



FOOD FOR THOUGHT

Experts say the food opportunities
for barley are endless



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NEW EXECUTIVE TEAM MAINTAINS MOMENTUM

Greetings Saskatchewan barley farmers. For those of you who don't know me yet, my name is Keith Rueve.

I've been on the SaskBarley board since 2016 and I am excited to serve as your Chair for the next year, especially as our organization is at the helm of so many industry developments.

Since I started my tenure on the SaskBarley board, our goal has been to ramp up research spending. This was a priority because we know this is the best investment for your check-off dollars and will keep your farm competitive and successful. We have seen steady progress in this area. Last year, 77 per cent of our 2020-21 expenses were spent on research funding alone. (You can view all of our activities from the past year in our annual report, available on our website.)

In January, we announced our commitment of \$107,940 to barley research over the



next four years as part of the Saskatchewan Agriculture Development Fund (ADF) program. In early February, we also announced our commitment of \$106,925 to barley research over the next three years, this time through the Agriculture Funding Consortium (AFC) program. With these two commitments, as well as the other 40 active

"Since I started my tenure on the SaskBarley board, our goal has been to ramp up research spending."

projects we are funding, SaskBarley's research commitments for 2021-22 total almost \$2 million.

These research expenditures means that for the crop year ending July 31, 2021, registered barley producers qualify for an SR & ED credit of 45.9% of their levy contributions on their federal tax return. In addition farm corporations may also claim 23.1% of their levy contributions as a qualifying expenditure towards the Saskatchewan Research and Development Tax Credit program.

In other good news for our board, we welcomed new board members Zenneth Faye (Foam Lake), Cody Glenn (Climax), and Maurice Berry (Carievale) to our team in January. The fact that these three experienced and passionate growers were willing to commit their time and efforts to our organization for the next term is a major win. They joined existing board members Matt Enns of Rosthern, Glenn

Wright of Vanscoy and, of course, myself.

I'm sure you've also noticed how we've ramped up our communications efforts in recent years, bringing you monthly market reports and e-newsletters, a bi-annual magazine, a revamped website and a podcast (watch for Season 3 coming soon!).

We also continue to work as your voice on issues that affect growers, including advocating for an export sales reporting program and creative solutions for farmers affected by drought (in years such as the last one).

I am proud of the work we've done to date, and I am honoured to serve as the Chair of SaskBarley as we continue to make progress in all these exciting areas. I look forward to seeing you all more over the next year.

Keith Rueve
Chair, SaskBarley

SaskBarley
DEVELOPMENT COMMISSION 

The Rise of BARLEY

Affordable, versatile and nutritious, this wholesome grain is ready for its big break

by Delaney Seiferling

As a food and ingredient for human consumption, barley has a lot going for it.

It's affordable, easy to cook with, versatile and very nutritious — in fact, it even has a health claim in Canada.

However, barley is not nearly as common in a Canadian kitchen as other prairie grains, such as oats and wheat.

But many people think that could — and should — change.

POTENTIAL FOR THE CROP

Dr. Marta Lzydorczyk is a research scientist with the Canadian Grain Commission's Grain Research Laboratory. She has been studying barley for approximately 25 years now and thinks the specialty food varieties, which have high beta-glucan content, hold a lot of untapped potential.

"They have unique characteristics that are very beneficial for human health, due to the high concentration of dietary fibre ingredients," she says.

After completing decades of research on how to best

process and incorporate barley into food products, Lzydorczyk sees the most potential for the crop as an ingredient to be incorporated into existing grain-based food products, such as breads and pasta.

Using the right amount of barley in these products could provide a nutritional boost, without compromising the overall quality of the product, she says.

"The amount that you need to consume to satisfy the recommended level of beta-glucans is not that high, so you have more concentrated products delivering the health benefits and even potentially allowing products to meet the health claim," she says.

She also sees a lot of potential for barley to be available as a processed food product, in the form of pearl barley (as it is most commonly available now), flakes, steel-cut grain, or even in new forms.

"Nowadays, many of our varieties are producing very large kernels, so there is a possibility of cutting the barley into shapes or cutting it along the crease and polishing it to make a rice substitute," she says,

adding this is already being done in Japan.

Some smaller Canadian companies are already making and distributing some of these — and other — products.

InfraReady Products, based in Saskatoon, creates and sells 12 barley products.

The most sought after among these products is pearled barley flour, says president Mark Pickard, who started the company in 1994.

He says demand for barley flour has increased in the past two decades, particularly amongst western Canadian markets (while the company exports more than 50 per cent of its products, that's not the case for barley flour). He attributes the most recent growth to rising numbers of African immigrants, who use the flour for traditional dishes.

Beyond barley flour, InfraReady makes several other specialty barley products, including pearl barley, pre-cooked whole barley, grits and barley flakes. The company also produces high- and low-diastatic barley flours for the baking industry, as well as hulled barley flakes to use as a cereal adjunct in brewing.

During his time in the business,



Pickard says he has explored many other promising options for novel barley products. For example, using pre-cooked, waxy, hullless barley as a nutritional, low-fat ingredient in baking.

"It has a waxiness or lubricity to it, so it mimics fat in baking, which replaces the oil," he says. "So, for example, in muffins it would make them nice and moist."

InfraReady has also used waxy hullless barley to create a flushable, biodegradable, non-toxic cat litter, called ReadyMate (it's available at Early's in Saskatoon).

"It uses the same functional



Baking barley into breads and pastas is an obvious choice to help the crop reach its full edible potential.

attribute that we exploited in baking — water absorption — but applied to an industrial product,” Pickard says.

Pickard also thinks there’s a lot of opportunity to further explore how high levels of germinated barley could be used in food products to produce a natural chemical, nicknamed GABA, which is associated with anti-seizure and anti-anxiety effects in humans.

“We know that we can get these elevated levels of GABA through processing of waxy hullless

barley,” he says.

“There’s lots of food potential, lots of nutraceutical potential. And that’s not even including the beta-glucan aspect.”

MORE BENEFITS OF BARLEY

Beyond the health and functionality aspects of barley, another major benefit is its affordability, says Dorothy Long, communications manager at Canadian Food Focus.

“Right now, people are very concerned about the cost of food and making their food go further,” she says. “So there is appeal for things like barley that are nutritionally dense, but relatively economical, and can be used to stretch other foods.”

Another major benefit of barley is its nourishing quality, she says. “People are worried and looking for ways to comfort themselves, so they are turning to comfort foods, like barley soup and good, hearty breads.”

OBSTACLES

Despite the potential and appeal of barley, there are several significant barriers to growing the human consumption market.

For one thing, the education piece is missing, says Long, who has worked for decades promoting Canadian-grown foods to consumers.

“Lots of people don’t necessarily know what to do with barley,” she says, adding there is still significant confusion around the differences between pearl and pot barley.

“There’s such a subtle difference between them and yet most people don’t know they can use them interchangeably.”

Furthermore, she says, generally, people just don’t know how to cook with barley.

Canadian Food Focus, which aims to tell the story of Canadian food and farming to consumers, recently published a video about the different kinds of barley and Long was surprised to see that it had over 7,000 views within months of posting.

“We haven’t advertised that video at all,” she says. “And those views just come from people Googling

what to do with barley and trying to get an understanding of it.”

Long feels more work could be done on the educational piece. To that end, she has been adding more articles, recipes and cook-along videos featuring barley to the Canadian Food Focus website and social media.

“We need to make people feel more confident about cooking with barley,” she says.

Another piece will be ensuring the supply is there, says Izydorczyk. In her experience, the food industry has long been interested in working with barley as an ingredient, but there are ongoing concerns around supply.

“The effort needs to involve the whole supply chain and ensure the producers growing the barley are appropriately rewarded, because it is a specialty product,” she says.

The CGC recently started collecting information on the quality and nutritional aspects of each year’s Canadian barley supply — including malting, general purpose and food varieties — so the information is available as needed.

Now, with many of the foundational pieces in place — including the knowledge on functionality, the health claim and the passion within the industry around barley — Izydorczyk believes there is a bright future ahead for barley in food markets. She says the industry just needs to be willing to nurture that potential and further the work that has been done to date.

“We have to keep the momentum going.” 🍞

For more information, or to see the full report, visit saskbarley.com.

SaskBarley commits \$107,940 to collaborative barley research through ADF

In January, SaskBarley announced it had committed \$107,940 to funding barley research over the next four years through the Saskatchewan Agriculture Development Fund (ADF) program.

The research will support the development of new barley varieties, adaptability, and soil nitrogen and carbon dynamics for Western Canadian producers. These projects, along with over 40 other active projects SaskBarley is funding, help to ensure that barley remains a competitive crop choice for Saskatchewan producers.

Exciting new communication outlets at SaskBarley

Throughout the last two years, we have heightened and broadened our digital communications program here at SaskBarley, in part due to the restrictions on in-person events. Last year, we contracted Cole's Ag Communications to help us with these efforts. As a result, over the past year we revamped our website, added a whole new website for our extension activities (barleybin.ca), and launched a monthly market report, a podcast and a magazine. We've also enhanced our monthly e-newsletter and agronomic information. If you're not already on our email list to receive all this valuable information, visit saskbarley.com now and sign up.

SaskBarley commits \$106,925 to barley research through AFC

In February, SaskBarley announced a commitment of \$106,925 to barley research over the next three years through the Agriculture Funding Consortium (AFC) program.

The projects supported through the AFC were reviewed and funded in collaboration with the AFC program and other like-minded organizations supporting agriculture research in Western Canada, including Alberta Barley Commission, Alberta Beef Producers, Manitoba Crop Alliance, Results Driven Agriculture

Research and Western Grains Research Foundation.

This research will support the development of best management practices and technology that could lead to resistance to pre-harvest sprouting in new barley varieties, as well as other breakthroughs that will benefit Saskatchewan producers. 🌾

SaskBarley
DEVELOPMENT COMMISSION

Research Investments

— Funded By Farmers

\$215,000
Amount SaskBarley has committed to barley research over the next four years, through Agriculture Funding Consortium and Agriculture Development Fund.

40
Number of active projects SaskBarley is funding on top of the new ADF and AFC projects.

1:6
\$1 of SaskBarley investment has \$6 of partner funding

\$4.6M
Total investment in research projects over next four years

5
RESEARCH PROJECTS TO ADVANCE BARLEY

77% Amount of SaskBarley expenses that went to research in 2020/21

AREAS SUPPORTED BY FUNDED RESEARCH:

- Variety development
- Disease resistance & management
- Best management practices
- **NEW TECHNOLOGY**

FUNDING PARTNERS FOR THE NEW PROJECTS:

Alberta Barley Commission, Alberta Beef Producers, Manitoba Crop Alliance, Results Driven Agriculture Research, SaskCanola, SaskPulse, Sask Wheat and Western Grains Research Foundation

CANADIAN MALTING BARLEY TECHNICAL CENTRE

Malting, brewing industries adapt to challenging quality

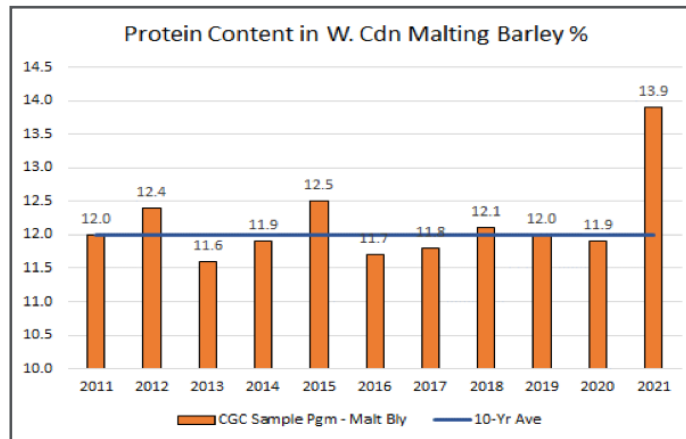
by Peter Watts
Managing Director

The drought during the 2021 growing season on the Canadian prairies led to the smallest barley crop in Canada since 1964. The overall yield was 6.9 million tonnes, driven by a severe drop in yields, averaging 43 bushels per acre compared with the five-year average of 70 bushels.

The dry, hot growing season was capped off by rains during harvest, in many areas leading to some significant pre-harvest sprouting in barley.

Combining low carry-in stocks and record high prices for feed barley, the net result has been a supply crunch this year which makes it difficult for the North American malting sector to source sufficient supplies. The barley that is available generally has quality challenges including very high protein content and reduced germination due to the harvest moisture.

As we are now a few months into the year, we have some perspective on how the malting and brewing industries are dealing with the challenges associated with the less-than-



Average protein content in 2021 western Canadian malting barley is 16% higher than the 10-year average and outside the optimal range for malt barley. Source: Canadian Grain Commission — Harvest Sample Program

optimal 2021 crop.

MALTING INDUSTRY APPROACHES

More than ever, maltsters this year have to carefully consider the quality parameters of the barley they are preparing to malt, including protein content, percent of kernels with pre-sprout damage and size distribution (plump vs thins).

With these variables in mind, maltsters must carefully monitor barley water absorption during steeping, the first stage of malting. Typically, high protein barley takes longer to absorb

moisture, so longer submersions may be required, followed by longer dry rests. Conversely, barley with pre-harvest germination tends to uptake water more quickly, so maltsters must avoid “drowning” those water sensitive kernels.

During germination, maltsters will be looking to ensure adequate modification — the process of breaking down starches and proteins in preparation for brewing — to avoid high malt beta-glucan content often associated with high protein barley.

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CBRC

We are ramping up!

Gina Feist
Manager, CBRC

Last year, the Canadian Barley Research Coalition (CBRC) ramped up its involvement in barley research, with several new initiatives.

In August 2021, we officially took on the administration of the National Barley Cluster, a \$10.2-million research investment led by the Barley Council of Canada. Exciting updates and discussion around the Barley Cluster research are being shared through social media, podcasts and videos this year. To learn more about the Barley Cluster, visit barleyresearch.ca.

Planning for the next Barley Cluster is well underway. On behalf of the barley value chain, CBRC will facilitate the submission of the next Barley Cluster (2023-28) to the Agriculture & Agri-Food Canada (AAFC) cluster program under the Next Policy Framework (NPF).

The submission of the next Barley Cluster is an extensive process that brings together the barley value chain to support research of high importance to producers, the barley industry and government.

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cmbtc.com

For inquiries please contact the CMBTC by email at cmbtc@cmbtc.com or call 204-984-4399.



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High levels of beta-glucan can cause issues for brewers during lautering (the second stage of brewing where the liquid wort is “strained” out of the mash to remove malt grist) and filtration. Maltsters also want to avoid over modification, which can be accelerated with high moisture and protein content and leads to excessive soluble protein, high free amino nitrogen (FAN) and potentially lower extract yield. All these factors can create headaches for brewers.

The last stage of the malting process, kilning, may also need to be conducted at lower temperatures for longer periods to avoid the formation of high malt colour due to high

soluble protein content in malt.

Finally, careful blending of malt after processing is critical. Barley with very different profiles, such as protein levels, are typically malted separately but are blended after processing to meet customer specifications. The goal for maltsters this year is to provide as consistent quality malt as possible for their customers throughout the year. 🍷

The Canadian Malting Barley Technical Centre (CMBTC) is an independent, not-for-profit research facility established in 2000 that serves the Canadian malting barley supply chain. SaskBarley is proud to be a financial supporter of the CMBTC and to serve on its board of directors.



Ramping Up
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Over the next year, barley research funders will review letters of intent, select full proposals for peer review and develop a business case that will articulate the importance of barley research in Canada.

CBRC has also been busy enhancing communications and reinforcing its position as the leading resource for barley research in Canada. We have updated our website to include details of the National Barley Research Strategy, Core Breeding Agreements, National Barley Cluster research activities and industry news, including the Canadian Grain Commission’s 2021 Harvest Survey. You can also follow us on Twitter (@barley_research) for timely industry information and updates.

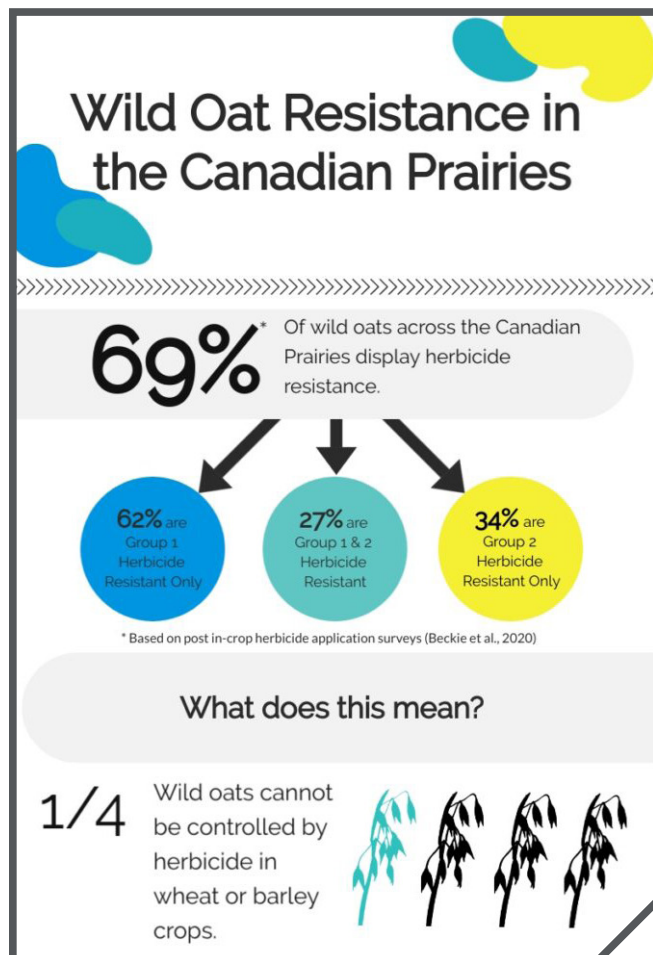
CBRC recently held its annual general meeting and welcomed the following newly elected board members: Cody Glenn, Glenn Wright and Connie Matson. Boris Michaleski and Dick Wymenga have also agreed to stay on and continue to support our important, ongoing work. CBRC thanks outgoing board members Jason Skotheim and Matt Enns, who dedicated significant time and energy to CBRC’s creation. 🍷

New video aims to help farmers understand resistant wild oats

SaskBarley is one of the proud sponsors of this first video produced by the Resistant Wild Oat Action Committee (RWOAC), focused on better understanding resistant wild oats across the Canadian prairies.

Hear from farmers across Western Canada as they share their experiences, management tools and techniques to manage the spread of resistant wild oats within their own operations.

The video is available here: <https://weedsience.ca/wild-oat-action-committee/> 🍷



The Canadian Barley Research Coalition (CBRC) is a national, not-for-profit organization founded by the three western Canadian barley producer groups: Alberta Barley, the Saskatchewan Barley Development Commission and the Manitoba Crop Alliance. CBRC provides a forum for collaboration on long-term research investments that aim to improve the profitability and competitiveness of Canadian barley.

Supply & demand for barley tightest in decades

Recent highlights of global production and trade

by Peter Watts
Managing Director, CMBTC

HIGHLIGHTS:

- According to major agriculture analytical organizations, such as the United States Department of Agriculture (USDA) and the International Grain Council (IGC), the global barley supply and demand (S&D) is the tightest it has been in decades. With world ending stocks projected at 16.7 million (M) tonnes at the end of 2021/22 according to the USDA, that would be the lowest stocks since 1983.
- The war in Ukraine will impact the ability of both Ukraine and Russia to export barley and other grains (corn, wheat) through the Black Sea for the foreseeable future. The two countries were projected to export 10.5 million tonnes of barley this year, almost a third of global exports.

GLOBAL BARLEY EXPORTERS

OCT/SEP ('000 METRIC TONNES)

	2018-19	2019-20	2020-21	2021-22F	+/- Jan	2021 vs 2020
E.U.	5,809	7,579	8,558	7,500	(200)	(1,058)
Australia	3,666	3,231	8,007	8,500	-	493
Russia	4,320	5,141	5,691	4,500	-	(1,191)
Ukraine	4,407	4,990	5,053	6,000	-	947
Canada	2,269	2,520	3,520	1,600	(100)	(1,920)
Argentina	3,001	2,598	2,458	3,500	-	1,042
UK	1,538	1,404	1,292	1,000	100	(292)
Kazakhstan	1,762	1,292	1,028	700	100	(328)
U.S.	101	155	350	175	-	(175)
Uruguay	62	41	185	250	(50)	65
Other	292	473	554	388	N/A	(166)
WORLD	27,227	29,424	36,696	34,113	(150)	(2,583)

Source: USDA – February update

ANNUAL GRAIN PRODUCTION IN CANADA

('000 METRIC TONNES)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22F	Prev. 5 Yr Avg	2021 vs 2020
Barley	8,839	7,891	8,380	10,383	10,741	6,948	9,247	-35%
Canola	19,599	21,458	20,724	19,912	19,485	12,595	20,236	-35%
Corn	13,889	14,096	13,885	13,404	13,563	13,984	13,767	3%
Flax	591	555	492	486	578	346	541	-40%
Oats	3,231	3,733	3,436	4,227	4,576	2,606	3,841	-43%
Rye	436	341	236	333	488	473	367	-3%
Soybeans	6,597	7,717	7,417	6,145	6,359	6,272	6,847	-1%
Durum	7,762	4,962	5,785	5,017	6,571	2,654	6,019	-60%
Spring Wheat	20,705	22,560	24,053	25,952	25,842	16,009	23,822	-38%
Winter Wheat	3,673	2,855	2,514	1,701	2,770	2,989	2,703	8%
Pulses*	8,349	7,089	6,425	7,187	8,175	4,326	7,445	-47%
TOTAL SELECT CROPS	93,672	93,257	93,347	94,747	99,147	69,201	94,834	-30%

Source: Statistics Canada, Dec. 3, 2021

*Pulses include peas, lentils, beans and chickpeas

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- With limited options to source barley before the northern hemisphere new crop is available, remaining supplies this year will have to come from Australia or possibly Argentina, although even the export logistics in these countries are full well into spring.
- China's announcement on Feb. 24 they will now accept imports of barley and wheat from all origins in Russia will undoubtedly result in greater feed barley exports from the Black Sea to China in the future. Neither Ukraine nor Russia exports significant quantities of malting barley.
- With tight barley supplies globally and recent geo-political developments, international barley prices have remained firm, with French old crop feed barley rising above US \$350 FOB in recent days compared with approximately \$300 at the beginning of 2022 and roughly \$250 early last August.

CANADA

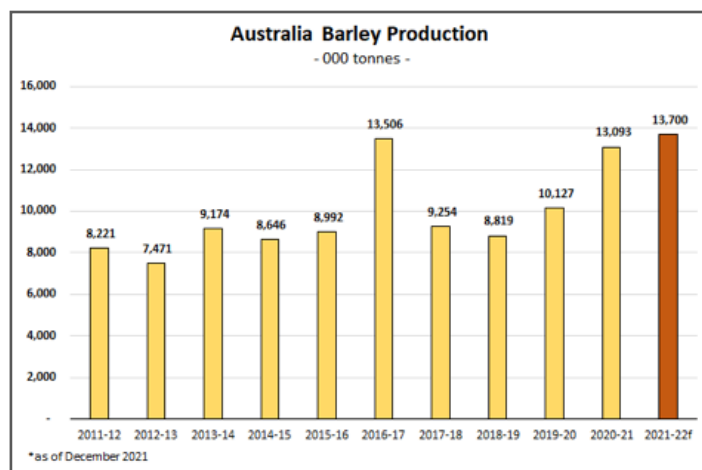
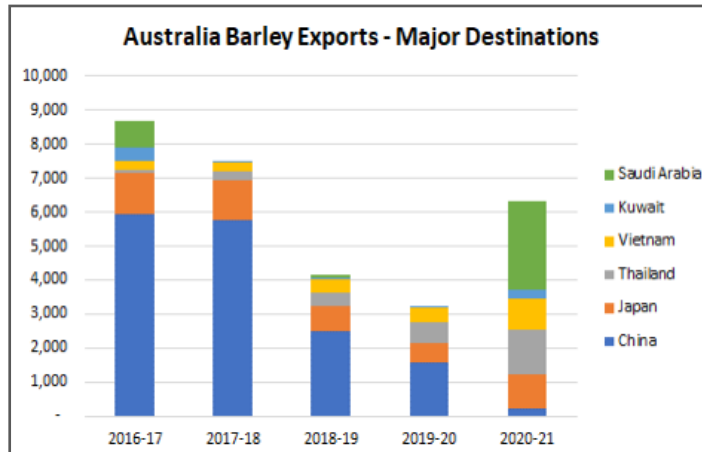
- On Dec. 3, 2021, Statistics Canada (StatCan) released its final estimates for area, yield and production of field crops in Canada for 2021.

» Barley production estimated at 6.95 M tonnes, including 345,000 tonnes in eastern Canada, the smallest barley crop in Canada since 1967 (5.5 M tonnes)

» Average yields of 43 bushels per acre (bu/ac), the lowest since 2002 (41.5)

2021-22 Barley Exports by Final Destination						
(metric tonnes)						
	Aug	Sept	Oct	Nov	Dec	To Date
China P.R.	-	355,247	594,493	193,579	220,469	1,363,788
USA	9,620	10,034	14,759	21,205	15,910	71,528
Japan	1,359	-	1,000	6,490	-	8,849
Other	-	-	-	-	3	3
World Total	10,979	365,281	610,252	221,274	236,382	1,444,165

Source: Statistics Canada



- Canada's 2021 barley exports were strong in spite of the small crop, with numbers for August-December totalling 1.44 M tonnes and China as the major destination. The majority of exports were feed barley, with a small amount of malting barley.
- Canada has been importing significant amounts of corn for the feed sector. As of Feb. 17, 2022, there had been more than 700,000 tonnes of corn imported to Canada, with another 1.5 M tonnes of sales on the books. Agriculture and Agri-Food Canada (AAFC) is projecting 4 M tonnes of corn imports, which would be the highest on record.
- Canada will also import malting barley this year to supplement short supplies.

Imports will come from origins such as the U.S., Europe and Australia.

GLOBAL EXPORTERS

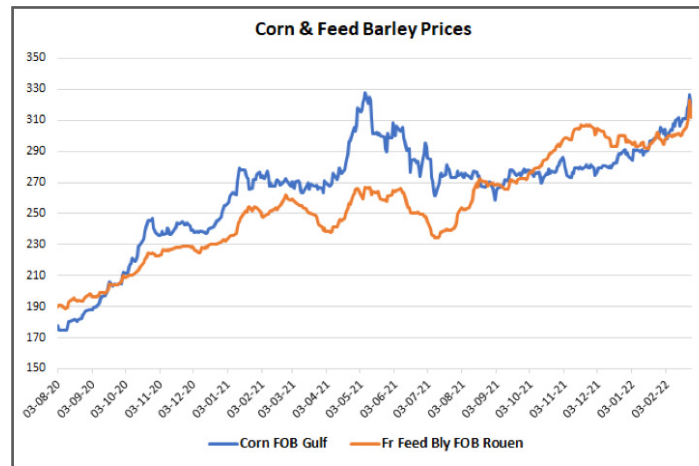
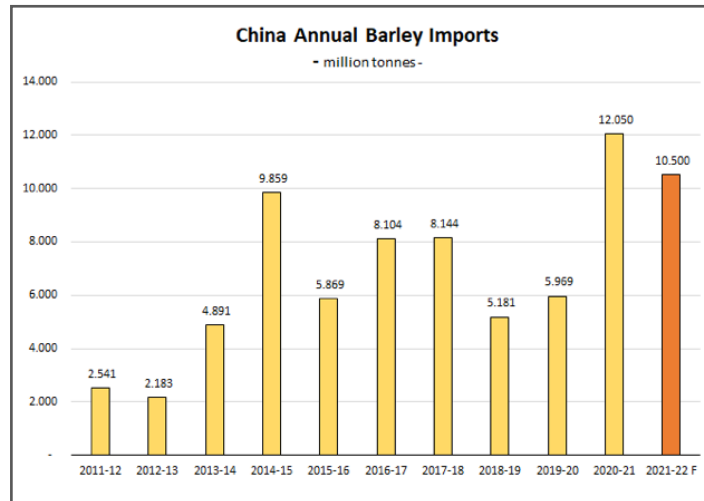
- In its March report, the Australian Bureau of Statistics (ABARES) increased its Australian 2021 barley production estimate to 13.7 M tonnes, the highest on record, up from 13.1 M tonnes in 2020.
- In 2020/21, Australia exported 8 M tonnes of barley, despite a de-facto embargo on exports to China. Australian exports were redirected to Saudi Arabia, Japan, Thailand and Vietnam, among others.
- Australia has also exported malting barley to some non-traditional destinations this year, such as Mexico, Peru and Ecuador. Exports are projected at 8.5 M tonnes in 2021/22.
- In spite of two successive strong export programs, Australia's barley supplies remain healthy, with carry out expected between 2-3 M tonnes at the end of 2021/22 (estimates vary quite substantially depending on the source).
- Final estimates of Argentine 2021 barley production are 5.2 M tonnes, the largest on record. Total barley exports are projected at 3.65 M tonnes, which would also be a record. With a massive barley export program to China (more than 2 M tonnes), exports have dropped significantly to traditional destinations such as Colombia, Ecuador and Peru for malting barley,

and the Middle East for feed barley.

- European Union (EU) barley exports between July 1, 2021 and Feb. 20, 2022 totalled 5,172 M tonnes, up slightly from the previous year. With a smaller crop this year (51 M tonnes vs. 54 last year), both the USDA and the European Commission are forecasting EU barley exports will be down, from 8.5 M tonnes in 2020/21 to 7.5 M tonnes in 2021/22. However, based on the export pace to date that may be an underestimate.

CHINA

- China's 2020/21 barley imports (October-September) are estimated by the USDA at 12 M tonnes, an all-time record. All of the increase was in feed barley imports, with China generally taking 3-3.5 M tonnes of malting barley annually.
- The USDA import forecast for 2021/22 is 10.5 M tonnes. With imports averaging 1.3 M tonnes a month between October-December, this would seem an easy target. However with the disruption in the Black Sea, this estimate may



drop and China may have to look to the U.S. and Argentina for additional corn supplies.

- Corn prices on China's Dalian Commodity Exchange have rallied since

the harvest low at the end of September 2021 (US\$395), coming up to US\$457 per tonnes today.

BARLEY PRICES

- Given the tight global

S&D, barley prices have remained firm. Recent events have pushed those prices even higher, with old crop French feed barley now quoted around US\$350 FOB and U.S. Gulf corn quoted at US\$340 FOB. New crop (2022) French feed barley is now estimated at US\$325 per tonne FOB Rouen.

- Barley prices on the Prairies have also remained firm, with Lethbridge feed barley values hovering around \$440 per tonne or \$9.50/bu delivered feedlot.

2022/23 OUTLOOK

- AAFC released its first projections for 2022/23 supply and demand in January. The year-over-year changes in seeded and harvested area are not significant. With a return to average yields, the forecast is for barley production of 10.5 M tonnes in 2022. Also notable is that the 2021/22 export forecast of 2.95 M tonnes is likely on the high side (by 300,000-400,000 tonnes). However, strong domestic demand carry-out stocks of 300,000, the tightest on record, are likely in the ballpark.

Grain and Crop Year (a)	Area Seeded thousand ha	Area Harvested	Yield t/ha	Production	Imports (b)	Total Supply	Exports (c)	Food & Industrial Use (d)	Feed, Waste & Dockage	Total Domestic Use (e)	Carry-out Stocks	Average Price (g) \$/t
Barley												
2020-2021	3,060	2,809	3.82	10,741	294	11,991	4,277	299	6,417	7,003	711	294
2021-2022f	3,357	3,002	2.31	6,948	150	7,809	2,950	219	4,060	4,559	300	420
2022-2023f	3,300	2,960	3.58	10,590	60	10,950	3,350	319	6,001	6,600	1,000	320

Source: AAFC, February 2022

Rescuing your barley from DON

SaskBarley-funded research aims to lower DON content in barley after harvest

by Leeann Minogue

Resistant barley varieties protect cereal crops from fusarium, but they aren't bulletproof.

In the right (wrong?) conditions, barley and wheat can be infected by *Fusarium*

graminearum, a fungus that produces deoxynivalenol (DON) metabolites (also called vomitoxin). Malt and feed buyers have a low tolerance for DON, so even modest levels can make grain a marketing nightmare.

Researcher Dr. Rex Newkirk and his team at the University of Saskatchewan have found

ways to lower the DON content of wheat and barley after harvest. SaskBarley, along with Sask Wheat and the Saskatchewan Ministry of Agriculture's Agriculture Development Fund (ADF), provided funding for the team to test these options:



Air fractionation machines like the one shown here use air flow to separate lighter, DON-infected barley from healthy kernels.

SORTING WITH AIR FRACTIONATION

Barley infected with fusarium head blight is lighter than healthy grain. Newkirk used this density difference to sort FHB-infected barley with an air fractionator. These machines are relatively simple.

“Grain is fed down in front of a fan,” Newkirk says. Heavy material falls right below the fan, lighter material flows further down the tunnel. Chaff comes out the end with a high DON content and can be separated from the rest of the grain. Newkirk and the team found it was important to set the fan speed correctly for optimal results. Plus, “you have to be careful not to lose too much barley,” Newkirk warns.

Air fractionation is a practical solution for grain with DON content just above marketable levels. These machines are reasonably priced and can process about 50 tonnes of grain per hour. For more precise sorting, Newkirk has another suggestion.

BOMILL SORTERS

BoMill seed sorters were designed to sort grain based on protein levels, but when Newkirk asked if they could be used for DON, BoMill recalibrated their machines.

When a BoMill drum rotates, grain kernels settle into grooves. There, one of the machine’s 96 lights shines on them to estimate quality differences by changes in the near-infrared light absorption. The measurements aren’t exact; they’re used to sort the grain into “high” and “low” levels as set by the user.

BoMill sorters are more likely to be used at seed cleaning facilities than on-farm. “It’s expensive,” Newkirk says, and they only process about three tonnes of grain per hour. But when seed is in short supply, they could be cost-effective. Newkirk recommends using air fractionation before sorting with a BoMill, so there’s less volume to sort. With these two methods, he says, “you could clean out a lot of DON.”

GET RID OF DON

Newkirk also has a method for lowering DON content in the bin, without losing any grain. Pumping ozone through the grain



At the Canadian Feed Research Centre at the University of Saskatchewan (top), new and improved animal feeds are researched, developed and commercialized. (Right) Strip tests can measure total DON in grain at levels as low as 0.20 ppm.

can break down 30-50 per cent of the DON content. Ozone (O₃) is an unstable chemical with lots of uses, such as killing microbes in hospitals and purifying drinking water.

Ozone generators can be purchased or rented. The ozone they make can be moved through a bin using aeration fans for 24 hours. Ozone is most effective on grain with a high moisture level. It’s possible that ozone could cause iron to oxidize and promote rust, though Newkirk and his research team haven’t seen any rust yet. This solution won’t be effective for barley with very high DON content, but “if you take something that’s on the edge, you can get the DON content down without losing any material,” Newkirk says.

It hasn’t been widespread in recent years, but Newkirk says “fusarium head blight



will show up again.” When it does, air fractionators, BoMill sorters and ozone generators offer farmers three more tools to lower the impacts of this disease. 🧪

To view the final report, visit: <https://saskbarley.com/projects/>

Growing the market for new barley varieties

The industry is working hard to ensure new varieties have full potential for acceptance

by Leeann Minogue

Of all Saskatchewan crops, barley is most likely to be grown from the oldest seed variety. Not because there are no new varieties or barley growers won't try new things, but because of the lag between variety development and industry acceptance.

"The new varieties are better yielders and have other agronomic advantages," says Peter Watts, managing director of the Canadian Malting Barley Technical Centre (CMBTC). "But many maltsters and brewers tend to stick with what they know."

As a result, the industry must work hard to ensure new varieties get the opportunity to be fully evaluated, as gaining acceptance benefits the entire value chain, from breeders to brewers.

Each year, the CMBTC publishes a list of barley varieties with the best potential to be purchased for malt. Two of this year's six varieties, CDC Copeland and AAC Metcalfe, have been registered for more than 20 years. AAC Synergy is already widely accepted, and new varieties CDC Fraser and AAC Connect are gaining traction. "They both have good yields, and good disease packages," Watts says.

The CMBTC also lists three varieties — CDC Churchill, CDC Copper and AB BrewNet — as "in development" for 2022. Watts says their yields are "spectacular," but it's still early.

"They look good in internal malting trials,



Devil May Care Brewing Company in Winnipeg brewed this batch of its Bright Water craft beer with CDC Fraser barley. Photo courtesy Devil May Care Brewing Company.

but pilot scale is completely different than commercial-scale production," he says.

HOW DO THEY CATCH ON?

When a new variety is registered, the industry begins the evaluation process. Maltsters and brewers need varieties that process well and don't present issues that could negatively impact the sensory properties of the final product: beer.

"Canada's domestic malting industry is always the first group to test new varieties," Watts says. "International customers like to hear what the Canadian malting companies say before they commit to testing a new variety."

This process takes time, so in the early years after a new variety is released, it can be difficult to match supply with demand. "Producers should have a

contract with a malting or grain company when growing a new variety," Watts says.

Once a new variety is registered, the CMBTC evaluates its malting and brewing characteristics and sends small samples to international customers for testing. When those potential buyers are interested in a new variety, the CMBTC works with the seed industry to source enough barley so maltsters and brewers can test commercial-scale quantities in their own facilities. "That's really the gold standard of market development," Watts says.

Watts has noticed brewers' tastes in new varieties changing — literally. "Large and small brewers are really paying attention to the sensory properties of these varieties," he says.

WHAT ABOUT FEED?

Due to recent high demand, feed barley market development hasn't been as high of a priority lately, especially as the industry has faced short supplies this year, Watts says.

Canada's livestock industry is the primary market for feed, but the CMBTC doesn't take it for granted. "We need to continue to work to make sure that barley is the grain of choice," Watts says. This includes examining ways to increase barley's nutrient value.

Historically, high-yielding, low-quality barley varieties were bred specifically for the feed market, but now some malt varieties can compete. "Synergy was the game-changer," Watts says. AAC Synergy and newer varieties have comparable yields to familiar feed varieties.

"You may as well grow a malt variety. You get a premium and a bigger market opportunity." 🍷

THE TROUBLE WITH THRIPS

How to identify and deal with this small-grain cereal pest

Thrips are characterized by small size-sized, long slender bodies and fringed wings. Photos courtesy of Sheila Elder

by Dr. James Tansey
Saskatchewan Ministry of Agriculture

There are about 6,000 species of thrips worldwide, with 147 described species in two suborders in Canada, including 28 non-natives. Recent molecular work indicates there may be as many as 255 additional as-of-yet-undescribed species

in Canada. Although some species are important for pollination and a few are predators of other small insects, thrips can be damaging pests in crops.

They have unique, asymmetrical mouthparts that are characterized by a greatly reduced right mandible. Their feeding is described as “rasping-sucking,” as they

scrape the surface of plant tissue and ingest the fluid that flows from the wound. When they feed on actively growing plant tissue, reduced and distorted growth, and yield loss can occur. When they feed on more mature tissue, silver leaf scars can occur that reduce the quality and marketability of some crops.

Thrips, primarily western

flower thrips (*Frankliniella occidentalis*), melon thrips (*Thrips palmi*), and chili thrips (*Scirtothrips dorsalis*), are also increasingly important vectors of tospoviruses worldwide. These infect primarily fruit and ornamental crops.

Continued on next page

Cont. from previous page

Thrips (the same term is used for both singular and plural references) are characterized by small sized (the largest species is only 2 mm as adults, the smallest is 0.6 mm), long slender bodies and fringed wings. Adult thrips are generally relatively weak flyers and employ a “clap and fling” technique. The animal claps the leading edges of its wings together at the end of the upstroke and then rotates the wings around the trailing edges, flinging them apart. Many small insects use this technique to promote air circulation and generate lift quickly.

The barley thrips (*Limothrips denticornis*) was first reported in North America in 1923 in New York. In its native Europe and Asia, it can be

found on a wide variety of grass species but is a minor pest and only on rye. In North America, it is generally more important on barley, though it can be found on winter wheat, durum, winter rye, corn and triticale as well. Adults are

Economic thresholds:

Threshold (thrips/stem) = (Cost of control per acre/ expected \$ value per bushel) / 0.4.

small (1.1 mm to 1.8 mm), elongate, and dark brown to black. These thrips lay eggs on upper leaf sheaths and each female can produce 100 eggs. Juveniles are smaller and lighter coloured.

Barley thrips overwinter as adults and move to winter grasses in the spring. They are somewhat stronger flyers than many thrips species but are still limited by their size.

Thrips feeding on cereals can

result in tissues appearing bleached. When numbers are high and feeding is intense, kernels can be shriveled. Severe flag leaf feeding can result in kernels filling improperly and reduced kernel weight.

Scouting for barley thrips should be done from first sign of flag leaf until the head is completely emerged from the boot. Barley thrips can be found on stems but are more commonly under the top two leaf sheaths. Because thrips are relatively weak flyers, there may be greater concentrations in protected field edges. Greatest damage has been reported in dryland cropping areas after prolonged drought.

THRESHOLDS

Sample at least 50 stems from different parts of the field. One adult thrips per stem can cause a loss of 0.4 bushels per acre. This usually translates to an action threshold for barley and oats of 7-8 thrips/stem prior to head emergence, but greater precision can be achieved by using the formula. The action threshold is the number of insects

detected that justify the expense and effort of applying control. Numbers lower than this do not warrant control but may need further monitoring to assess possible population growth. Only apply control prior to the completion of heading.

Thresholds for cereal thrips have been determined for barley and oats, but effects on other cereals crops in North America are less well understood. Work in Europe has found comparable damage from thrips in rye, triticale and winter barley. Recent reports of barley thrips in durum in Saskatchewan also suggest a risk of damaging effects, but these are not as well understood. A report from Germany indicated that, despite some relatively high thrips numbers, there was no correlation between barley thrips and damage. However, there is also evidence from Europe of the importance of long crop rotation to thrips damage control in wheat. 🌾



Please forward reports of thrips issues to Dr. James Tansey with the Ministry of Agriculture (james.tansey@gov.sk.ca).

Mortal danger

Get the most out of your barley this season by understanding seedling mortality

By Mitchell Japp

SaskBarley

Mortality is serious. On its own, it conjures images of the grim reaper — the black-hooded cloak and scythe, swooping in to complete its grim task.

Seedling mortality seems less grim by comparison, but it is well worth understanding to ensure you get the most out of your barley.

Calculating seeding rates is designed to increase precision and accuracy — to ensure you're planting to achieve the optimal plant stand for your farm. But, if you've calculated seeding rates before, you'll know that it requires an estimate of seedling mortality. It's hard to be precise or accurate with an estimate.

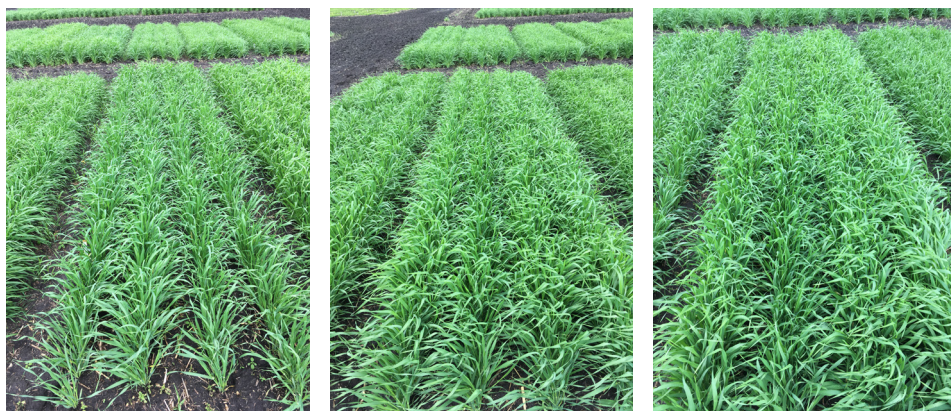
Seeding rate (lbs/ac)=

$$\left(\frac{\text{Desired plant population}}{\text{ft}^2} \right) \left(\frac{\text{TKW}}{\text{g}} \right)$$

Germination less seed mortality
(in decimal form)

10.4

Seedling mortality — or conversely, seed survivability or emergence percentage — may be used somewhat interchangeably in discussions of seeding rates. Seedling mortality describes the seeds we would expect to live but don't, while seed survivability refers to what actually grows.



AAC Synergy barley at 15, 27 and 39 plants/ft² in a project titled “Determining optimum target plant stands for spring cereal crops in Manitoba.” Photo printed with permission from Anne Kirk, taken in Carberry, MB.

Germination minus mortality is equal to seed survivability.

In the seeding rate calculation, we have accurate values for TKW (weight of one thousand seeds in grams) and germination from the seed lab. But, we know that not all seeds that germinate will make it out of the ground and live. There are crop specific estimates for seedling mortality, with cereals being among the best at 5-20 per cent. But, 5-20 per cent is a big range.

The challenge with seedling mortality is that it varies with management and environment. Management variability may come from seed opener type, row spacing, seeding rate, seeding speed, seed-to-soil contact, fertility management, crop residue, residual herbicide carryover and more. Environmental factors may include disease, moisture, insects and more. With so many variables, there will be differences between farms, fields and years. But, taking the time to measure emergence will help to establish an appropriate baseline for your farm and take seeding rate calculations to the next level.

See below the step to calculate seedling mortality (note: this will only work if the seeding rate used is based on a target plant stand and TKW):

1. Note any observations about seeding conditions and management decisions that may affect seedling mortality.

2. Put a reminder in your phone or day planner to count emergence 21 days after planting. This is the optimal time to identify each plant before tillering starts and is long enough that all plants will be emerged.
3. 21 days after seeding, count the emergence. Ideally, 6-10 locations that are representative of the field. The more uniform the field, the fewer locations are needed.
4. Determine counts based on a square metre or square foot. You can use agronomic tools like a square foot or square metre, or count plants in a single row. To count plants in a single row, divide your row spacing into the area you are targeting. For example, for 12” row spacing, count the plants in 12” of row (144 in² ÷ 12 in = 12 in)
5. Using the average establishment from all locations, divide that into the target seeding rate. Subtract that amount from your germination and you'll know the seedling mortality for that field. For example, if you targeted 25 plants/ft² and you count 20 plants/ft², your emergence is 80 per cent and if the germination was 95 per cent, seedling mortality was 15 per cent.

Once you have collected seedling mortality for a few years, you'll have a much more accurate and precise value to include in your seeding rate calculations. Taking good notes of the variability over time will also allow you to make adjustments to the calculation for specific conditions. 📊



Photos courtesy Rafter R Brewing Co.

Sask brewer finally finds his groove

Family and community a driving force behind Rafter R Brewing

By Melanie Epp

In some ways, barley has been in the background of every one of Ryan, 43, and Teresa, 43, Moncrieffs' memories. Growing up together in a tiny village in west-central Saskatchewan, it was there when they travelled to and from school. It fed the Moncrieffs' cattle, and filled the surrounding grain bins. And it was there when Ryan

got his first taste of what would later become a passion and profession. But more importantly, it's part of the landscape that taught them the importance of tradition and the value of preserving that special bond between people and place.

Ryan and Teresa have known each other since they were in diapers. As the kids of farming families, Teresa grew up a mile down the road from Ryan in Senlac, Sask., a tiny village in the heart of cattle country not far from the Alberta border. At last count, Senlac had a population of just 41. Ryan's family still lives there, growing crops and raising cattle. Teresa's parents are retired, but still live on the family farm.

Around 2005, the couple moved to Chauvin, Alta., the first home to the Moncrieffs' four children: Avery, Holden, Lily and Olivia. First, Ryan took a job in the oilfields, but later he made the switch from drilling to brewing, a move he said felt fateful.

"I realized then that this was the industry I was meant to be in," he said. "It was just one of those things where you finally find your groove."

Ryan has always loved beer, but growing up there were few options available to him. Still, he was keen to broaden his horizons. When he and a good friend got together, they'd try to bring something new to the table.

Later, he got into homebrewing

where he tried to replicate different styles from all over the world. But things really began to change when he started work at Ribstone Creek Brewery, not far from their home in Chauvin. His mentor, he said, was a wealth of knowledge who taught him how to understand a beer's unique characteristics. It was there he learned the importance of using quality ingredients and fostering close relationships with local maltsters. These lessons would serve him well when he and Teresa decided to open a brewery of their own some years later.

In 2020, the couple moved home to Saskatchewan and opened Rafter R Brewing on July 29, 2020 in the small town

of Maple Creek, just four hours south of where they'd grown up. Tradition and community became the backbone of the beers they serve. Today, Teresa runs the day-to-day operations — serving customers in the taproom, keeping books and ordering stock — and Ryan focuses on brewing. Their menu offers a variety of ever-changing beers, including a few mainstays — a Blonde Ale, a West Coast IPA, a Berliner Weisse, a Red Ale and an Oatmeal Stout.

Being from farm families themselves, supporting local growers and maltsters is important to the Moncrieffs. While some of the malts come from Germany and the UK, most are locally produced in Alberta and Saskatchewan, lending their small-batch craft beer a small-town taste.

"It matters to us to support the local farming communities, and it matters to our customer," said Teresa. "I get asked multiple times a week where we purchase our grain from. People want to



know and are pleased when they hear a lot of our grain is grown and malted in Saskatchewan and Alberta."

The most local beer they've brewed was their Oktoberfest lager. A classic German-style beer, it was made with 100 per cent Saskatchewan-grown barley and hops.

In the future, Ryan said he'd like to create a truly local beer that respects his own roots. "I would love to take something from my dad's farm at home, have it malted and make a beer off the family farm," he said.

Surrounded by the prairies of Saskatchewan, Rafter R Brewing is located in the town of Maple Creek. The taproom is open Tuesday to Saturday. 🍷



Ryan and Teresa Moncrieff opened Rafter R Brewing Company in Maple Creek, SK, in 2020.

What's on tap at Rafter R Brewing?



BLONDE ALE 5.0% abv

A straightforward, approachable beer brewed with the average beer drinker in mind.



WEST COAST IPA 6.3% abv

Dry hops give this beer tropical and citrus fruit flavours and a solid bitterness.



BERLINER WEISSE 4.0% abv

German-style, kettle-soured wheat beer. Tart, crisp and refreshing, it's traditionally served with fruit juice on the side.



RED ALE 4.5% abv

Light caramel and toffee notes, finished with a crisp bitterness that refreshes the palate.



OATMEAL STOUT 4.7% abv

Black as midnight, but not as dry and burnt as some stouts. Roasted and complex.

**THE SASKATCHEWAN BARLEY
DEVELOPMENT COMMISSION:**

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

**SASKATCHEWAN BARLEY DEVELOPMENT
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