 2015 to 27 per cent in 2017.

The association rules, which outline who has to share the \$500,000 small business deduction, were also revised to make it harder for related farming corporations to each individually access

the small business deduction. The rules relating to transferring assets between siblings and their corporations were also revised. This means family farms corporations need to make sure they have accurate advice when moving assets such as farmland between companies. Being offside on these rules could result in significant tax implications.

The taxation to farmers who own eligible capital property (ECP), such as water rights and quota, went through a dramatic shift effective Jan. 1, 2017. This resulted in new rules farmers are subject to when selling or purchasing ECP, some transitional rules for farmers who purchased ECP on or before Dec. 31, 2016 and sold it after Jan. 1, 2017, and a new regime for deducting ECP expenses against farm income.

Finally, although it wasn't a tax change, I feel that Bill 6 was another big change for farmers. In 2017, the farming industry rate per \$100 of insurable earnings ranges from \$1.70 to \$2.97.

ASG: Why are these changes significant and how does it affect farmers in the province?

RS: Obviously, these changes are significant to Alberta's farmers because they have resulted in higher personal and corporate tax rates. Taxes aside, these changes could also impact a farmer's decision on whether to incorporate his/her operations, purchase new farmland using a corporation or own it personally, or transfer the farm down to the next generation or sell it to the neighbour.

Furthermore, some of the changes, such as the Worker's Compensation Board (WCB) changes, put additional filing and compliance responsibilities on farmers. Uncertainty regarding what your responsibilities are if one of your employees is hurt while on the job could be detrimental to a farming operation.

ASG: What can farmers do to mitigate these changes?

RS: Education is key to manoeuvring through change. Talk to your adviser any time there is a change that you think could impact your farming operations. If your adviser does not know how the change could impact you and your operations or cannot offer a solution on how to respond to things, get a second

opinion. There is no harm in having a discussion with another adviser to understand what has changed, how it could impact you and your operations, and most importantly, provide you with some comfort over how you are managing the change.

ASG: Can commodity groups play a part in helping farmers work through ongoing taxation changes?

RS: Absolutely! Commodity groups work for farmers by lobbying and advocating on their behalf and making the various

levels of government aware of how change impacts their members. Many commodity groups were members of committees who worked to show the Alberta government how Bill 6 would impact the farming communities. Currently, almost every commodity group I can think of has put forth submissions to the Department of Finance regarding the July 18, 2017 proposed tax changes. Commodity groups are also a great way of putting farmers in touch with the experts who can offer insight into the changes and provide practical solutions on how to manage the change.



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“Education is key to manoeuvring through change. Talk to your adviser any time there is a change that you think could impact your farming operations.”

—Rebecca Sanford

ASG: What does the future look like for further changes? What is going to impact farmers in the immediate future?

RS: There are a number of changes that the Minister of Finance has put forth that could impact the future taxation of farmers, including:

- The elimination of deferred grain cash tickets,
- Restricting who can use their capital gains deduction on the disposal of qualified farm property if the gain is subject to the new TOSI rules, and
- The corporate taxation of passive income in excess of \$50,000 (i.e.

rental income from farmland, seismic payments, and oil and gas).

It should be noted that all of the above are only proposals put forward by the Minister of Finance. In mid-October, the Minister had issued three separate press releases stating that some of the changes they proposed on July 18, 2017 are now being adjusted or removed. But as of this writing, no further draft legislation has been released. That makes it very hard to really understand what Finance has changed.

The farming community needs to be aware of how each item could impact their current operations and their

future plans. It is important for every farmer, regardless of whether they farm in a proprietorship, a partnership, a joint venture or a corporation, to speak with an adviser who is well-versed in these areas and who can help develop a plan on how to address these potential changes.

Similarly, the proposed changes in Bill 17, which will be effective Jan. 1, 2018, will force farmers to consider things like minimum wage, vacation pay and statutory holidays. As with the proposed income tax changes, discussing the impact of Bill 17 on your operations with your adviser will help you understand what you need to have in place by the New Year.



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Industry Boards Give Farmers a Voice

Serving on a board has many rewards.

AS you finish up your busy growing season, the last thing on your mind might be an industry board meeting. But as harvest comes to an end, farmers around Alberta are taking up the reins of boards across industries.

Why sit on a board? For growers like Kevin Auch, it's a matter of recognizing the potential in his sector and then working to see just how much progress can be made.

"We are one of the newer boards in the province and we have gone from nothing to a powerhouse organization trusted with a fairly large budget to help out our farmers," says Auch, chair of the Alberta Wheat Commission. "Our role is really twofold – the first is to advocate for wheat growers, but the biggest role we have is investing in research to help solve some of the problems Alberta wheat growers face."

The Alberta Wheat Commission was created around the same time the Canadian Wheat Board single desk was dismantled, as growers in the province voiced a desire to see some of the work of the board continue. Auch joined to become an active participant in the discussion of his industry, and is serving as chair for the remainder of his second three-year term.

"The more effort you put into a board, the more you are able to accomplish and the more the industry advances," he says. "I know a lot more about the industry than I did even a few years ago. Without industry boards, issues wouldn't be dealt with in terms of market development and research at the grower level. We are also a credible voice to the customer, reassuring them that we are selling high quality, healthy product."

Auch farms 5,000 acres south of Vulcan. He is a strong advocate for



Kevin Auch, chairman, Alberta Wheat Commission



Ward Oatway, president, Alberta Seed Growers

strict crop rotations, as he says crop diversity is one of the biggest ways to manage disease and to keep agriculture sustainable.

"I want to make sure wheat is profitable for the grower and desirable for the consumer," he says. "As a member of the board, I can drive some of the research into solving disease issues to make sure wheat remains a staple crop in Canada."

Building a Board

Currently at the end of his term as chairman of the Alberta Canola Producers Commission (ACPC), Greg Sears initially joined his board in 2012 as a way to stay involved in the industry and to share his expertise as both a farmer and an engineer. He says board involvement is an important way to help the agriculture community through service.

"It is very gratifying to be able to advance the industry of farming," he says. "As numbers go, we are a small population and industry boards help give us a louder voice. On a personal level, board participation is an excellent way to network with other farmers to learn more about what practices work for them."

The ACPC is made up of 12 regions and each region has a director. Usually it's another member who encourages a colleague to participate, but Sears says he'd like to see even more farmers put their name forward for nomination. On his board, potential members need the signature of 10 eligible producers to become an official nominee. If there is more than one nominee in each region, elections are held within the region.

"The biggest concern other farmers communicate to us before signing on is the time commitment, but you can choose your level of involvement to a certain extent," he says. "We have four board meetings a year, and there are also several industry and government events that some of our board will attend each year. We try to spread the work load around but the time commitment can range from 12 to 30 days per year – depending on the member's interests."

Sears farms 2,400 acres north of Grande Prairie and appreciates that board participation allows him to share his experiences and advocate for issues

important to his region's farmers. He says the ACPC board has directors who farm 1,000 acres, and those who farm 60,000 acres. He prefers to see both experienced and younger producers on a board in order to have a mix of voices, and to share different perspectives.

Building an Industry Network

As the son of a seed grower, Ward Oatway grew up watching his father attend board meetings. In his youth, his summer family holiday was attending the national meetings. It was at one of those national meetings later in his career where Oatway was approached by the Alberta Seed Growers to join the board – and knowing what they had accomplished in the past helped entice him to put himself forward as a nominee.

“It was initially a bit of nostalgia that led me to the board, but today I see just how many people are involved to make sure that our industry is being heard,” he says. “For me, working with seed growers across the country, not just around the

province, gives me the kind of insight into what different growers face, and also into how solutions in one part of the country can help in Alberta.”

This is Oatway's first year as the president of the Alberta Seed Growers and he says that while there has been a steep learning curve, having a supportive past president has helped him in his role.

“Our past president has helped me to prioritize and provided guidance on the direction he took the board while allowing me to find my way. It's a very democratic process, so it's important to make sure you are representing growers in the way they have asked.”

He says boards can also step in when the roles of different provincial and federal departments change suddenly. He points to when the Canadian Food Inspection Agency eliminated their crop inspectors. Several agricultural boards, including the Alberta Seed Growers, stepped up to make sure the new inspection process was in place so that the shift to third party inspectors went seamlessly.

“What was a big change that could have caused panic instead transitioned easily in part because of the involvement of various boards,” says Oatway. “It seems like policy continues to change quickly, in terms of breeding and technology and global markets. We make sure our growers' interests are being heard in those policy discussions.

Oatway grows 1,300 acres of pedigreed pea, barley and wheat seed along with commercial canola on his farm near Clive. He says he wants to see more people volunteer to become members of boards.

“I think if people ask to become members they have a really good mindset coming into the process,” he says. “Ours is a very young board but we need a mix of experiences as people have more or less time, based on where they are in their lives. Board experience is worth the time it takes to become fully invested in your industry, and to help make a difference going forward.” **Jennifer Barber**

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Alberta and British Columbia Pedigreed Seed Growers Directory of Varieties Produced in 2017

Grower listings were prepared by the Canadian Seed Growers' Association for varieties eligible for sale in Canada and crops issued certificates at the time of publication. Breeding institution and distributor listings were prepared by the publisher. CSGA assumes no responsibility for errors or omissions in any listings. Pedigreed class code is listed after the grower's phone number. S=Select; F=Foundation; R=Registered; C=Certified; BI=Breeding Institution; Dist=Canadian Distributor(s)

NOTE: Varieties denoted with a * are carryover pedigreed seed.

BARLEY

AAC CONNECT ☉ Pending

BI: AAFC, Dist: Canterra Seeds

Cross, Douglas / Westlock / AB / (780) 349-2587
 Haney Farms Ltd. / Picture Butte / AB / (403) 738-4517
 Penwest Seeds / Three Hills / AB / (403) 443-2577
 Rasmussen, Brian D. & Joel Trevor / Standard / AB / (403) 644-3800
 Richards, Cliff & Dan / Sexsmith / AB / (780) 766-2266
 Sendziak, Don P. & Stephen / Edmonton / AB / (780) 434-1322
 Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358

AAC SYNERGY ☉

BI: AAFC, Dist: Syngenta Canada

Eliason, Bruce W. / Wrentham / AB / (403) 222-2258
 Ellis, Brian / Olds / AB / (403) 556-2890
 Gatez, Blaine Gerald / Crossfield / AB / (403) 946-3994
 Harbin, Clifford T. & Bruce C. / Rivercourse / AB / (780) 745-2268
 Holtman, Scott / Taber / AB / (403) 634-4525
 Lindholm Seed Farm / New Norway / AB / (780) 352-3240
 Markert Seeds Ltd. / Vulcan / AB / (403) 485-6708
 Strathmore Seed Cleaning Plant / Strathmore / AB / (403) 934-3421
 Willms Seeds Ltd. / Grassy Lake / AB / (403) 655-2434

AC MAJOR ☉

BI: AAFC, Dist: Alliance Seed

Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696

AC METCALFE ☉

BI: AAFC (Brandon), Dist: SeCan Members

Chin Ridge Seeds Ltd. / Taber / AB / (403) 223-3900
 Cornish, Bob / Airdrie / AB / (403) 948-3070
 Dueck, Ralph E. & Brent / Olds / AB / (403) 556-2602
 Eliason, Bruce W. / Wrentham / AB / (403) 222-2258
 Foster's Seed & Feed Limited / Beaverlodge / AB / (780) 354-2107
 Lefsrud, Kevin J. & Edmund J. / Viking / AB / (780) 336-2500
 Limoges, Richard / McLennan / AB / (780) 324-2335
 Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696
 McNelly, Bevin / Clyde / AB / (780) 348-5749
 Murray, Bruce & Wesley / Lethbridge / AB / (403) 327-9389
 Ohrn, Norman / Thorsby / AB / (780) 985-2263
 Penwest Seeds / Three Hills / AB / (403) 443-2577
 Stamp Seeds / Enchant / AB / (403) 739-2233
 Strain, Arthur George / Foremost / AB / (403) 867-2227
 Svean, Alan Carl & Scott / Rivercourse / AB / (780) 745-2578
 Webber, Curtis / Parkland County / AB / (780) 963-6897

AC RANGER

BI: AAFC (Brandon), Dist: FP Genetics

Airth, Jock & Linda / Brooks / AB / (403) 362-4372

AC Rosser

BI: AAFC, Dist: SeCan Members

Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617

AMISK ☉

BI: FCDC (Lacombe), Dist: SeCan Members

Beamish, Dale / Jarvie / AB / (780) 954-2166
 Benci, Dennis / Carmangay / AB / (403) 643-2294
 Jones, Greg Thomas & Tristan / Ponoka / AB / (403) 783-6495
 Kittle, James W. & Andrew / Viking / AB / (780) 336-2583
 Plante, Jacques / St. Paul / AB / (780) 645-4604
 Smith, Gary W. / Eckville / AB / (403) 746-5878
 Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617
 Webber, Curtis / Parkland County / AB / (780) 963-6897
 Wildeman, Russell / Clive / AB / (403) 470-8528

BENTLEY ☉

BI: FCDC (Lacombe), Dist: Canterra Seeds

Penwest Seeds / Three Hills / AB / (403) 443-2577
 Rasmussen, Brian D. & Joel Trevor / Standard / AB / (403) 644-3800
 Sendziak, Don P. & Stephen / Edmonton / AB / (780) 434-1322

Sendziak, Don P. & Stephen / Edmonton / AB / (780) 434-1322
 Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358

CANMORE ☉

BI: FCDC (Lacombe), Dist: Canterra Seeds

Benci, Dennis / Carmangay / AB / (403) 643-2294
 Haney Farms Ltd. / Picture Butte / AB / (403) 738-4517
 King Seed Farm (Webb, David G.) / Three Hills / AB / (403) 443-7330
 Lindholm Seed Farm / New Norway / AB / (780) 352-3240
 Penwest Seeds / Three Hills / AB / (403) 443-2577
 Stamp Seeds / Enchant / AB / (403) 739-2233
 Rasmussen, Brian D. & Joel Trevor / Standard / AB / (403) 644-3800
 Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228
 Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358

CDC ASCENT ☉ Pending

BI: CDC, Dist: SeCan Members

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CDC AUSTENSON ☉

BI: CDC, Dist: SeCan Members

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 Dallas, Bradley C. / Bowden / AB / (403) 224-2162
 Dyck, Heinz W., Colin, Alan & Kelton / Rosemary / AB / (403) 378-3321
 Fabian, Patrick V. / Tilley / AB / (403) 377-2000
 Feenstra, Lloyd / Barons / AB / (403) 757-3737
 Galloway Seeds Ltd. / Fort Saskatchewan / AB / (780) 998-3036
 Gibson, Donald / Sangudo / AB / (780) 785-2214
 Hadland, Edward / Baldonnel / BC / (250) 793-9746
 Hallett's Hay and Seed / Carstairs / AB / (403) 337-3072
 Hoff, Peter Edward / Gleichen / AB / (403) 348-2140
 Huvenaars, Carl / Hays / AB / (403) 725-2213
 Jones, Greg Thomas & Tristan / Ponoka / AB / (403) 783-6495
 Kemp, Richard L. / Red Deer County / AB / (403) 227-4836
 Limoges, Richard / McLennan / AB / (780) 324-2335
 Markert Seeds Ltd. / Vulcan / AB / (403) 485-6708
 Massey, Derwin & Kirby / Stettler / AB / (403) 883-2503
 McDonald, Gerald / Co. Of Grande Prairie #1 / AB / (780) 538-3868
 McNelly, Bevin / Clyde / AB / (780) 348-5749
 Meinczinger, Matthew Jr. / Busby / AB / (780) 349-2456
 Mueller, Richard J., R.R. & Rosemary / Barrhead / AB / (780) 674-6713
 Nemetz, Charlie, Jerritt & Lewis / Stettler / AB / (403) 742-0436
 Niemela, Terrance & Tracy / Sylvan Lake / AB / (403) 746-2645
 Oatway's Seed Farm / Clive / AB / (403) 784-3001
 Pare, Raymond A. / Wainwright / AB / (780) 842-2073
 Selte, Donald / Vermilion / AB / (780) 853-2484
 Shultz, Shawn / Didsbury / AB / (403) 335-3694
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 Knight, William, Craig & Brian / Tees / AB / (403) 784-3633
 Kopjar, Gerald M. / Rowley / AB / (403) 368-2409
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Macyk, Tim / Radway / AB / (780) 699-4073	C			Jones, Greg Thomas & Tristan / Ponoka / AB / (403) 783-6495	S		
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CDC TREY BI: CDC, Dist: FP Genetics Wood, Robert, Patricia & Marshall / Bowden / AB / (403) 588-3548	R C	
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GADSBY BI: FCDC (Lacombe), Dist: SeCan Members Harris, William P., Linda, Thomas & A. / Beaverlodge / AB / (780) 354-2823 Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617 Webber, Curtis / Parkland County / AB / (780) 963-6897	S F R C*	C C
HARRINGTON BI: U of Saskatchewan, Dist: SeCan Members Murray, Bruce & Wesley / Lethbridge / AB / (403) 327-9389	R	

LEGACY BI: Busch Ag Res., Dist: FP Genetics Laliberté, Adam & Vos, Henry / Fairview / AB / (780) 835-5286 Wood, Robert, Patricia & Marshall / Bowden / AB / (403) 588-3548	S S	F	R	C
LOWE Pending BI: FCDC (Lacombe), Dist: SeCan Members Eliason, Bruce W. / Wrentham / AB / (403) 222-2258 Mueller, Darcy / Three Hills / AB / (403) 820-4115	S			C
SUNDRE BI: FCDC (Lacombe), Dist: Mastin Seeds Card, Gordon B. & Rhett / Magrath / AB / (403) 758-3444 Feenstra, Lloyd / Barons / AB / (403) 757-3737 Hallett's Hay and Seed / Carstairs / AB / (403) 337-3072 Jones, Danny / Beaverlodge / AB / (780) 354-8089 Klassen, Ken / Rosemary / AB / (403) 378-4408 Lyster, Norman / Stettler / AB / (403) 742-4456 Mastin, Robert B. / Sundre / AB / (403) 556-2609 Richard, Gerald / Spirit River / AB / (780) 864-2339				C C C R R C C C
TROCHU BI: FCDC (Lacombe), Dist: SeCan Members Webber, Curtis / Parkland County / AB / (780) 963-6897				C
OATS				
	S	F	R	C
AC JUNIPER BI: AAFC, Dist: Mastin Seeds Tolway, Wilfred / Clairmont / AB / (780) 567-2422			R	
AC MORGAN BI: AAFC (Lacombe), Dist: SeCan Members Hill, Gordon P. & Blair / Taylor / BC / (250) 789-3469 Jonk, Nicholas / Westlock / AB / (780) 349-5458 Kemp, Richard L. / Red Deer County / AB / (403) 227-4836 Limoges, Daniel / Girouxville / AB / (780) 833-1287 Meinczinger, Matthew Jr. / Busby / AB / (780) 349-2456 Miller, Brian / Barrhead / AB / (780) 674-5001 Mueller, Richard J., R.R. & Rosemary / Barrhead / AB / (780) 674-6713 Selte, Donald / Vermilion / AB / (780) 853-2484 Smith, Gary W. / Eckville / AB / (403) 746-5878 Victoor, Rene & Jamie / Sturgeon County / AB / (780) 459-3253 Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617 Webber, Curtis / Parkland County / AB / (780) 963-6897 Wildeman, Russell / Clive / AB / (403) 470-8528				C R C C C R R C S F R C C C*
AC MUSTANG BI: AAFC (Lacombe), Dist: Mastin Seeds Feenstra, Lloyd / Barons / AB / (403) 757-3737 Hadland, Edward / Baldonnel / BC / (250) 793-9746 Hallett's Hay and Seed / Carstairs / AB / (403) 337-3072 King Seed Farm (Webb, David G.) / Three Hills / AB / (403) 443-7330 Mastin, Robert B. / Sundre / AB / (403) 556-2609 Tolway, Wilfred / Clairmont / AB / (780) 567-2422				C C C C S F S
CDC ARBOR Pending BI: CDC, Dist: FP Genetics Laliberté, Adam & Vos, Henry / Fairview / AB / (780) 835-5286	S			
CDC BALER BI: CDC, Dist: FP Genetics Sand, Ron W. & David R. / McLaughlin / AB / (780) 745-2251 Wood, Robert, Patricia & Marshall / Bowden / AB / (403) 588-3548				R R C

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- Jonk, Nicholas / Westlock / AB / (780) 349-5458
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CDC NASSER

BI: CDC, Dist: N/A

- Davidson, E. Daryl & Dean / Kitscoty / AB / (780) 846-2456
- Repka, Gerald / Willingdon / AB / (780) 636-3458
- Sand, Ron W. & David R. / McLaughlin / AB / (780) 745-2251

CDC SEABISCUIT

BI: CDC, Dist: Canterra Seeds

- Sendziak, Don P. & Stephen / Edmonton / AB / (780) 434-1322

CS CAMDEN

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- Fairview Seed Cleaning Coop / Fairview / AB / (780) 835-2478
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- Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696
- Penwest Seeds / Three Hills / AB / (403) 443-2577
- Plante, Jacques / St. Paul / AB / (780) 645-4604
- Sekulic, Nick / Rycroft / AB / (780) 814-2849
- Sendziak, Don P. & Stephen / Edmonton / AB / (780) 434-1322
- True Seeds / Redwater / AB / (780) 777-5885

Murphy

BI: AAFC, Dist: SeCan Members

- Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617

ORE3542M

BI: Oat Advantage, Dist: SeCan Members

- Chin Ridge Seeds Ltd. / Taber / AB / (403) 223-3900
- Hill, Gordon P. & Blair / Taylor / BC / (250) 789-3469
- Jones, Greg Thomas & Tristan / Ponoka / AB / (403) 783-6495
- Ohrn, Norman / Thorsby / AB / (780) 985-2263
- Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617

WALDERN

BI: AAFC, Dist: SeCan Members

- Richard, Gerald / Spirit River / AB / (780) 864-2339

RYE

BRASETTO, KWS BONO & KWS GATANO

BI: KWS, Dist: FP Genetics

- FP Genetics / Regina / SK / 1-877-791-1045

GUTTINO

BI: KWS, Dist: SeedNet

- Stamp Seeds / Enchant / AB / (403) 739-2233
- Van Roessel, William & Jean / Bow Island / AB / (403) 545-6018
- Willms Seeds Ltd. / Grassy Lake / AB / (403) 655-2434
- Witdouck, Dale / Iron Springs / AB / (403) 738-4395

PRIMA

BI: AAFC (Swift Current), Dist: SeCan Members

- Stamp Seeds / Enchant / AB / (403) 739-2233

TRITICALE - SPRING

AAC DELIGHT Pending

BI: AAFC (Lethbridge), Dist: N/A

- Fabian, Patrick V. / Tilley / AB / (403) 377-2000

BUNKER

BI: FCDC (Lacombe), Dist: FP Genetics

- Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358

PRONGHORN

BI: FCDC (Lacombe), Dist: N/A

- Mans, John / Nobleford / AB / (403) 824-3585

TAZA

BI: FCDC (Lacombe), Dist: Solick Seeds

- Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358

TYNDAL

BI: FCDC (Lacombe), Dist: SeCan Members

- Card, Gordon B. & Rhett / Magrath / AB / (403) 758-3444

TRITICALE - WINTER

BOBCAT

BI: FCDC (Lacombe), Dist: N/A

- Fabian, Patrick V. / Tilley / AB / (403) 377-2000

METZGER

BI: FCDC (Lacombe), Dist: Haney Farms Ltd.

- Corns, Bryan / Taber / AB / (403) 223-1614

PIKA

BI: FCDC (Lacombe), Dist: N/A

- Kiffiak, Nathan J. & Anderson, Tim / Foremost / AB / (403) 867-2338

WHEAT - DURUM

AAC CABRI

BI: AAFC, Dist: SeCan Members

- Willms Seeds Ltd. / Grassy Lake / AB / (403) 655-2434

AAC CONGRESS Pending

BI: AAFC (Swift Current), Dist: Canterra Seeds

- Haney Farms Ltd. / Picture Butte / AB / (403) 738-4517
- Huvenaars, Carl / Hays / AB / (403) 725-2213
- Kiffiak, Nathan J. & Anderson, Tim / Foremost / AB / (403) 867-2338
- Mercer, Lloyd A., Connie, Ryan & Bolstad, Leslie / Lethbridge / AB / (403) 327-9736
- Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228

AAC RAYMORE

BI: AAFC (Swift Current), Dist: SeCan Members

- Huvenaars, Carl / Hays / AB / (403) 725-2213

AAC SPITFIRE

BI: AAFC (Swift Current), Dist: SeCan Members

- Benci, Dennis / Carmangay / AB / (403) 643-2294
- Brummelhuis, Mitchell & Mack / Vauxhall / AB / (403) 654-7515
- Chin Ridge Seeds Ltd. / Taber / AB / (403) 223-3900
- Crooymans, John, Joseph & Andrew / Bow Island / AB / (403) 545-6333
- Eliason, Bruce W. / Wrentham / AB / (403) 222-2258
- Haney Farms Ltd. / Picture Butte / AB / (403) 738-4517
- Hierath, Michael Wayne & Philip / Milk River / AB / (403) 647-2347
- Kiffiak, Nathan J. & Anderson, Tim / Foremost / AB / (403) 867-2338
- Klassen, Ken / Rosemary / AB / (403) 378-4408
- Penwest Seeds / Three Hills / AB / (403) 443-2577
- Sim, Darwin & Derek / Ponoka / AB / (780) 372-2111
- Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228
- Stamp Seeds / Enchant / AB / (403) 739-2233
- Van Roessel, William & Jean / Bow Island / AB / (403) 545-6018
- Willms Seeds Ltd. / Grassy Lake / AB / (403) 655-2434
- Witdouck, Dale / Iron Springs / AB / (403) 738-4395

AAC SUCCEED VB

BI: AAFC (Swift Current), Dist: FP Genetics

- Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228
- Stamp Seeds / Enchant / AB / (403) 739-2233

AC NAVIGATOR

BI: AAFC (Swift Current), Dist: N/A

- Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696

CDC ALLOY

BI: CDC, Dist: FP Genetics

- Benci, Dennis / Carmangay / AB / (403) 643-2294
- Geldreich, Dave / Bow Island / AB / (403) 545-2222
- Quattro Ventures Inc. / Bow Island / AB / (403) 545-2222
- Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228

CDC FORTITUDE

BI: CDC, Dist: CPS (Canada) Inc.

- Anderson, Stephen F. / Scandia / AB / (403) 362-5886

CDC PRECISION

BI: CDC, Dist: Alliance Seed

- Crooymans, John, Joseph & Andrew / Bow Island / AB / (403) 545-6333
- Hierath, Michael Wayne & Philip / Milk River / AB / (403) 647-2347
- Markert Seeds Ltd. / Vulcan / AB / (403) 485-6708
- Mercer, Lloyd A., Connie, Ryan & Bolstad, Leslie / Lethbridge / AB / (403) 327-9736
- Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228
- Stamp Seeds / Enchant / AB / (403) 739-2233
- Van Roessel, William & Jean / Bow Island / AB / (403) 545-6018

STRONGFIELD

BI: AAFC (Swift Current), Dist: SeCan Members

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Geldreich, Dave / Bow Island / AB / (403) 545-2222	S			
Markert Seeds Ltd. / Vulcan / AB / (403) 485-6708				C
Quattro Ventures Inc. / Bow Island / AB / (403) 545-2222				R C
Sim, Darwin & Derek / Ponoka / AB / (780) 372-2111				R R
Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228				R C
Strain, Arthur George / Foremost / AB / (403) 867-2227			R	

WHEAT - MIDGE TOLERANT S F R C

AAC CAMERON VB Ⓞ				
BI: N/A, Dist: Canterra Seeds				
Boisvert, Marc / Girouxville / AB / (780) 618-4724				R
Huvenaars, Carl / Hays / AB / (403) 725-2213				R C
Lefsrud, Kevin J. & Edmund J. / Viking / AB / (780) 336-2500	S			
Penwest Seeds / Three Hills / AB / (403) 443-2577		F		
Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358	S			
AAC FORAY VB Ⓞ Pending				
BI: AAFC, Dist: SeCan Members				
Hoff, Peter Edward / Gleichen / AB / (403) 734-2140				C
Huvenaars, Carl / Hays / AB / (403) 725-2213				R
Jensen, Albert / Drumheller / AB / (403) 823-9976				C
Klassen, Ken / Rosemary / AB / (403) 378-4408				C
Lopushinsky, Julian / Bruderheim / AB / (780) 796-2048				C
Markert Seeds Ltd. / Vulcan / AB / (403) 485-6708				C
AC SADASH VB				
BI: AAFC, Dist: SeCan Members				
Benci, Dennis / Carmangay / AB / (403) 643-2294				C
Crooymans, John, Joseph & Andrew / Bow Island / AB / (403) 545-6333		F	R	
AC SHAW VB				
BI: AAFC, Dist: SeCan Members				
Maisonneuve, Andre / Guy / AB / (780) 925-3074				R
Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617	S	F*	R	C*

CDC ADAMANT VB				
BI: CDC, Dist: FP Genetics				
Geldreich, Dave / Bow Island / AB / (403) 545-2222		S	F	
Sleepy Hollow Seeds Ltd. / Milk River / AB / (403) 647-2228				R
CDC LANDMARK VB				
BI: CDC, Dist: FP Genetics				
Airth, Jock & Linda / Brooks / AB / (403) 362-4372		S		
Chin Ridge Seeds Ltd. / Taber / AB / (403) 223-3900		S		R
Galloway Seeds Ltd. / Fort Saskatchewan / AB / (780) 998-3036				R
Hoff, Peter Edward / Gleichen / AB / (403) 734-2140				R
Markert Seeds Ltd. / Vulcan / AB / (403) 485-6708		S	F	R
Sand, Ron W. & David R. / McLaughlin / AB / (780) 745-2251		S	F	R
Sekulic, Nick / Rycroft / AB / (780) 814-2849				R
True Seeds / Redwater / AB / (780) 777-5885				R
CDC TITANIUM VB				
BI: N/A, Dist: CPS (Canada) Inc.				
Anderson, Stephen F. / Scandia / AB / (403) 362-5886				C
Laliberté, Adam & Vos, Henry / Fairview / AB / (780) 835-5286				R

WHEAT - SPRING S F R C

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Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696				C
AAC AWESOME Ⓞ Pending				
BI: AAFC, Dist: SeCan Members				
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AAC BRANDON Ⓞ				
BI: AAFC (Swift Current), Dist: SeCan Members				
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Benci, Dennis / Carmangay / AB / (403) 643-2294				C
Brummelhuis, Mitchell & Mack / Vauxhall / AB / (403) 654-7515				C
Carlson, David / Gwynne / AB / (780) 352-6871				C
Chin Ridge Seeds Ltd. / Taber / AB / (403) 223-3900				C
Clark, Todd / Edmonton / AB / (780) 499-5060				C
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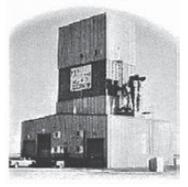


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Geeraert, Gerald / Rockyford / AB / (403) 533-2421				C
Gibson, Donald / Sangudo / AB / (780) 785-2214				C
Good, Kevin / Carstairs / AB / (403) 852-2389				C
Hadway, W. Tom & Carol / Didsbury / AB / (403) 335-4929			R	
Haney Farms Ltd. / Picture Butte / AB / (403) 738-4517				C
Harbin, Clifford T. & Bruce C. / Riverview / AB / (780) 745-2268			R	C
Hierath, Michael Wayne & Philip / Milk River / AB / (403) 647-2347				C
Hoff, Peter Edward / Gleichen / AB / (403) 734-2140				C
Hundeby, Arron / Wetaskiwin / AB / (780) 335-5111				C
Huvenaars, Carl / Hays / AB / (403) 725-2213			R	C
Jensen, Colin / Drumheller / AB / (403) 820-0181				C
Kapitski, Lawrence / Andrew / AB / (780) 365-2134			R	C
Kemp, Richard L. / Red Deer County / AB / (403) 227-4836				C
King Seed Farm (Webb, David G.) / Three Hills / AB / (403) 443-7330			R*	C
Kittle, James W. & Andrew / Viking / AB / (780) 336-2583				C
Kopjar, Gerald M. / Rowley / AB / (403) 368-2409		S		R
Limoges, Richard / McLennan / AB / (780) 324-2335				C
Lindholm Seed Farm / New Norway / AB / (780) 352-3240				R
Lindholm, Luke & Stevan / New Norway / AB / (780) 608-4277			R	C*
Lopushinsky, Julian / Bruderheim / AB / (780) 796-2048				C
Masse, Derwin & Kirby / Stettler / AB / (403) 883-2503				C
Meinczinger, Matthew Jr. / Busby / AB / (780) 349-2456				C
Metzger, Don / Carbon / AB / (403) 572-3284				C
Miller, Brian / Barrhead / AB / (780) 674-5001			R	C
Mueller, Darcy / Three Hills / AB / (403) 820-4115			F	
Nemetz, Charlie, Jerritt & Lewis / Stettler / AB / (403) 742-0436				C
Pare, Raymond A. / Wainwright / AB / (780) 842-2073		S	F	R
Penwest Seeds / Three Hills / AB / (403) 443-2577			F	
Pepneck, David / Vauxhall / AB / (403) 424-0096				C
Rix, Graham / Wetaskiwin / AB / (780) 360-9234				C
Sand, Ron W. & David R. / McLaughlin / AB / (780) 745-2251				C
Sekulic, Nick / Rycroft / AB / (780) 814-2849				C
Sendziak, Don P. & Stephen / Edmonton / AB / (780) 434-1322			R	C

Shultz, Shawn / Didsbury / AB / (403) 335-3694				C
Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358	S	F		R
Solick, Corwin / Halkirk / AB / (403) 916-5582	S			C
Sounding Creek Seeds / Oyen / AB / (403) 664-9617				C
Stamp Seeds / Enchant / AB / (403) 739-2233				C
Stewart, Murray / Big Valley / AB / (403) 876-2784				R
Thompson, M. Ellwood & Kelly / Red Deer County / AB / (403) 728-3535				C
Van Roessel, William & Jean / Bow Island / AB / (403) 545-6018				C
Victoor, Rene & Jamie / Sturgeon County / AB / (780) 459-3253				R
Wagner, Terry & Loree / Lacombe / AB / (403) 782-2107				C
Willms Seeds Ltd. / Grassy Lake / AB / (403) 655-2434				C
Witdouck, Dale / Iron Springs / AB / (403) 738-4395				C
Wood, Robert, Patricia & Marshall / Bowden / AB / (403) 588-3548	S	F		R
Zwack, Bryan / Daysland / AB / (780) 608-9426				C
Zwack, Thomas / Daysland / AB / (780) 374-2450				C
AAC CHIFFON Ⓞ				
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Witdouck, Dale / Iron Springs / AB / (403) 738-4395				C
AAC CONCORD Ⓞ Pending				
BI: AAFC, Dist: Canterra Seeds				
Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358				R
AAC CONNERY Ⓞ				
BI: AAFC, Dist: Canterra Seeds				
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Galloway Seeds Ltd. / Fort Saskatchewan / AB / (780) 998-3036			F	C
Haney Farms Ltd. / Picture Butte / AB / (403) 738-4517				C
Lindholm Seed Farm / New Norway / AB / (780) 352-3240		S*		R*
Rix, Graham / Wetaskiwin / AB / (780) 360-9234				C
Sekulic, Nick / Rycroft / AB / (780) 814-2849				C
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Solick Seeds Ltd. / Halkirk / AB / (403) 884-2358				C
Stickland, Brian / Penhold / AB / (403) 886-4875				C
Victoor, Rene & Jamie / Sturgeon County / AB / (780) 459-3253	S	F		C
AAC CROSSFIELD Ⓞ Pending				
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 Klassen, Ken / Rosemary / AB / (403) 378-4408 C
 Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696 C
 Mercer, Lloyd A., Connie, Ryan & Bolstad, Leslie / Lethbridge / AB / (403) 327-9736 C
 Sich, Louis J., Ivan & Martin / Trochu / AB / (403) 442-2112 F R C
 Sim, Darwin & Derek / Ponoka / AB / (780) 372-2111 C
 Stamp Seeds / Enchant / AB / (403) 739-2233 S F R C
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 Stamp Seeds / Enchant / AB / (403) 739-2233 S F R

AAC INDUS ☺ Pending

Bi: AAFC (Lethbridge), Dist: SeCan Members

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AAC PARAMOUNT ☺ Pending

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Weigum, Garry & Sarah / Three Hills / AB / (403) 443-9599 C
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AAC PENHOLD ☺

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 Bright, David / New Norway / AB / (780) 855-2240 C
 Carlson, David / Gwynne / AB / (780) 352-6871 C
 Clark, Todd / Edmonton / AB / (780) 499-5060 C
 Cyre, Clifford & Greg / Barrhead / AB / (780) 307-4332 C*
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 McDonald, Gerald / Co. Of Grande Prairie #1 / AB / (780) 538-3868 R
 Mueller, Richard J., R.R. & Rosemary / Barrhead / AB / (780) 674-6713 R
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 Nisbet, Andrew E. & Diane E. / Mountain View County / AB / (403) 224-3788 S R C
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 Radke, Bryan Victor / Barrhead / AB / (780) 674-5715 R
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SY433 ☼				
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Gatez, Blaine Gerald / Crossfield / AB / (403) 946-3994				C
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WHEAT - WINTER S F R C

AAC ELEVATE ☼				
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AAC GOLDRUSH ☼ Pending				
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AAC ICEFIELD				
BI: AAFC, Dist: FP Genetics				
Geldreich, Dave / Bow Island / AB / (403) 545-2222			S	
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BI: AAFC, Dist: SeCan Members				
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BI: CDC, Dist: SeCan Members				
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- Alberta Canola Producers Commission / 1-800-551-6652 / www.canola.ab.ca

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FLAX

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AAC BRAVO ☼

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AAC BRIGHT

BI: AAFC (Morden), Dist: SeCan Members

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AAC PRAIRIE SUNSHINE ☼ Pending

BI: AAFC (Morden), Dist: SeCan Members

Stamp Seeds / Enchant / AB / (403) 739-2233
 Willms Seeds Ltd. / Grassy Lake / AB / (403) 655-2434

AC PRAIRIE SAPPHIRE ☼

BI: AAFC, Dist: Alliance Seed

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 Kiffiak, Nathan J. & Anderson, Tim / Foremost / AB / (403) 867-2338
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B: CDC, Dist: SeCan Members

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BI: CPS (Canada) Inc., Dist: Alliance Seed

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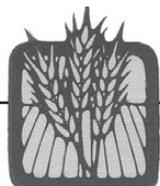
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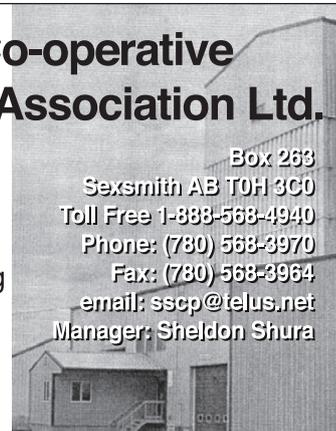
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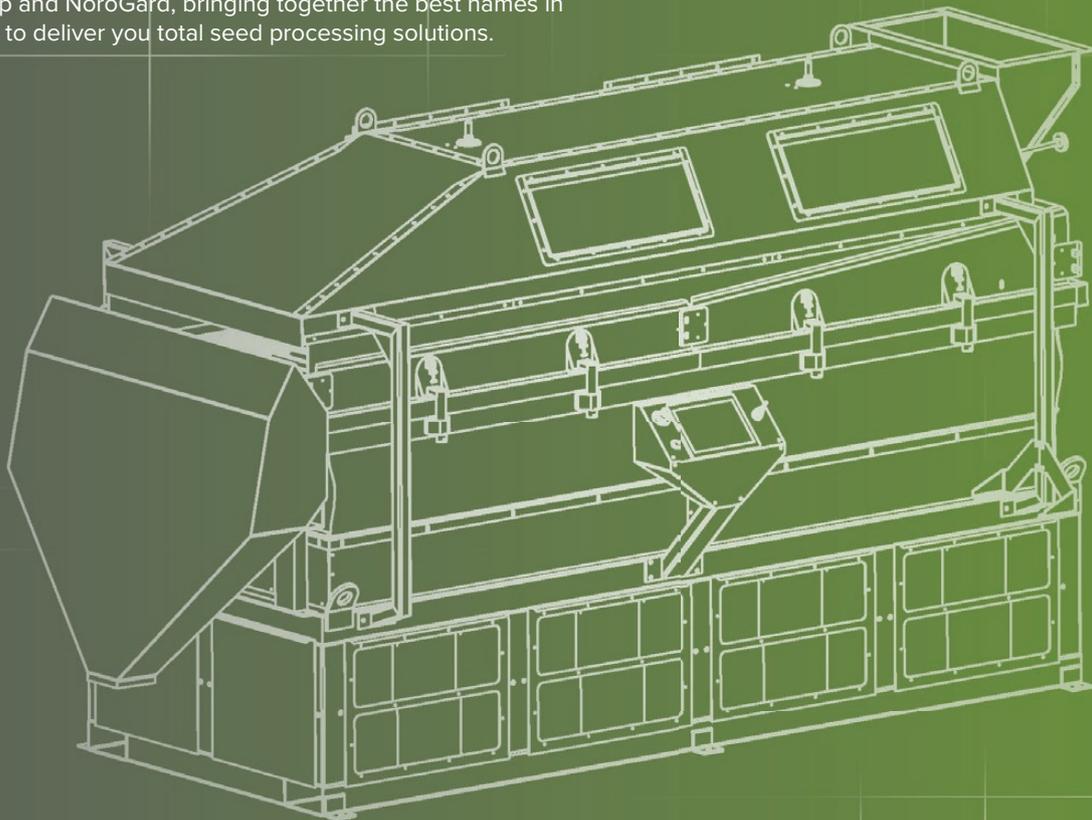
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Kittle, James W. & Andrew / Viking / AB / (780) 336-2583		C	Warkentin, Harold K. & Errol / Beaver County / AB / (780) 662-2617	F*	R*	C*
Koester, Gordon & Munro, Daniel / Rockyford / AB / (403) 533-2248		C	CDC INCA  Pending			
Logan, Glenn C., Marie & Douglas / Lomond / AB / (403) 792-3696	S	F	BI: CDC, Dist: N/A			
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Van Roessel, William & Jean / Bow Island / AB / (403) 545-6018		C	Van Roessel, William & Jean / Bow Island / AB / (403) 545-6018			R
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LIMAGRAIN CEREALS RESEARCH CANADA

An update on the new western Canadian cereals research program created through a partnership between Canterra Seeds and France-based Limagrain.

In the summer 2015, a new research and breeding partnership between Canterra Seeds and Limagrain was announced. The partnership, called Limagrain Cereals Research Canada (LCRC), aims to keep wheat genetics at the forefront in Western Canada.

Canterra Seeds is owned by western Canadian seed growers and agricultural retailers. France-based Limagrain is the fourth-largest seed company in the world (field crops and vegetable seeds), the European leader for functional flours and the primary industrial bakery in France.

We asked LCRC CEO Erin Armstrong about the importance of the partnership for the breeding and development of cereals in Canada, and what impact it will have on the number of and quality of varieties available to growers over the next five to 20 years. She first notes that LCRC senior breeder Jason Reinheimer joined the company in February 2016, and additional staff came on board in April and August.

“Over the next several years the LCRC team will grow as the program becomes fully established,” she says. “We are building on work done at Canterra Seeds that started in 2012 and involved screening material from existing Limagrain wheat breeding programs.”

Earlier this year, LCRC and partner Canterra Seeds announced the first variety from its cereal breeding program was recommended for interim registration.

GP202 is a Canadian Western Special Purpose (CWSP) wheat with high yields and the lowest accumulated DON levels among the CWSP varieties put forward for support at the Prairie Grain Development Committee meeting on March 2. The low DON levels make it ideal for producers looking for a feed wheat variety.

Senior breeder Jason Reinheimer says LCRC will build on the success and strength of the Canadian breeding and seeds industry through partnering and collaborating with local programs.



Photos courtesy of LCRC

“LCRC is developing varieties specifically for western Canadian farmers with plans to collaborate with public breeders as well as the Limagrain network of cereal breeders around the world. LCRC will bring genetics with unique characteristics to the market in Western Canada, and varieties from the existing pipeline could be registered within the next couple of years.”

Armstrong is clear the 2015 update to the federal Plant Breeders’ Rights Act, which brought Canadian plant breeding regulations in line with the current Convention of the International Union for Protection of New Varieties of Plants (UPOV), was “critical” to LCRC’s launch. There was considerable effort throughout the entire value chain to support an update to the Act, Armstrong explains, including the seed industry as well as Partners in Innovation, a group of grower organizations that supported enhancing Canada’s ability to attract investment with a goal to increased innovation.

“Without the update ensuring the ability to use the same intellectual property protection tools as almost all of the rest of the world, Limagrain and many other breeders were not willing to invest in cereal breeding in Canada,” she notes. “With the announcement of the passage of Bill C-18 in February 2015, it was full steam ahead with planning for the launch of LCRC.”

The LCRC research centre site is in the northeast area of Saskatoon, in a stand-alone building with generous office, seed lab and warehouse space, and a large enclosed yard. “Our first field season is successfully under our belts, with plans to expand field testing next year,” Armstrong notes. “The lab is fully functional and allows us to set up for field trials and do preliminary evaluation of the samples coming off the field. Bread



“The 2015 update to the PBR Act was critical to LCRC’s launch.”

—Erin Armstrong

quality testing is done at the Limagrain Cereal Seeds Quality Lab in Fort Collins, Colorado, a shared facility for the two North American Limagrain cereal breeding companies.”

Armstrong adds that Hayley Butler, LCRC’s quality lab manager, is a member of the Prairie Recommending Committee for Wheat, Rye and Triticale quality evaluation team, and is fully familiar with the quality testing requirements for the Canadian variety registration system.

Focus on Spring Wheat

LCRC’s initial focus is to develop broadly-adapted, disease-resistant and high-quality spring wheat varieties specifically for Western Canada. We asked Reinheimer for details on how this will work.

“LCRC will build on the success and strength of the Canadian breeding and seeds industry through partnering and collaborating with local programs,” he explains. “LCRC has developed an extensive trial testing network covering the diverse wheat growing areas of Alberta, Saskatchewan and Manitoba. We will field-test breeding material across a broad range of environments to help evaluate it against real-world stresses and diseases. Some of that material will make it into varieties and therefore onto farmers’ fields.”

Reinheimer adds while the wheat evaluation network will primarily be managed by LCRC’s breeding team, it will also include collaborative testing opportunities with government and universities. The wheat breeding material LCRC is utilizing in Canada has been accessed from Limagrain’s international breeding germplasm inventory.

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"Traits and germplasm developed through Limagrain's global research and breeding efforts, when combined with local germplasm and selected throughout Western Canada, will bring together the best of both worlds in terms of elite genetic combinations."

Reinheimer says he and the rest of the LCRC breeding team will also be taking advantage of new plant breeding technologies that have been developed over the past decade.

"For example, we generate more genomic data today than we have in all of the history of wheat breeding," he notes. "LCRC, through its linkage with Limagrain, is at the forefront of the

'genomics age' where we can test and select for high-performing varieties more effectively than we ever have before. Access to breeding technology that allows you to predict field performance in the lab, and ensuring it is continually 'ground proofed' on Canadian farms, will underpin variety success. This ability to use world-leading genomic tools and apply them on Canadian soil is certainly an exciting prospect for Canadian farmers."

LCRC plans to broaden its crop type portfolio in the near future. Reinheimer says durum wheat, barley and winter wheat are currently on the radar.

To take his position at LCRC, he and his family moved from Australia to Canada. "My wife and two young children love it in Canada and have felt so welcomed," he says. "So we have been busy learning to ice skate, trying to understand sports like curling and discovering awesome things like maple bacon."

Reinheimer calls being able to help build a new plant breeding operation in Canada a "fantastic" opportunity. "Especially when you have two great partners in Limagrain and Canterra Seeds for support," he notes. "I have always wanted to work in Canada as the agricultural community has so many positive aspects that are the envy of the world. To be able to work with so many great people who are passionate about helping forge a positive future for the Canadian grains industry is very exciting for me."

For her part, Armstrong says it was an honour to be asked to be LCRC CEO. "While I've run an organization before, this is the first time I've had the chance to build something from the ground up," she says. "Working with my colleagues Dr. Jim Peterson (research director), Sebastien Benon (CEO of the business unit into which LCRC fits) and with the board of directors is a real pleasure. I can't believe it's already been a year and a half since we started with our blank piece of paper. Once Jason came on board, things really moved forward quickly.

"We are all committed to having LCRC become an established provider of new cereal varieties for Western Canadian farmers and to contributing to innovation within our sector," she adds.

Trenea Hein



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Photo courtesy Harpinder S. Randhawa

The 4-P Funding Model

Taking a look at one very successful Alberta-based initiative.

THE 4-P model (public/private/producer partnership) for crop R&D involves funding contributions from government, private companies and producers. This type of initiative is seen as an effective way to pool resources and ensure the growth of total overall investment in variety development in Canada – and according to those directly involved, the 4-P involving Agriculture and Agri-food Canada (AAFC), Canterra Seeds and the Alberta Wheat Commission (AWC) is no exception.

This particular 4-P started in 2014 and runs through to the end of 2018, but Tom Steve reports that discussions about renewal will begin in early 2018.

“It’s the main CPSR (Canada Prairie Spring Red) wheat breeding program in Western Canada,” says Steve, general manager at the AWC. “Three-quarters of this wheat class is grown in Alberta as it’s well-suited to the climate. It goes into both feed and milling markets.”

The partnership’s main benefit for producers in his view is the continuation of a program that was in danger of being shut down. The main CPSR breeder at AAFC in Winnipeg had retired and the program was in jeopardy, he recalls. AAFC put out a request for partnership proposals in early 2014, and Canterra Seeds submitted one that was accepted in March. AAFC then held discussions with multiple grower groups that had expressed potential interest in participating, and by mid-2014, notes Canterra Seeds president and CEO David Hansen, AWC had joined the partnership with the full support of his company. All three parties are contributing \$3.4 million in cash and in-kind items over the five-year timeline.

“It’s overall a great way to develop new varieties with higher yields and better disease resistance,” Steve notes. “Alberta farmers, through the AWC, will get a share of royalties on seed

sales, likely starting with a variety called AAC Crossfield in the fall of 2018, and those royalties will go back into further research investments.”

Two other lines are already also approved for registration, and Hansen says there are many new candidates in the variety registration trials “that are showing amazing promise.”

Dr. Harpinder Singh Randhawa, based at AAFC Lethbridge, is the partnership’s breeder behind these varieties. He notes the 4-P model is not just about funding, but about providing other resources critical to ensuring a strong breeding program moving forward.

“With AAFC sites that have closed, for example the Cereal Research Centre in Winnipeg around 2012, and also the downsizing of satellite research sites, there really was no room for my breeding work,” he explains. “Through this partnership, I have access to trial sites through Canterra and this is very important. Money is certainly needed for variety development, but you also need other resources. To have the increased research capacity over a greater geographic area in Saskatchewan, Manitoba and Alberta greatly benefits the research. Canterra is also providing evaluation work.”

Canterra Seeds is also providing insight into commercial opportunities, says Hansen, as well as the ability to use different production and commercialization models based on what is best for a particular variety to maximize its distribution and value. In addition, Canterra is providing links to end-users and an understanding of their requirements in Canada and the U.S. in order to help guide development of new varieties in the program.

Beyond all this, Steve lists another benefit of this arrangement for producers: AWC’s close relationship with Dr. Randhawa. “It’s a great exchange of information,” he says.

Hansen agrees. "The relationship among the three partners continues to grow," he notes. "We are well-aligned, and with an effective governance model in place we are able to work well towards the objectives of the agreement. Partnerships make sense when you are able to bring various elements required to the table to further the advancement, versus everyone trying to do things on their own. Wheat is a very complex crop that requires a significant investment in order for it to remain a competitive option for the farmer. This may not apply for all crops, but for wheat and durum, this does seem to be true, and so the arrangement definitely makes sense."

Hansen adds that Canterra Seeds' interest in continuing the three-way relationship is strong, and that it fully intends to explore new opportunities, including perhaps the involvement of Limagrain Cereals Research Canada if it makes sense. Limagrain

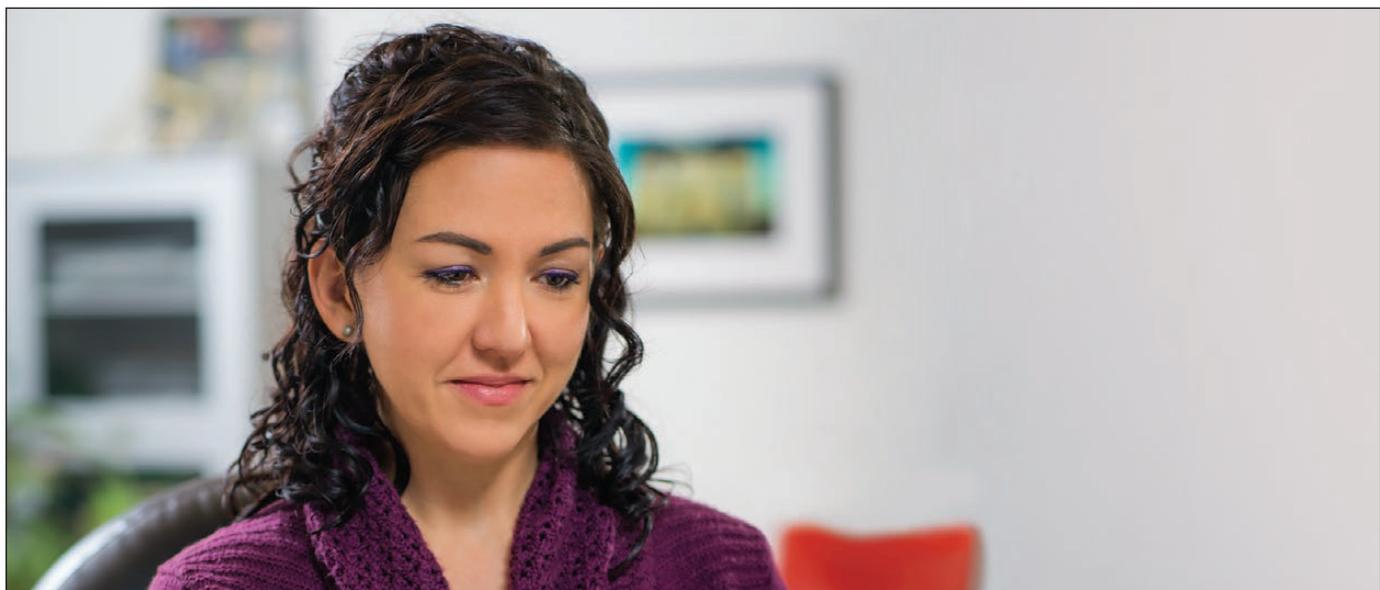
and Canterra Seeds have a partnership, and this relationship could provide opportunity for expanded future collaboration, including germplasm and breeding tools.

For his part, Steve notes that for AWC, the 4-P model for breeding Canada Prairie Spring Red wheat has been very successful and he looks forward to discussions on a renewal.

"We really like this model, and with it, we have the resources in place for a world-class program," he says. "We look forward to more varieties over the next few years."

Harpinder adds that from his perspective, it would be wonderful to continue on, and he looks forward to sitting down and discussing it early next year.

"It's been wonderful," he says, "to work both with Canterra and also the Alberta Wheat Commission." **Treena Hein**



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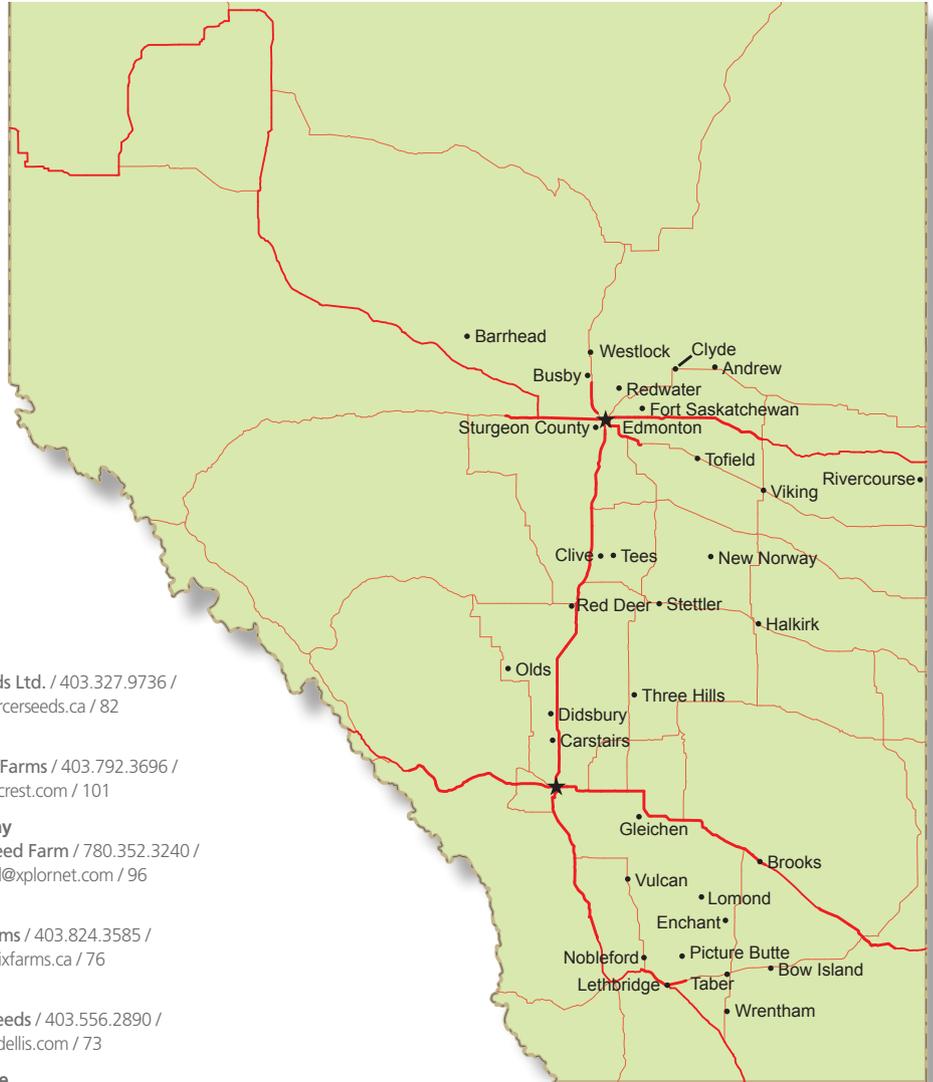
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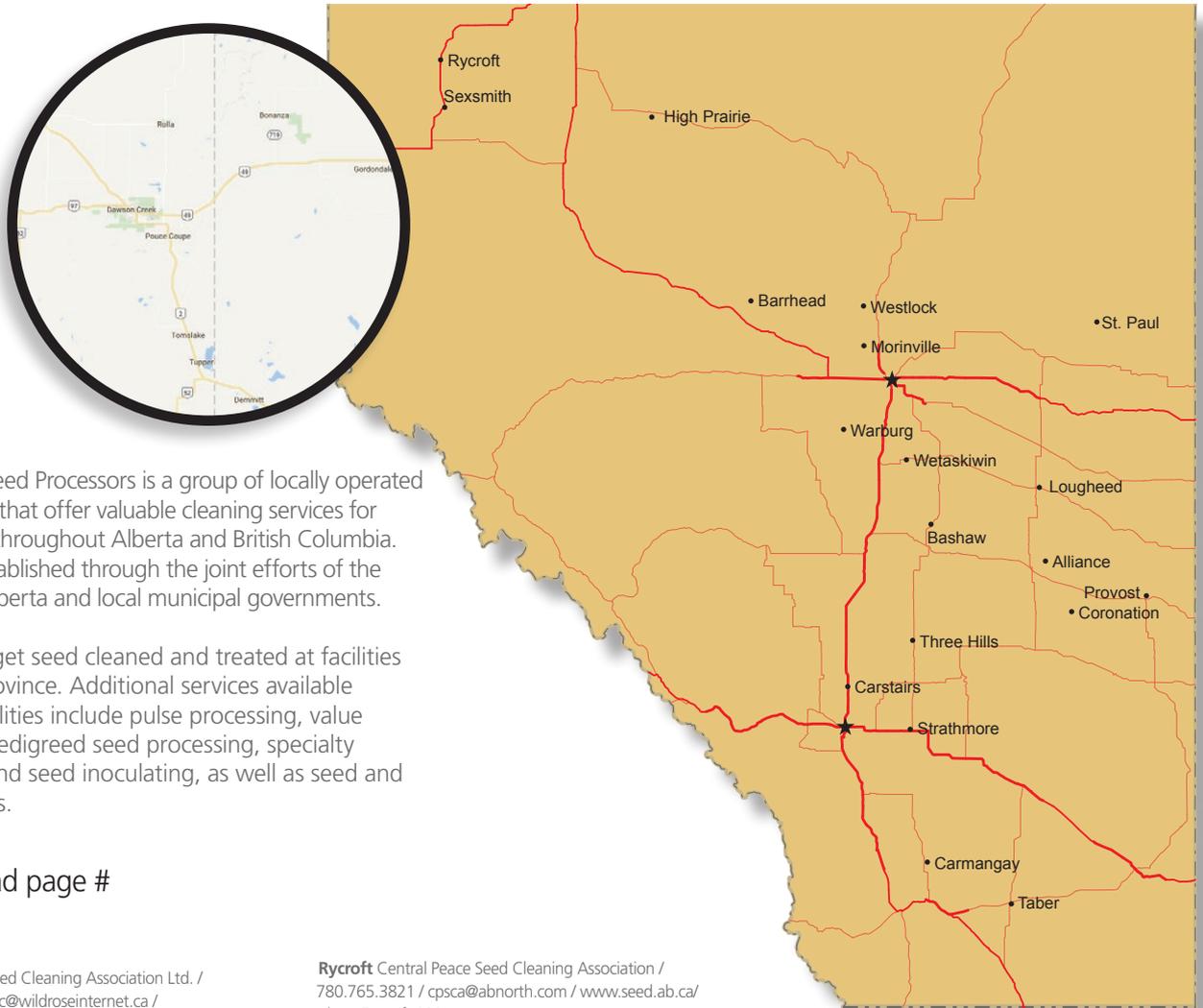
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CAN EPIGENETICS CHANGE THE WAY WE BREED CROPS FOR DROUGHT AND CLIMATE CHANGE?

EPIGENETICALLY manipulated crops have been shown to grow vigorously even when stressed by drought, heat or cold. Sally Mackenzie is a professor of plant science at the University of Nebraska and co-founder of Epicrop Technologies, a private company developing a new plant-breeding method using this technology. Epicrop's epigenetic technology is unique as it is able to improve crop yields and stress tolerance without making any changes to the DNA sequence of the plant. The final crop plant is genetically identical to the starting plant and contains no foreign genes or any changes to the plant's DNA.

So what's the difference between genetic modification versus epigenetic manipulation? Genetics is the study of DNA and the genes within, while epigenetics is the study of how and when the genes are expressed. When plants are genetically modified, the DNA itself is changed, while epigenetic manipulation involves changes to how genes are expressed or silenced.

Since the 1930s, plant breeders have used radiation or highly toxic chemicals (also known as mutagenesis) to mutate and modify the DNA of plants in order to produce better crops. Plant breeders who use this breeding technique expose plants to disruptions in hopes that some kind of random genetic mutation will occur that will be beneficial. The sweet Ruby Red grapefruit, which can be grown and sold as organic, is one of 3,000 plants that have been developed using mutagenesis. Despite the fact that the process results in tens of thousands of unplanned and unmappable mutations, it is unregulated, while genetic engineering, which might require only a single gene tweak, must go through years of expensive evaluations.

In the 1990s, a more precise method of genetic modification was approved for corn, soybeans and other crops. These GMOs are sometimes created by taking a useful gene or a few genes from one species and inserting it into a different one, resulting in crops that are resistant to viruses, insects or herbicides.

In both of the plant-breeding methods, we can use genetic sequencing to see that changes have actually been made to a plant's DNA. However, that is not the case with the new plant-breeding method being developed by Mackenzie and Epicrop. This method basically silences a gene, but leaves the DNA intact. No "foreign" DNA is inserted, as in transgenic breeding.

A few years ago, Mackenzie and her lab colleagues discovered a gene called MSH1. They learned that silencing the gene tricks plants into "believing" they are growing under stressful conditions, causing them to compensate by activating a number

of survival mechanisms, resulting in higher yields and more robust growth.

"When this gene is no longer functional, it sets off a cascade of events in a plant that are very interesting. The plant believes, under this condition, that it is experiencing all kinds of stress—drought, cold, and heat, all at one time—so lots of those different stress pathways are all amplified simultaneously. The plants believe that they're seeing stress, even if you're growing them in perfect conditions," says MacKenzie.

While silencing genes is nothing new, Epicrop's method of focusing on the MSH1 gene uses a new methodology that can be used over multiple generations. After silencing the gene, Epicrop crosses the manipulated plants with non-manipulated ones. The offspring are robust for about five generations, just like their manipulated parents.

As Mackenzie describes it, it's as if they have reprogrammed the plants' memory — not their DNA — so they always react as if they are growing under stressful conditions: "What we're doing, actually, is to create memory. Once we create this memory of stress, we can grow all of its progeny, and all of its progeny will still have that memory. We can go 10 cycles and still have that memory, so we've now created in this variety a memory stock — a breeding stock that we can use in all of our crosses. Now we've got a new way of doing breeding that gives us new, enhanced capabilities that we didn't have, and it is not subject to regulation because we're not adding any genetic change, we're adding epigenetic change."

Mackenzie and her colleagues have shown this breeding method is effective with sorghum, tomatoes and Arabidopsis, and she believes that it can be used with virtually any plant.

While traditional GMO crops take years to pass regulatory hurdles, Epicrop's plants will not have to undergo strict scrutiny because no changes are made at the genetic level. "There is nothing you can regulate about my technology," Mackenzie said. "When APHIS considered this for regulation, they didn't even know how to impose regulation even if they wanted to."

This means that epigenetic seeds may be available relatively soon to help farmers address drought and heat due to climate change.

Epicrop is currently conducting large-scale field tests on sorghum and tomato, and is developing partnerships with seed companies whose products can benefit from their epigenetic technology.

Source: Genetic Literacy Project

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