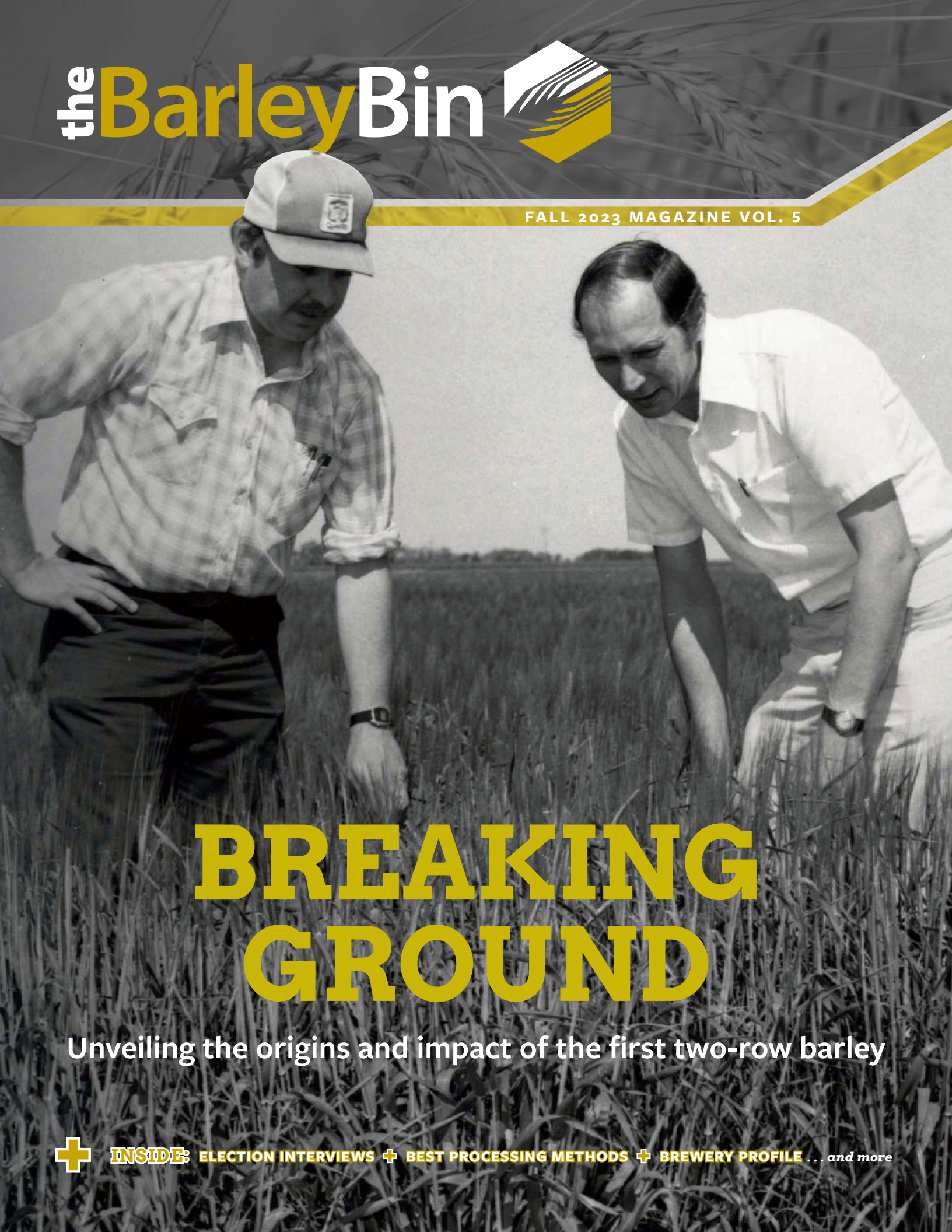
the BarleyBin

FALL 2023 MAGAZINE VOL. 5



BREAKING GROUND

Unveiling the origins and impact of the first two-row barley

INSIDE: ELECTION INTERVIEWS + BEST PROCESSING METHODS + BREWERY PROFILE . . . *and more*

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Cover Photo
Dr. Brian Rossnagel (left) and Dr. Bryan Harvey (right) examine barley cultivars growing in research plots on the USask campus. *Courtesy Bryan Harvey and Brian Rossnagel.*

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Cole's Ag Communications

Printing
Houghton Boston

Distribution
Houghton Boston

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Delivering results

On behalf of our board of directors, I hope you had a safe season as we bring the harvest home for another year.

As always, around this time of year I like to reflect on the season that has passed. Let us not forget the long hours and hard work that has gone into this growing season. It's a testament to the spirit of our barley producers, who weathered every challenge Mother Nature threw their way.

As an organization committed to increasing the production and value of barley, I am thrilled to bring you news of our successes in this latest edition of the *BarleyBin* magazine.

SaskBarley is driven by our mandate of delivering research results for our members. In this edition, we wanted to take you inside the world of varietal development as we feature three key barley varieties that have played an important role in the history of the Canadian barley industry. Through firsthand accounts, we explore the history of Harrington, AC Metcalfe, CDC Copeland, and CDC Churchill and dive into the past, present and future of barley. You can read more on **Page 4** or download the latest season of The BarleyBin podcast — available wherever you get your podcasts.

"The investment in new barley varieties is starting to have an impact in farmers' fields."

Speaking of research, we have also highlighted some current research initiatives that we've funded this year and an inside look at some key projects. You can find out more about those in our Research section — beginning on **Page 15**.

On the organizational side, we are coming off a busy spring and summer on the advocacy front, as we engage further with the provincial and federal governments. In fact, over the past year, we have had active involvement in our policy priorities with more than 90 engagements with regulatory bodies and the issuance of 16 impactful communications. These have come from direct engagement by SaskBarley board members and staff, and through our membership in SaskCrops — a coalition of Saskatchewan crop commissions. If you are interested in finding out more about our work through SaskCrops regarding food security, innovation and sustainability, you can visit **SaskCrops.com** or stay up to date on our website as well.

In this issue, we give an in-depth look inside the workings of the beer industry from voices at Paddock Wood Brewery. We hope that their story inspires you and gives some insight to the exciting potential in craft breweries. For more on everything malting barley, you can also read the CMBTC market report on **Page 12**.

Additionally, mark your calendars for our upcoming Annual General Meeting (AGM), which will take place on Tuesday, Jan. 9, 2024 in Saskatoon. Your participation and attendance at this event are vital for strategic input from producers to the future priorities of SaskBarley.

As I complete the last year of my second term, the leadership and impact of SaskBarley in the Canadian barley industry continues to grow. The investment in new barley varieties is starting to have an impact in farmers' fields with new varieties gaining significant acres. Thank you to all the farmers that continue to invest in this work through their levy dollars. Those investments are the driving force behind our progress at SaskBarley.

Keith Rueve
Chair, SaskBarley

SaskBarley
DEVELOPMENT COMMISSION

CANADIAN MALTING BARLEY:

A triumph of determination and innovation

Exploring the remarkable journey of Canadian barley breeders

by Delaney Seiferling

Today, Canada is a top producer and supplier of barley and malt to the global malting and brewing industry.

But that hasn't always been the case.

In the early 1970s, the Canadian malting barley industry was miniscule in relation to its current size.

There are several reasons for this increase. One of them is that, in the last 50 years, Canadian barley breeders have worked diligently to develop new malting barley varieties to meet the needs of Canadian farmers and the malting and brewing industry.

And it all started with one very determined Canadian breeder, who set out to develop the first Canadian two-row malting barley variety.

Bryan Harvey joined the University of Saskatchewan back in the late 1960s and was instrumental in establishing the Crop Development Centre in 1971, where he served as a barley breeder.

At the time, all malting barley in Canada was six-row, and the industry had little interest in developing anything else, Harvey says. Nonetheless, he decided to focus on adapting new two-row malting varieties to the local climate.

(From left to right) Drs. Bryan Harvey, Brian Rossnagel and Dave Christenson, on the University of Saskatchewan campus. *Photo courtesy Bryan Harvey and Brian Rossnagel.*

"I could see that that was a pretty short-term view," he says. "Virtually all of the rest of the world was using two-rows and if we wanted to get into the export market, that's clearly where we had to go."

Another focus he had was on creating something that could be sold into the domestic market, because he knew that foreign markets wouldn't accept anything that wasn't used locally.

Finally, he needed something that would be appealing to maltsters in terms of enzymatic activity and diastatic power (which means the ability to turn starch into sugar).

In 1977, Harvey and fellow breeder Dr. Brian Rossnagel, who joined the CDC around that time, arranged to bring in a malting barley variety from the United States, called Klages.

It was unique in that it was a cross

RIGHT:
Dr. Brian Rossnagel with the first two-row forage barley variety he released in Canada.
BELOW:
Drs. Bryan Harvey (left) and Brian Rossnagel (right) examine barley cultivars growing in research plots on the USask research farm.
Photos courtesy Bryan Harvey and Brian Rossnagel.

between a European six-row variety and a North American two-row, Rossnagel says.

"It was the first of that new kind of two-row malting barley."

But, as it had been bred for the irrigated conditions of the northwestern United States, it wasn't drought tolerant and it required a longer growing season.

So, with these challenges in mind, the breeders began working to adapt the variety to Canadian growing conditions by crossing it with other two-row varieties.

Rossnagel, whose office was across the hall from Harvey's, remembers the moment when his colleague realized he was onto something big.

"We were looking at data and he said, 'Rossnagel! Get in here!' So I got up and walked across the hall into his then-smoky office and he said, 'Look at this damn line! I don't think we've ever had anything like this before!'"

That line would become Harrington.

The first two-row malting variety to come out of a Canadian breeding program, Harrington was unique for several reasons.

It was attractive to farmers because of its quality and yield profile. It was also attractive to maltsters because it lacked the dormancy that previous varieties had and possessed a much more attractive enzyme profile, cutting the malting time by at least two days (which increased malting plant capacity by about 30 per cent without any additional cost for the brewers).

Harrington was a "godsend" for maltsters at the time, says Keith Armstrong, a brewer who was working at Molson's Barrie brewery at the time.

"Before that there had been smatterings of two-row barleys, but they'd never really succeeded in Canada, so Harrington was an absolute breakthrough and, as brewers, we really loved it. It was a great aid in cleaning up the flavour and providing us with smoother, easier-drinking beers naturally."

Maltsters quickly adopted the variety, which had a big impact on their end

Continued on next page

Cont. from previous page

product, Armstrong says.

"That was a massive change for the industry quality-wise."

Equally important in the success of the variety was its popularity in export markets. Harrington was officially released in 1981, at a time when global supplies of malting barley were down and demand was increasing, particularly from China, which had just begun importing the crop.

Because of these factors, Harrington really put Canada on the map as a global supplier of high-quality, two-row malting barley," says Peter Watts, managing director of the Canadian Malting Barley Technical Centre (CMBTC).

"A variety like Harrington that had higher extract levels than existing varieties at the time, was easy to malt, offered consistent performance in the brewery and provided positive flavour characteristics that made it a sensation in the global malting and brewing industries and secured Canada's position as a premium supplier of high-quality malting barley and malt, for which we are still recognized today."

But to Rossnagel, the most noteworthy part of the Harrington story is its improbability.

He recalls being told by other Canadian barley breeders that developing such a variety couldn't be done. In fact, the only reason the USask program was working on such a feat was because of Harvey's stubborn vision.

Another major factor in the success of the variety's development was the fact that Harvey had developed his own custom system for screening quality traits in barley lines before they made it to malt house trials, Rossnagel says.

"He developed a very crude system using some modified refrigerators and tubs of water, so he could actually screen a few — not thousands, like Aaron [Beattie] does now — lines for improvements in malting quality," he says.

This system allowed them to identify higher enzyme activity in the lines, which would be critical in the variety's success.

"Harrington was really the result of Bryan [Harvey]'s initiative, and him recognizing something really different and quite unique."

The development of Harrington was a major success for the Canadian malting barley industry and it paved the way for the notable two-row varieties that would come next, including AC Metcalfe, CDC Copeland, CDC Churchill and many others.

These varieties have truly put Canada on the map as a top provider of malting barley to the world, Watts says.

"Canadian barley is more expensive to produce and ship to our end-users due in large part to transportation costs. As a result, Canadian barley must offer superior quality and processing characteristics to justify the premium that customers pay."

And the future success of our industry will depend on our ability to continue to deliver and innovate, he says, especially as demands increase.

"Canada must continue to develop new barley varieties that meet the demands of the global malting and brewing sectors for quality and sustainability," Watts says.

"With net-zero targets for 2050 and sooner, Canada will need new malting varieties that have improved drought resistance, but that may also offer reduced energy requirements in processing, such as high-enzyme varieties with faster modification times."

In short, we are only as good as our breeding programs.

Dr. Bryan Harvey discusses his latest malting barley variety at a field day at the Kernen Crop Research Farm. *Courtesy SeCan.*

$51.5M

Between 1995 and 2020, western Canadian barley farmers invested $51.5 million of their check-off dollars into barley breeding efforts. And for that investment, they've earned a return of 26:1 through increased yields alone (the number is probably higher if you factor in other new agronomic benefits, but researchers weren't able to quantify those).

To hear more stories like this one, tune in to our BarleyBin Special Series podcast: A look back at 50 years of barley breeding in Western Canada: barleybin.ca/podcast-special-series/

SaskBarley
DEVELOPMENT COMMISSION

AGM 2024 Agenda

Tuesday, Jan. 9, 2024 • Saskatoon, SK

1. Call to Order
2. Approval of Agenda
3. Review and Approve Minutes of the Last Annual General Meeting
4. Business Arising from the Minutes
5. Report from Organization
6. Auditor's Report
7. Appointment of Auditor for 2023/2024
8 Election Results
9. Call for Resolutions
10. New Business
11. Adjournment

Register at saskcrops.com

Upcoming Events

NOVEMBER 2023

- ***Learn to Lead* (*Saskatoon*)**
  Wednesday, Nov. 22 – Friday, Nov. 24
- ***Grade School* (*Indian Head*)**
  Tuesday, Nov. 28
- ***Grade School* (*Swift Current*)**
  Wednesday, Nov. 29

JANUARY 2024

- ***SaskBarley AGM* (*Saskatoon*)**
  Tuesday, Jan. 9

FEBRUARY 2024

- ***Top Notch Farming* (*Spiritwood*)**
  Tuesday, Feb. 6
- ***Top Notch Farming* (*St. Walburg*)**
  Wednesday, Feb. 7
- ***Top Notch Farming* (*Unity*)**
  Thursday, Feb. 8
- ***Top Notch Farming* (*Melfort*)**
  Tuesday, Feb. 13
- ***CBRC Barley Symposium* (*Saskatoon*)**
  Monday, Feb. 26 – Tuesday, Feb. 27

MARCH 2024

- ***BarleyBin Live* (*Shaunavon*)**
  Tuesday, March 12
- ***Producer Malt Academy* (*Saskatoon*)**
  Wednesday, March 20 – Thursday, March 21

Finding our voice

SaskCrops is ensuring that the Saskatchewan agriculture sector is getting the recognition, and input, it deserves.

by Delaney Seiferling

A couple years ago, several of the Saskatchewan farm commissions received the same resolution at their annual general meetings.

In response, the groups — including SaskBarley, SaskFlax, SaskCanola, Sask Wheat, SaskOats and Sask Pulse Growers — came together to work on a joint solution and consistent messaging around the topic.

This collaboration sparked the idea of creating SaskCrops, a group designed expressly to communicate to government, policy makers and other audiences on behalf of farmers, with one unified and cohesive voice.

"Typically, when you're talking about a policy issue, it's whole-farm related . . . rather than a specific commodity, and so it really made sense to work together as one," said Tracy Broughton, executive director of SaskCanola in a Pulse of the Prairies podcast interview earlier this year.

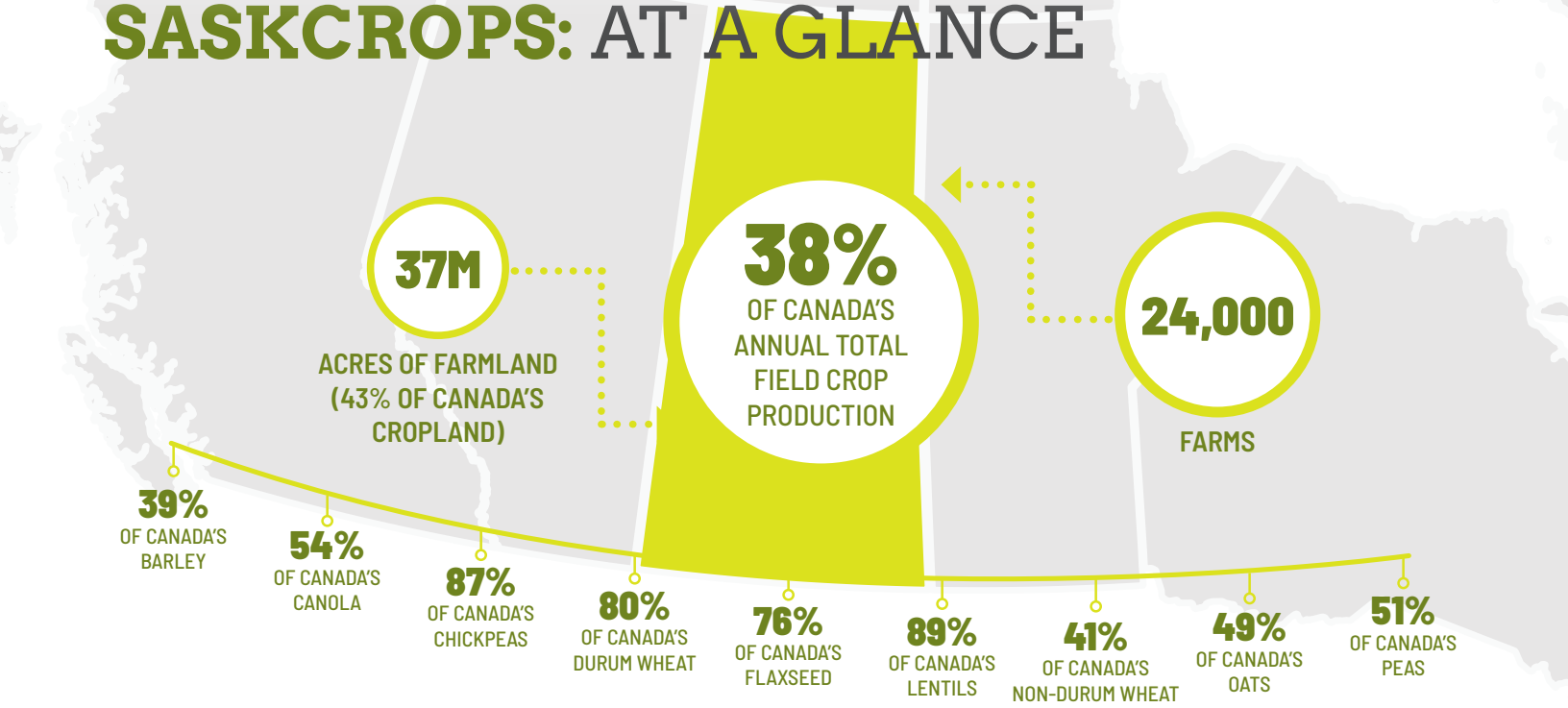
Since its formal inception (the groups had previously worked on issues jointly, just not under the SaskCrops banner), the group has been busy working to ensure farmers' interests are considered in policy issues that involve a whole-farm approach.

One of these issues has been the federal government's efforts to facilitate a fertilizer emission reduction target for the Canadian agriculture industry. In response to these discussions, SaskCrops has participated in government consultations and facilitated meetings with members of Parliament and representatives at all levels of government.

The group has also developed and pushed strong messaging around Saskatchewan farmers' efforts and success in recent decades in carbon sequestration and offsetting on-farm carbon emissions.

"We just wanted to make sure the Saskatchewan story was recognized because we have some very progressive growers in this province and

SASKCROPS: AT A GLANCE



we want to make sure their voice is heard on both a provincial and national level," said Broughton.

SaskCrops has also since been vocal on the importance of investing in research to help farmers become more efficient on farm; revising grain contracts to more justly balance power between the farmers and the grain companies; and the importance of having transparent grain sales reporting available to Canadian farmers.

The group has also established strong messaging about the importance of the Canadian agriculture sector to food security globally, and the importance of giving farmers the proper tools to be able to continue to grow safe and nutritious foods. This messaging was emphasized in a letter sent to the prime minister last year, which Broughton said was impactful.

"It really helped to change a lot of the conversations we were having with government."

Another focus of the SaskCrops group has been to make it clear just how important Saskatchewan's agriculture sector is to Canada and the world, says Jill McDonald, SaskBarley's executive director.

"Saskatchewan's agriculture sector is truly a global powerhouse, producing the majority of several Canadian crops and leading the world in innovation and low emission intensity," she says. "We want to make sure that everyone in Ottawa understands just how important our sector is, not only to the Canadian economy, but to global food production systems."

She says much of the group's outreach has also been accompanied with the message that we want to work together, collaboratively, with government to ensure mutually beneficial solutions.

"There's a strong need right now to balance emission reduction targets with the need to increase agricultural production in order to feed a growing global population," she says. "In order to come up with the best way to do this, Saskatchewan farmers need a seat at the table. And we are here to make sure that happens."

CANADIAN AGRICULTURE:

Provides **1 in 9** jobs in Canada

Generates **6.8%** of Canada's GDP

Source: Agriculture and Agri-Food Canada (AAFC)

WE ARE GLOBAL LEADERS IN TERMS OF:

REPUTATION:
Saskatchewan is recognized as a consistent, reliable supplier of safe, high-quality agricultural products.

FOOD SECURITY:
Saskatchewan leads the way in reducing global dependence on food from less-stable, environmentally fragile areas.

INNOVATION:
Saskatchewan farmers are leaders in global agricultural innovation and emissions reduction, fuelled by research and innovative technologies.

LOW EMISSION INTENSITY:
Our documented history of sustainable agriculture is a global-leading example of successful management of economic and environmental imperatives.

2023 Director Election Candidates

Questions & Answers

SaskBarley will hold an election to choose three new members of the Board of Directors. Below you will find the candidates and their answers to the questions posed on the opposite page. **Watch for your voting package in the mail. Voting opens Oct. 19 and closes Nov. 29.**

CHAD FERGUSON

1. I've farmed for a long time and it just seems like there's a few things that should be better known to be in the industry. I've got some ideas to put forward for SaskBarley and want to be part of a bigger group that's got some more say for all of agriculture.

2. I've farmed all my life and we've grown barley for most of those years, if not all of them. I also worked off farm at a grain elevator where I was on the other side of the desk buying malt barley from hundreds of producers and was involved in shipping it across various places and to markets overseas.

3. There's always room for opportunities, there's always room to grow, there's always something you could do better, so that's obviously what a guy looks to do. There's an excess of malt barley in the industry and a lot of that malt barley is forced to go into the feed market, but there's a lot of value that's missed there. We're always looking at grower input, what they want, what works and what doesn't. All of those things are all a part of the bigger picture.

4. Barley has always been involved in research, as far as right on the farm, down to new varieties that have been released over the last years. Talking with different maltsters we know what kind of malt extract and what kind of product they have at the end of the day. Really, that's what the malt side is about, seeing what they need and what they're working with for their customers and trying to fit those needs.

5. Long term you want the barley industry to thrive and grow. There's a lot of producers out there that have tried growing malt barley for a long time and never had any luck with it. I think there is many opportunities for sure, the barley industry just has to keep pushing forward. I think a group of people on the board that have similar mindsets and broad experiences, makes for a well-rounded table to develop a strong SaskBarley.

GORDON MOELLENBECK

1. I think SaskBarley is a great organization and does great work. I'd like to be a part of that and continue to help move it forward for the producer and for barley itself. We need to have grassroots people from the farm to be a part of these organizations. So, I thought now's a good time as any to volunteer for it.

2. Off the farm I learned how to work as a team to fulfill goals that were either given to us or made by us. Every place I've worked at was very results driven. And in farming, you must have results and you must make sure that on the business side profitability is there for you. This is my 40th crop that I'll be putting in, so with all that experience and 40 years on and off the farm, I have some pretty good skills to help all farmers make good choices and give them good tools to work with.

3. I think one of the things is that it is a very competitive crop for farmers both on the soil health side of things and on the dollar side of things. It's both here at home and on the world stage where we have to be competitive. Because the guys in Australia, they're our competitor as much as your next-door neighbour. We have to make sure that we continue to provide a good sound product for customers.

4. Some of the new malt varieties we're using are Connect and Churchill, so these new varieties give us better agronomic, better standability and better yields. We've also done some feed and forage varieties on our farm in the past and that has given us more products for cows and it gives us a cheaper way to feed them. I'd like to continue to find better varieties.

5. I'd like to help farmers make barley their top choice when deciding on crop rotations. Work as a team to continue our breeding support programs with better varieties and make barley synonymous with Saskatchewan; you know something like Alberta beef or Ontario-corn fed beef. Give Saskatchewan barley name recognition for producers, whether in the grocery stores or at the bar. I want them to make sure that they know that this is a Saskatchewan product.

1. Why are you interested in becoming a SaskBarley director?
2. What skills and experiences do you have that would be valuable as a director with SaskBarley?
3. What do you view as the challenges or opportunities for Saskatchewan's barley industry?
4. SaskBarley is involved in various research and development initiatives. How has research and innovation benefited your farm? And how would you as a director help shape SaskBarley's role in R&D to fit in the future of the barley industry?
5. What is your long-term vision for the Saskatchewan barley industry? How do you expect that vision to move forward within SaskBarley?

MATT ENNS

1. I've been a SaskBarley director for the past four years including stints as chair and vice-chair. I've found it challenging, educational and at times frustrating, but overall rewarding. I have been the lone "farmer perspective" in many venues and believe that having a strong producer voice in the room has made an impact. I'd like to utilize the experience I've gained in the previous term to continue to advocate for growers to the rest of the supply chain.

2. Being the owner/operator of "Maker's Malt," Saskatchewan's second malting facility, has given me insight into the entire supply chain. My role on the board often involves bridging growers and the malting/brewing and food industries. I believe I can continue to play this role and have a unique ability to communicate between groups.

3. One of the major challenges I enjoyed working on was the availability and adoption of new malting barley varietals. I believe the momentum in this direction is currently strong. I see upcoming challenges in dealing with federal policy on climate change and its impact on agriculture production including livestock and grain. Here I see the opportunity to demonstrate the sustainability that already exists with our western Canadian production model. Projects such as implementing traceability in our supply chain, sustainability work and access to new international markets all continue to be works in progress.

4. The R & D completed with our barley check-off dollars is nothing short of fantastic. I bring a mentality of efficiency to research funding decisions and can report to producers that our money is being used exceptionally well. Our farm supports this research by hosting the U of S trial plots with over 4000 plots on our farm harvested each year. We also run an annual varietal and agronomic trial at farm scale. On the Maker's Malt side, research seems never-ending and with aspects relevant to the larger barley industry.

5. I believe that our long-term vision should be to keep Saskatchewan producers in their rightful place as world-leaders in barley and malt production. To do this we need to continue to improve the varieties we grow and ensure they're adopted by the supply chain. We also need to navigate an increasingly difficult world where policy is often dictated to us. Having the ability to defend our production model with evidence of its sustainability in relation to its competitors is paramount. We need to continue to attract new international customers and innovate ways to increase the value proposition they see in western Canadian barley.

THOMAS SUNDERLAND

1. I am interested in becoming a SaskBarley director because barley has been a seminal part of my family farm's crop rotation over the past 110 years. We firmly believe that barley is, and has the potential to become, an even more profitable enterprise to our crop plan. My goal as a SaskBarley director would be to bring more awareness and visibility to the value barley has to offer in Saskatchewan.

2. As a younger producer I have never sat on any ag boards, so this would be a new experience for me. However, I have been involved in the industry for many years and am interested in doing my part to help keep the barley industry as strong as possible in our province.

3. Market access is very important for the barley industry and it's very important that we are meeting the needs of our end users. In recent years and particularly this year, chit in malt barley has become an increasing problem. Transportation has always been a major challenge on the Prairies and increasing cost of production is something that all producers are aware of.

4. The newer varieties have helped push yields higher and allowed for less lodging and less straw which has helped for seeding into the stubble the following year. There is, however, the difficulty in getting maltsters and grain companies on board for accepting these newer varieties. I believe SaskBarley has an important role to play in helping to find varieties that the malting industry will accept.

5. I believe that Saskatchewan's barley industry has many opportunities and I firmly believe that continued research and development will only benefit Saskatchewan barley producers. I believe Saskatchewan is well situated to take advantage of the decreasing barley production in the U.S. With newer and improved varieties, we will be able to increase production of both malt and feed barley. SaskBarley plays a critical role in funding research and new variety selection, and I believe that is crucial in moving the industry forward.

Malting barley market perspectives

The story of 2023 is one of extraordinary variability in terms of yields and quality

by Peter Watts
Managing Director, Canadian Malting Barley Technical Centre (CMBTC)

REVIEW OF 2022-23

In 2022, with favourable weather during the growing season and harvest, Canada produced a healthy 10-million-tonne barley crop. While carry-in stocks were low, the large crop provided ample supply of good quality barley for the domestic market and export.

With Australia on the sidelines of the barley market in China due to prohibitively high import duties, demand from other origins was strong, with Canada, followed by France and Argentina supplying 81 per cent of China's barley imports or 6.1 million tonnes out of a 7.5 million tonne barley import program.

Canada also had a strong barley export program to the U.S. in 2022-23 at 444,000 tonnes (until end June), of which 257,000 tonnes was malting barley, harkening back 10 years to when malt barley exports to the U.S. regularly reached 400,000-500,000 tonnes annually.

And with strong values, Canada exported a record malting barley program in terms of both volume and value. According to Statistics Canada,

CANADIAN BARLEY SUPPLY AND DISPOSITION*

	2018-19	2019-20	2020-21	2021-22	2022-23
Seeded Area ('000 ac)	6,494	7,403	7,561	8,322	7,045
Harvested Area ('000 ac)	5,918	6,741	6,940	7,440	6,513
Yield (bu/ac)	65.1	70.8	71.0	43.1	70.4
Production ('000 tonnes)	8,380	10,383	10,741	6,984	9,987
(thousand metric tonnes)					
Imports	43	63	294	228	25
Total Supply	9,666	11,309	11,991	7,923	10,554
Exports	3,058	2,952	4,277	2,673	4,009
Feed	*1,000*	*994*	*1,885*	*1,419*	*1,472*
Malting	*1,296*	*1,250*	*1,649*	*550*	*1,800*
Malt	*763*	*708*	*743*	*704*	*738*
Food & Industrial Use	317	278	299	284	300
Feed, Waste & Dockage	5,170	6,858	6,417	4,178	5,536
Total Domestic Use	5,746	7,399	7,003	4,707	5,836
Carry-out Stocks	863	957	711	543	709

*All figures StatsCan, except gold shaded cells, which are CMBTC estimates.

Updated Sept. 14, 2023

malting barley exports totaled $950 million in 2022-23, by far and away the largest malt barley export program by value in Canadian history.

OUTLOOK FOR 2023-24

Canada's barley crop in 2023 is markedly smaller than last year, with the latest StatCan estimate of 7.9 million tonnes. Very dry conditions across the Prairies started early in the growing season, and while some areas received timely rains in late June that salvaged the crop, while others were not so lucky. Southwest and western Saskatchewan and southern Alberta were very dry throughout the growing season in most areas, with yields often comparable to 2021. While StatCan estimates barley production at 7.9 million tonnes, early harvest reports (after the August StatCan estimate) suggest higher yields than estimated by StatCan. As a result, industry estimates are closer to 8.5 million tonnes production. StatCan releases updates in September and their final estimate in December.

But the story of 2023 is also one of extraordinary variability in terms of yields and quality, with some regions of the Prairies receiving adequate or at least timely rains, which produced average or above average yields with good quality (if they didn't get harvest rains), including lower protein content (many report sub 11 per cent or even below 10 per cent protein, which is unusual for the Prairies). This is in contrast to the very high protein from the dry areas.

The net result has created a complicated sourcing and logistical situation for both grain company exporters and domestic malting companies, as they work to segregate and blend lots of malt barley to optimize quality and meet processing and end-user quality requirements.

In spite of the smaller crop, prices for barley and crops in general have fallen in recent months due to harvest pressure and sizeable crops elsewhere, in particular the U.S. corn crop, which is estimated at a near-record 350 million tonnes. Steady imports of U.S. corn into Western Canada is keeping a lid on feed, and as a result, malting barley prices.

INTERNATIONAL BARLEY SUPPLIERS IN 2023-24

In the EU, barley production in 2023 is projected by the European Commission at

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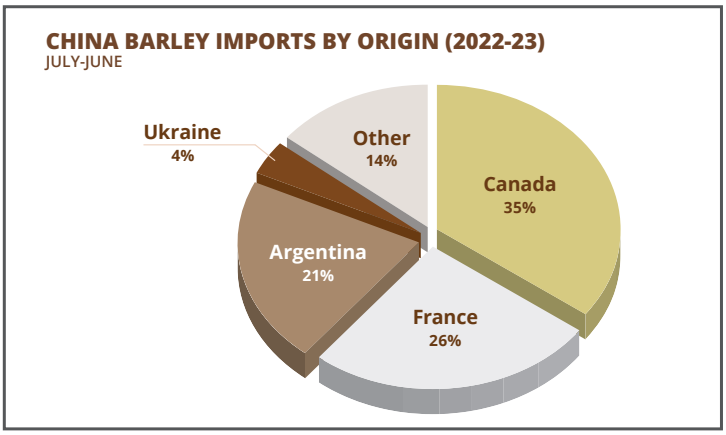
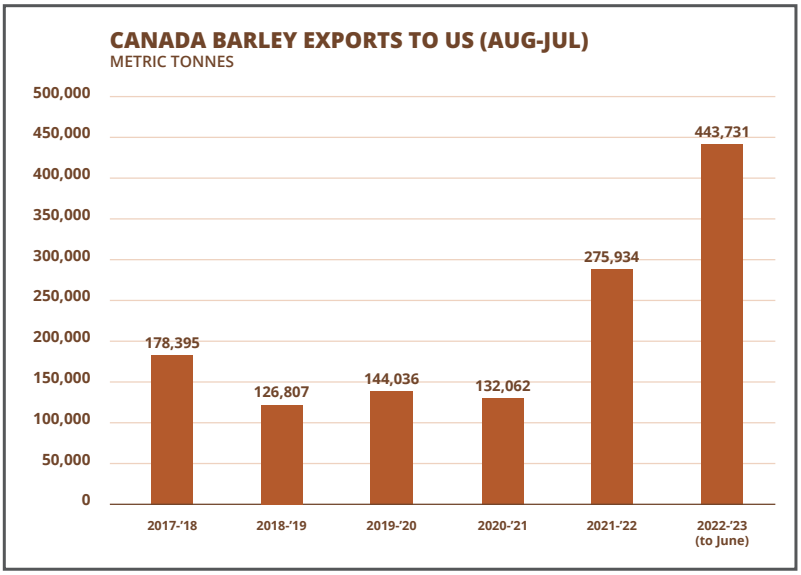
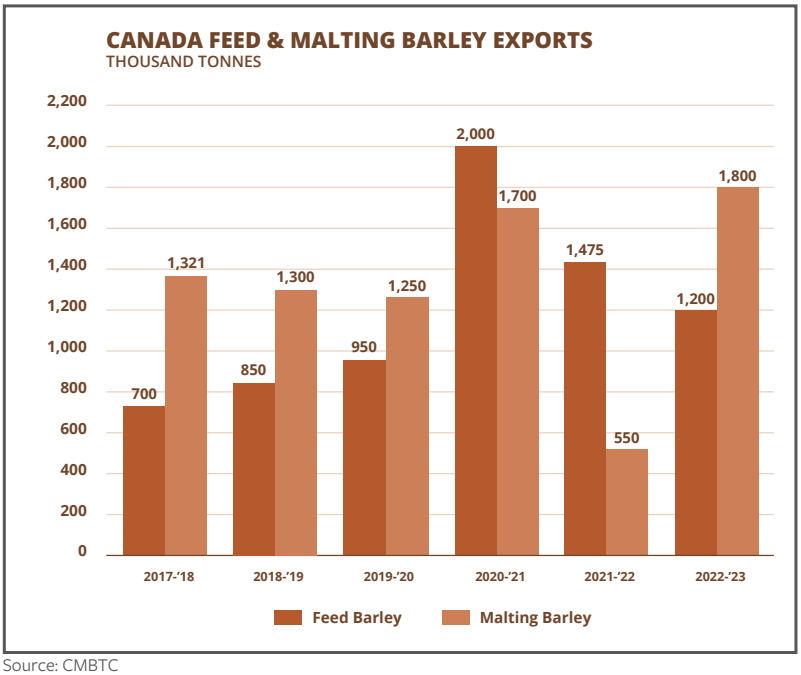


Source: Chinese customs



Source: StatCan



Source: CMBTC

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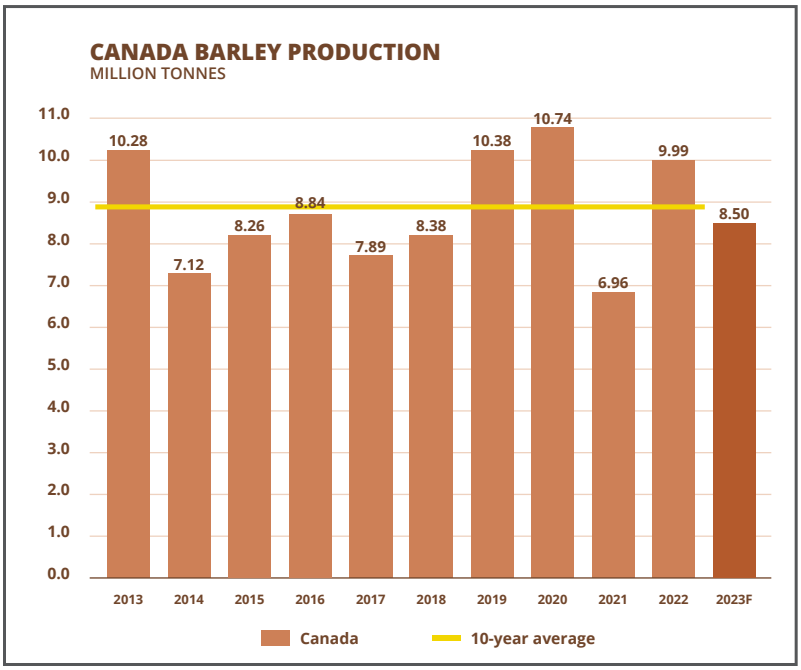
49 million tonnes, well below the five-year average of 52.7 million tonnes due to smaller crops in Spain, Germany and Scandanavia. France is typically the world's largest producer of malting barley in any given year with around 6-7 million tonnes of production. The majority of this is purchased by the malting and brewing industry domestically in the EU, but France also exports 2-3 milion tonnes of barley offshore, and accounts for the majority of EU malting barley exports, with most of it sold to China.

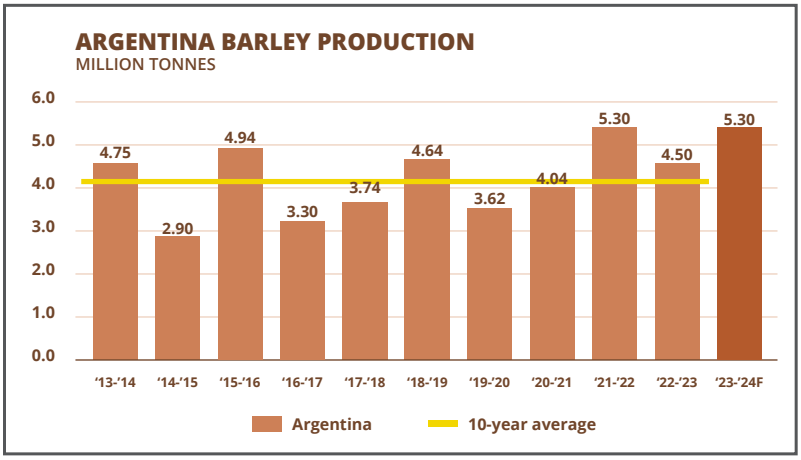
The 2023 barley crop in France struggled due to dry conditions pushing up protein content, and while the crop is a little bigger than last year at 12.2 million tonnes versus 11.4 million tonnes in 2022, strong demand for feed from Spain, which experienced a severe drought, and poor malting barley crops elsewhere, including Scandinavia and the U.K. due to harvest rain, is keeping domestic demand strong and prices high, which will ultimately limit offshore exports of both feed and malt barley from the EU this coming year.

In Argentina, in spite of a smaller crop this past year, a relatively strong export program was executed, projected to reach 2.7 million tonnes. However, this has resulted in tight supplies until new crop harvest, which will start in December. But with good moisture conditions during the winter, Argentina is poised to produce a good size barley crop, and depending on harvest conditions, should have ample export availability of both malting and feed barley.

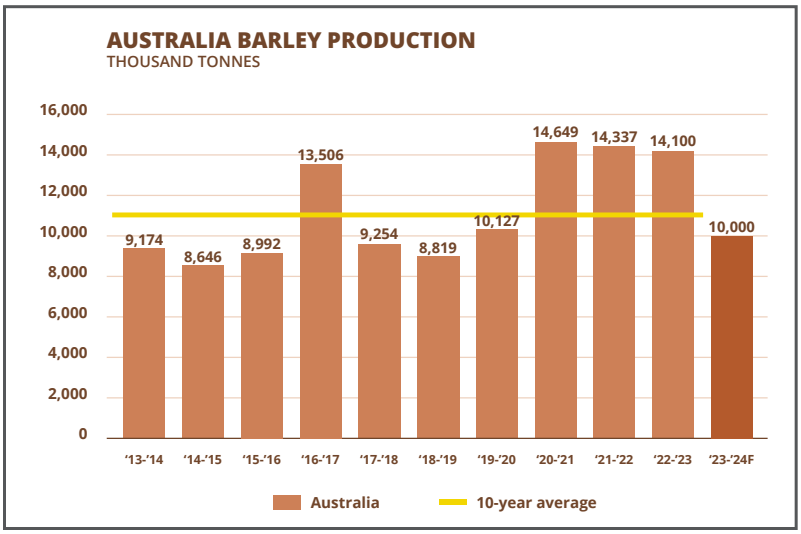
With a more average barley crop projected in Australia this year, after three years of bumper crops, export supply for malting and feed barley will not be as plentiful as it has been in the past few years. However there will still be a healthy exportable surplus from the 2023 crop. As of August 2023, the Chinese tariff of 80.5 per cent on Australian barley imports, which has been in place since spring 2020, has been lifted. This creates more competition for Canada in the coming year to supply China's malting and brewing industry. However, over the past three years, Australian barley exporters have found markets for their barley in other countries, which may continue to offer alternative markets to China.



Source: StatCan/CMBTC



Source: USDA



Source: USDA

Unlocking barley's potential:

Research projects supported by SaskBarley

Processing barley grain with variable kernel size.

Dr. Greg Penner, U of S.

SB Commitment: $118,266

Feed barley is an important market for Saskatchewan's barley industry. Barley is typically processed using a roller mill to improve access to the starch and protein for cattle. This works well when kernel size is uniform, but not with variable kernel sizes. The roller mill will result in either under-processing of smaller kernels or over-processing the larger kernels. This project explores alternative barley processing for optimal utilization, including temper rolling, steam flaking and high-moisture methods. The research will delve into beef and dairy cattle performance with these different methods. For more details see **Page 18**.

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Do barley varieties differ in response to N fertility, PGR and fungicide?

Mike Hall, ECRF & Suncrest College.
SB Commitment: $93,580

Recent research in Alberta identified varied wheat variety responses to enhanced management practices, while some are better suited to standard management. Yields ranged from 6-17 per cent. SaskBarley initiated a variety specific management project with ADOPT funding at seven AgriARM sites across Saskatchewan in 2022. The initial results were promising, so SaskBarley is again working with ADOPT and the same AgriARM sites to continue the research across a range of environments. The project will evaluate enhanced N fertilizer, plant growth regulator use and fungicide application on six popular varieties: AAC Synergy, AAC Connect, CDC Fraser, CDC Austenson, Claymore and Oreana. This research deepens our understanding of barley variety management and their responses to intensive practices.

Improving barley salinity tolerance and functional quality by characterizing root, GABA and gene expression responses.

Dr. Pankaj Bhowmik, NRC.
SB Commitment $74,297

In 2021, SaskBarley funded a proof-of-concept project exploring barley germplasm for salinity tolerance and GABA (Gamma Aminobutyric acid) content. The germplasm included Canadian varieties, breeding lines, landraces and wild ancestors. Promising results led to this comprehensive project. The researchers will delve into salinity tolerance traits, including GABA, root architecture and plant growth traits, to explore improved salinity tolerance and functional foods. Barley's salinity tolerance can be enhanced, which is a valuable opportunity to explore. This research is crucial for supporting the raw ingredient marketplace.

(Left) Barley leaves showing typical initial symptoms of bacterial leaf streak: Water soaking and streaky lesions observed as darker green areas on leaves. (Middle and right) Barley leaves showing chlorotic streaky lesions typical of bacterial leaf streak. *Photo by Dr. Constanza Fleitas..*

Identifying microbial inocula to increase salt tolerance in barley.

Dr. Jonathan Bennett, U of S.
SB Commitment $36,024

Barley is highly salt tolerant but can still be improved. Microbes such as plant-growth-promoting rhizobacteria and arbuscular mycorrhizal fungi, adapted to saline environments, hold promise as barley inoculants. They could improve salinity tolerance, benefiting growers in saline areas. This supports higher barley yields and decreased weed growth in marginal areas.

Searching for resistance to bacterial leaf streak in wheat (*Triticum spp.*) and barley (*Hordeum spp.*).

Dr. Randy Kutcher, U of S.
SB Commitment: $43,891

Bacterial leaf streak concerns are

rising in barley and wheat regions of Western Canada. It is not yet clear if the disease is increasing, or awareness is increasing, but it is a problem for which we have few solutions. Dr. Kutcher and his team are leading research on this issue. Management options for bacterial leaf streak are limited because fungicides are ineffective against bacteriological diseases.

This project is focused on screening established varieties, elite lines, and other germplasm for sources of resistance. Resistant lines will be further screened against a range of different bacterial isolates.

Understanding the stochastic impacts of Fusarium head blight (FHB) in barley.

Dr. Gurcharn Singh Brar, UBC.
SB Commitment: $28,750

Stochastic impacts are those that are randomly determined but can be analyzed statistically. This project is focused on the "gene expression noise" that occurs during *Fusarium graminearum* infection in barley. While the term "gene expression noise" suggests a lack of co-ordination of gene expression, that is not the case. The goal is to determine which genes are consistent and which are more variably expressed in response to FHB infection. This information can be utilized to help breeders and pathologists better understand the large genotype by environment interactions for varietal response to FHB.

Development of ZoomAgri AI technology for varietal purity testing in Canada.

Peter Watts, CMBTC.
SB Commitment: $60,000

Malt barley sales include a requirement to meet a minimum of 95 per cent varietal purity. This has been monitored with genetic testing, which is slow and costly, requiring a delay to confirming acceptance as malt. ZoomAgri uses proprietary technology that consists of a software integrated into a hardware developed to determine the varietal purity of agricultural commodities, such as malting barley, via image processing and artificial intelligence. The accuracy of the method is estimated at 98 per cent, based on use in other countries. Samples can be processed rapidly (e.g., in the line at the grain elevator) for a low cost. This project evaluates ZoomAgri's ability to differentiate Canadian barley varieties compared to DNA methods.

BarleyBin Field Lab: Barley Seeding Rates.

SaskBarley, IHARF and MAX Ag.
SB Commitment: $17,259

SaskBarley has entered on-farm, field-scale trials in 2023. The protocol selected for 2023 was seeding rates. The objective to optimize seeding rates based on target plant density to balance seed costs, yield, crop competitiveness and stand management. The recommended seeding rate for malt barley is 300 live seeds/m^2, which corresponds to 20-22 plants/ft^2. Researchers found that 300 live seeds/m^2 optimized agronomics, including yield and lodging, as well as malt characteristics, including protein and plump kernels. This project will fine-tune on-farm practices and help the transition of small-plot research to the farm.

In order to best exploit all of barley's benefits, it has to be optimally processed as feed.

Rolling right along

New research aims to determine best processing methods for feed barley, to optimize benefits and demand

by Delaney Seiferling

Dr. Greg Penner, a professor and researcher at the University of Saskatchewan, has long been studying the benefits of barley as feed.

His previous research has concluded that there are many benefits, including the fact that it allows for better energy and nitrogen release than other feeds, it's better for digestion and gut health in animals than corn, and it tends to be widely available and affordable in Canada.

But in order to best exploit all these benefits, the barley has to be optimally processed as feed.

And this is where his current research in the area has taken him. Earlier this year, Penner launched a research project, funded by SaskBarley and other sources, that aims to determine the optimal processing and kernel size for barley as feed, to ensure optimal digestion and nutrient use.

This research will be critical to ensuring there's a strong and growing market for barley as feed, says Mitchell Japp, research and extension manager for SaskBarley.

"If processing is insufficient, then the utilization goes down," he says. "If it's over processed, there's risk of some digestive disorders."

Currently, barley intended as feed is mostly processed using a roller mill, which damages the hull and pericarp and allows access to the starch and protein within the kernel to facilitate digestion.

"When you have uniform seed size, the process is relatively straightforward but that's not always what we get."

The consistent seed size is critical because setting rollers to process the small kernels can result in over-processing large kernels and setting rollers for the large kernels will result in under-processing of the small kernels, Japp says.

> ***"When you have uniform seed size, the process is relatively straightforward"***
>
> **Mitchell Japp,**
> *Research and Extension Manager*

Penner's research has also shown that size sorting prior to processing isn't always feasible, due to infrastructure and logistical challenges.

So, the currently ongoing five-year project will explore other processing options, including temper rolling and steam flaking, as well as dry rolling for comparison. It will then determine how each of these alternative methods affects feed intake, ruminal fermentation and nutrient utilization by cattle. The research will also investigate the effects of these alternative processing methods on the performance of growing and finishing beef cattle (i.e. feed intake, feed conversion, carcass characteristics), and the performance of lactating dairy cattle (i.e. feed intake, ruminal fermentation, milk and milk component yields). Finally, Penner and his team will evaluate the costs and benefits associated with each of these methods.

The overall goal of the research is to have tangible results that can be shared with the grain processing industry and animal feed audiences, to help get more barley into feedstock and therefore help develop new markets for Canadian barley, Japp says.

"This falls under SaskBarley's commitments to continue to invest in research for feed barley utilization," he says.

The organization's strategic research priorities in this include creating opportunities and evidence for feed barley profitability and inclusion of barley in livestock rations and identifying and supporting barley traits for new or expanded value added markets, including feed.

And although much is already known about the benefits of barley as feed, this project will play a key role in developing markets that will have a direct impact on barley farms across Saskatchewan, Japp says.

"Feed is our biggest market. We will continue to support growth in that area."

Getting the most out of barley

Here's how can you unleash the potential of new varieties, while also optimizing fertilizer rates

by Mitchell Japp

Nitrogen fertilizer is an expensive crop input, but it has an excellent return on investment. The challenge for producers is finding the balance between optimizing nitrogen rates for yield, without causing challenges like lodging or high protein.

In Lincolnshire, England, a farmer set a new world record barley yield of 16.21 t/ha, or a whopping 300 bu/ac. While such records aren't indicative of average yields, it is exciting to see what can be achieved with a combination of good genetics and intensive agronomy.

That combination was modeled when, in 2018, SaskBarley and Saskatchewan Ministry of Agriculture initiated Barley Max, aiming to capitalize on genetic advancements for higher yields, better disease resistance, reduced protein content and the agronomic research that had been led by Dr. John O'Donovan over a decade earlier. Our mindset mirrored the ideas that drove Alberta's Barley 180 project, striving for 180 bu/ac with enhanced agronomic practices and solid genetics.

The Barley Max project encompassed two experiments, one assessing management practices and the other investigating optimum nitrogen fertilizer rates for new barley varieties compared to the traditional AC Metcalfe variety. After three years, both AC Metcalfe and new varieties AAC Synergy and CDC Bow responded similarly to the varied agronomic inputs, while the magnitude of response varied, with higher yields for the newer varieties. In the second experiment, the newer varieties outperformed AC Metcalfe at the same rate of nitrogen fertilizer, but also responded to higher nitrogen fertilizer rates while maintaining protein at acceptable levels for malt.

Variety selection for this project, as with many malt barley projects, presented some challenges.

Variety selection for this project, as with many malt barley projects, presented some challenges. At the time, AC Metcalfe and CDC Copeland were the top two choices, but it was clear that variety transition was happening. Our selection focused on promising varieties within the malting sector, emphasizing traits found in emerging varieties. AAC Synergy is high yielding, comparable to the highest-yielding feed varieties, with good disease resistance. CDC Bow has the best lodging resistance rating of the malt varieties. Both are lower protein.

The project, led by Mike Hall and Brianne McInnes at East Central Research Foundation (Yorkton) and Northeast Agriculture Research Foundation (Melfort), included additional locations managed by Agri-ARM sites at Conservation Learning Centre (Prince Albert), Western Applied Research Corporation (Scott), and Wheatland Conservation Area (Swift Current). Funding was provided by SaskBarley and the Ministry of Agriculture's Strategic Field Program. Over three hot and dry growing seasons, site-years were categorized as high or low yielding for analysis.

The newer varieties consistently outperformed AC Metcalfe, but all three varieties responded consistently to the range of treatments applied. Even at the high-yield sites, due to the generally dry conditions, there was a small but significant yield increase observed from the most intensive management treatment. Generally, it appears increasing management led to small, but

The Barley Max project encompassed two experiments, one assessing management practices and the other investigating optimum nitrogen fertilizer rates for new barley varieties compared to the traditional AC Metcalfe. *Photo courtesy Mitchell Japp.*

significant yield increases, without compromising protein levels. Differences in lodging were small, but AC Metcalfe lodged worse than CDC Bow. The plant growth regulator (PGR) reduced lodging in the high yielding group.

The low-yielding site years were exceptionally challenged by drought. Overall, the stressful conditions did not result in any positive improvements from additional agronomic management, over the most basic treatment. Protein was high at all locations — too high for malt selection. Applying PGR led to lower yields, which is consistent with the label recommendation that PGRs should not be applied in stressful growing conditions.

In the second experiment, the three varieties were tested with nitrogen fertilizer rates ranging from 0 to 240 lbs N/ac. Only the results from the high-yielding sites are discussed here.

Protein management was a challenge for AC Metcalfe, while the newer varieties had acceptable protein levels beyond any reasonable nitrogen rate. Lodging was rarely an issue, but when it was, AC Metcalfe was most susceptible.

Yield was notably higher for AAC Synergy and CDC Bow, compared with AC Metcalfe. The new varieties responded better to high rates of N than AC Metcalfe as well. This indicates not only greater yield potential and versatility in managing these varieties, but also their increased nitrogen use efficiency.

Overall, the project has clearly shown enhanced agronomic inputs and management can improve malt barley production with the new varieties. The improvements in genetics that include higher yield potential, better disease and lodging resistance, as well as lower protein require changes in management practices to fully harness these improvements.

SUPPORTING LOCAL STRENGTHENS COMMUNITIES

Paddock Wood Brewing Co. brings industry people together

By Melanie Epp

When Matt Omer started on as head brewer at Paddock Wood Brewing Co., he had a goal: to bring more "local" to the brewing process. Growing up in Grandora, SK, he saw how supporting local agriculture could strengthen a community. His aim was to take what he calls a more "full-circle" approach.

Paddock Wood Brewing Co. has been a staple in Saskatoon since its inception in 2003. It was, in fact, the first microbrewery to set down roots in the city. Omer joined the company in 2021. Currently, he is transitioning into the role of operations director, but plans to remain very much a part of the brewing process. It is, after all, his passion.

The son of a local veterinarian, Omer grew up in a tiny hamlet where his family raised horses and some cattle. He said growing up there made him empathetic to the troubles farmers face from year to year.

"Seeing somebody having a (bad) year made me think, well, maybe I should drink more beer," he said.

While exercising "purchasing power" is certainly one way to support a community,

Hanging up their 2Row Light Lager banner.
Photos courtesy Paddock Wood Brewing Co.

Omer knew drinking beer wasn't the only answer. As head brewer at Paddock Wood, he was in a position to effect real change. Omer works closely with Matt Enns at Maker's Malt to ensure the malt they're using is made with locally grown barley.

Every year, Maker's Malt hosts a customer appreciation event that brings together brewers, breeders, researchers and farmers. Omer said attending the event has helped him to forge stronger ties within the industry.

Effecting change starts not only with choosing local ingredients, but also with changing mindsets. This summer, Paddock Wood launched its newest brew, 2Row Light Lager, at Ag in Motion, the largest outdoor farm expo in Western Canada. Omer said he hopes that introducing farmers to beer made with barley they grew will help them make the switch from macro brewery beers to more locally produced brews.

"We wanted the farmers to know that they're enjoying a product that they had a help in producing," Omer said.

The grain isn't only used to make beer, though. Once the brewing process is complete, spent grain is sent on to local cattle farmers to be used as feed.

"I like to call it the circle-of-life approach," Omer added.

Getting beer lovers to switch from their regular brew to a craft beer requires education, said Omer, which is why he felt it was important to be present at Ag in Motion. Three beers were showcased at the event: 2Row Light Lager, Hopped Up Honey Amber Ale and Saskatcheweizen, a wheat beer.

"2Row Light Lager was especially well received," Omer said.

Going forward, Omer would like to produce a SMaSH beer, a style of beer that includes a single malt and a single hop.

"It would help put the spotlight on local barley and a local hop," Omer said. "And it helps the economy here in Saskatchewan because if that barley's used then our farmers are happy."

What's on tap at **Paddock Wood Brewing Co.**

2ROW LIGHT LAGER
4.0% abv

Inspired by the agricultural heart of the Prairies. Laid-back, easy drinking, this brew is perfectly refreshing for everyone.

SUN SEEKER HAZY IPA
5.0% abv

Sun Seeker is an unfiltered hazy IPA with big hop flavour, but low bitterness with notes of citrus and tropical fruits.

RED HAMMER
6.0% abv

Smooth, malty and caramel tasting, this brew is subtly hopped, with a dry finish.

ELECTRIC CHERRY SOUR
4.7% abv

Will excite your senses with its delicious cherry overtones, tart profile and vibrant red colour.

CZECH MATE
5.2% abv

Iconic, clean, dry and crisp, with a somewhat malty character. Brilliantly clear.

THE SASKATCHEWAN BARLEY DEVELOPMENT COMMISSION:

The Saskatchewan Barley Development Commission was established in 2013 under the Agri-Food Act, 2004

SASKATCHEWAN BARLEY DEVELOPMENT COMMISSION (SASKBARLEY)

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