2024-25 CDC Oat Breeding Program Report to the Oat Industry

A.D. Beattie

Crop Development Centre, University of Saskatchewan

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1.0 Overview

1.1. General

Support of the Crop Development Centre (CDC) oat breeding program from our industry partners represents a significant proportion of the funding that the program receives. The CDC oat program is extremely appreciative of the increased support we've received from the SaskOats, FP Genetics, Richardson Milling, Grain Millers and General Mills. We are close to renewing support for the oat breeding program from the Western Grains Research Foundation (WGRF) with an agreement set to be signed in July. We also renewed our funding agreements with FP Genetics and SaskOats in 2024 for an additional five years, General Mills generously provided us with three additional yeas of funding beginning in 2024, Grain Millers increased their annual funding over the past year and Richardsons continues to provide strong annual funding to the program. This report outlines activities undertaken between July 1, 2024 and June 30, 2025.

The 2024 growing season was characterized by above average rainfall in May and June that was combined with average temperatures. This period was followed by relatively dry and above average temperatures in July and August. There was very good soil moisture available for spring seeding which commenced on May 10 and was completed on May 19 with two periods of delay due to rain. June received 111 mm of rainfall which made herbicide application challenging, but it was completed in a timely manner. By early July crops were a bit behind normal development, but above average temperatures and limited rainfall in July and August allowed crops to rapidly proceed through heading and into maturity. From May 1-August 31 Saskatoon received 1,345 GDD (5°C base) with the 5-year average being 1,348 GDD, and received 229 mm of precipitation with the 30-year average being 216 mm. Overall, plots at Preston, Seed Farm, Kernen, and Codette SK, Lacombe AB, and Ft. Whyte, Portage-la-Prairie, Kelburn and Brandon, MB were uniform and produced good data. Plots at Goodale suffered from extreme lodging due to storms in mid-July, although some lodging data was obtained the site was not able to be harvested. The Melfort site had slightly elevated CVs, but the data was still useful. Harvest began on August 15 and was completed by August 31 with no delays due to rain and no frost received prior to completion. Good data was produced from almost all sites during the 2024 season and all material moved through the program normally.

We had no issues with breeding material passing the phytosanitary requirements for New Zealand and were thus able to send all intended breeding lines to the New Zealand winter nursery.

Over the past year Mr. Chamara Silva resigned from the field program to take a position with another research group and Ms. Amara Gungaabayar returned from maternity leave.

Over the past year the program bought two high volume seed counters that can be used in combination with seed treatment which has significantly sped up our spring pre-seeding preparation. The 80 hp Kubota tractor and Valentini rotary tiller/packer bought last year was used at our off-station sites at Downey and Rosthern and greatly improved the uniformity of the seed bed and subsequent germination.

1.2 Highlights

OT3125 was supported for registration in February 2025 and provided to FP Genetics for marketing. **OT3125** is a moderate β-glucan, oil and protein oat line that combines good groat percentage, good test weight, kernel weight, plumps and low thins. It shows very good yield potential, shorter height, good

lodging resistance and moderate maturity. **OT3125** also demonstrates resistance to smut. **OT3121**, which was supported for registration in February 2024, was officially registered with CFIA in 2024 as **CDC Hank**.

CDC Anson, marketed by FP Genetics, is performing well in the AB, SK and MB regional variety trials, where it displays yield potential similar to/slightly better than CS Camden in AB and SK, and yields at the top of the variety list in MB. The variety is set for more widespread commercial release in 2025. **CDC Endure**, marketed by Alliance Seeds, remains the top (or near the top) yielding variety, along with **CDC Arborg** (marketed by FP Genetics), in the Alberta, Saskatchewan and Manitoba Seed Guides. **CDC Arborg** continued to increase in acreage in 2024, making it the 3rd most seeded variety (based on provincial insurance data) in Western Canada (Fig. 1). **CDC Endure** also continued to increase in acreage in 2024, making it the 5th most seeded variety (Fig. 1).

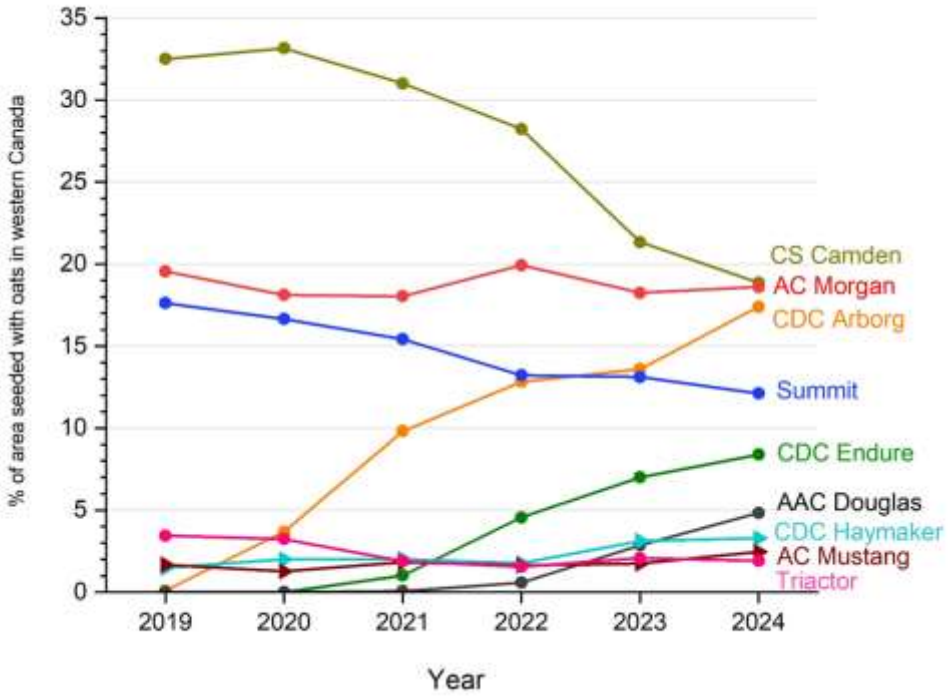

Figure 1. Comparison of area seeded with the top milling and feed/forage oat cultivars each year in western Canada from 2019 to 2024 (courtesy of Grain Research Lab, Canadian Grain Commission).

2.0 Oat Breeding Program Activities

2.1 Crossing and Early Generations

A total of 68 new crosses were made in the greenhouse during the 2024 winter, summer and fall crossing blocks. Sub-categories of crosses included introductions, crown rust resistance, adult plant crown rust resistance, stem rust resistance, protein, general, yield and forage. The F1 generation from the winter and summer crossing blocks were sent to the winter nursery in Leeston, New Zealand (Southern Seed Technology, Ltd.) for seed increase over the winter of 2024-25. The F1 generation from the fall crossing block was increased in the greenhouse during the winter of 2024-25.

Thirty-nine F2 generation populations were grown as bulk plots in Saskatoon during the summer of 2024. F3 seed harvested from these plots were subsequently sent to our New Zealand winter nursery for generation advancement over the winter of 2024-25. Twenty-three F3 generation populations were grown as bulk plots in Saskatoon during the summer of 2024. F4 seed harvested from these plots were subsequently sent to our New Zealand winter nursery for generation advancement over the winter of 2024-25. Forty-seven F4 generation populations were grown as bulk plots in Saskatoon during the summer of 2024. F5 seed harvested from these plots were subsequently sent to our New Zealand winter nursery for generation advancement over the winter of 2024-25.

Twelve F5 and thirty-four F6 space-planted populations were grown in Saskatoon in the summer of 2024 with 400 single plant selections from each population harvested and further culled based on physical seed quality and/or molecular markers to 200 lines per population.

Seventeen F5 and three F6 single-seed descent (SSD) hill populations, and 24 F6 and 62 F7 hill populations were grown in Saskatoon in the summer of 2024. Approximately 50% of hills were culled in the field with a further 50% culled after threshing of field selected hills based on physical seed quality and NIT-based prediction of hull, total fat and protein content.

2.2 Winter Nursery Increases

Over the winter of 2024-25 the following populations were grown for seed increase at the winter nursery located in Irwell, New Zealand (Southern Seed Technology, Pty.):

25 F1 row populations derived from 2024 crosses.
13 F2 bulk increase populations derived from 2024 crosses.
39 F3 bulk increase populations derived from 2023 crosses.
23 F4 bulk increase populations derived from 2023 crosses.
47 F5 bulk increase populations derived from 2022 crosses.

2.3 Advanced Generations

2.3.1 Preliminary Oat MicroPlots (POMP)

A total of 1,184 lines were evaluated at the POMP stage as un-replicated plots in Saskatoon in the summer of 2024 with 50% culling in the field and a further 50% culling based on chemical and/or physical grain quality. Field selection was based on maturity, height, lodging resistance, leaf diseases (if present) and overall appearance. Chemical quality traits evaluated included, protein content, oil content and beta-

glucan content, depending on the population. Physical grain quality assessed included hull percentage, test weight, plumpness and seed weight. Lines were subjected to appropriate disease evaluation (crown rust at Guelph, ON). 308 lines were advanced to the 2025 Preliminary Oat Yield Trials (POYT).

2.3.2 Preliminary Oat Yield Trials (POYT)

484 lines were tested at the POYT stage in two replication tests grown at the Kernen Crop Research Farm (KCRF), the Goodale Research Farm and Melfor, SK (milling lines), or KCRF and Seed Farm (forage lines). No selection was done in the field. Lines were evaluated for yield along with the chemical and physical grain quality characteristics mentioned for the POMP. Lines were subjected to appropriate disease evaluation (crown rust at Guelph, ON; oat smut at University of Minnesota). Sixty-six (66) lines were advanced to the 2025 Standard Oat Yield (SOYT) and ENCORE Trials, while 23 lines were advanced to the 2025 Forage Oat Yield Trials (ForOYT).

2.3.3 Standard Oat Yield (SOYT) and ENCORE Trials

Sixty-six (66) lines were tested at the SOYT/ENCORE stage in two or three replicate tests grown at 5-6 locations, depending on the trial (Codette, Goodale, KCRF, SK; Lacombe, AB; Brandon, Portage-la-Prairie, Ft. Whyte, Kelburn, Roblin, MB; and Ottawa, ON). Lines were evaluated as in the POYTs. Lines were subjected to appropriate disease evaluation (crown rust at Guelph, ON, Saskatoon, AAFC-Morden and the University of Minnesota; oat smut at the University of Minnesota; stem rust at AAFC-Morden, Saskatoon and Ft. Whyte, FHB at AAFC-Morden, BYDV at the University of Illinois).

Three milling lines were advanced to the 2025 Western Co-operative Oat Registration test (WCORT) (Table 1). General characteristics of the lines are as follows:

OT3134: MS CRR, S SRR, R Smut, YLD>Endure, shrtr, strgr, ok Mat, ok TWT, >TKW, >>PLP, <THINS, >MY, Wht, BG<Endure, Fat<Endure, >erProt

OT3135: MS CRR, S SRR, R Smut, YLD=Endure, ok HT, strgr, Erlr, <erTWT, >TKW, >>PLP, <<THINS, >MY, Wht, BG<Endure, Fat=Dancer, ok Prot

OT3136: Pc64, S SRR, R Smut, YLD<Endure, ok HT, strgr, Ltr, ok TWT, >>TKW, >>PLP, <<THINS, >>MY, Wht, BG<Endure, Fat=Dancer, >er Prot

Table 1. Summary of lines being advanced to the 2025 WCORT.

2025 Coop#	CDC#	Pedigree	Type	2024 SOYT#
OT3134	SA220176	OT5003/CDC Endure	Milling	2024 SOYT#1-4
OT3135	SA220351	SW151310/CDC Endure	Milling	2024 SOYT#1-20
OT3136	SA222014	SA162691/OT3102	Milling	2024 SOYT#1-28

2.3.4 Forage Oat Yield Trials (ForOYT)

Nineteen lines were evaluated in three replicate tests grown at three locations (KCRF, Seed Farm, SK, and Lacombe, AB). Lines were evaluated for dry matter yield, grain yield, neutral detergent fiber (NDF), acid detergent fiber (ADF), starch, relative feed value, 30hr neutral detergent fiber digestibility (NDFD30) and

protein content. No lines were advanced to breeder seed production and ten were selected for another year of testing in the 2025 ForOYT.

2.4 Cooperative Testing

OT3125 was proposed for, and received, support for registration at the 2025 PGDC meeting. **OT3132** and **OT3133** were advanced for a 2nd year of testing in the 2025 WCORT. All other CDC oat lines were dropped from further testing in the WCORT.

2.5 Breeder Seed Production

2.5.1 Advanced Bulk Increases

0.02 acre plots of 2024 WCORT 1st year (**OT3130**-**OT3133**) milling entries were grown. Approximately 250 heads were taken from the 1st year entries for potential Breeder Seed purification. **OT3132** and **OT3133** were threshed and will be used to plant 2025 breeder hills. The others were discarded.

2.5.2 Breeder Hills

Breeder hills are the initial stage of Breeder Seed purification produced for 2nd year cooperative testing lines. In 2024 breeder hills were produced for **OT3125**, **OT3126** and **OT3128**.

2.5.3 Breeder Long Rows

Breeder long rows are the second stage of Breeder Seed purification produced for lines supported for registration that year.

Breeder long rows were grown for **CDC Hank** in 2024.

2.5.4 Breeder Seed and Special Increases

A 0.75 acre Breeder Seed plot of **CDC Westgate** was grown at KCRF to increase seed stock of this variety.

0.3 acre special increases were grown for no varieties.

2.6 Plant Breeders Rights (PBR) Trials

CDC Hank and CDC Westgate completed first year PBR trials in 2024. The second and final year PBR trials will be conducted in 2025.

CDC Byer (**OT3115**) completed second year PBR trials in 2024. Grant of PBR is pending.

2.7 Variety Registration

CDC Westgate was registered with CSGA in 2024 (#2716-2024).

CDC Hank was registered with CFIA in 2025 (#10383).

2.8 Miscellaneous Trials

The oat tests listed in Table 2 were planted in 2024 as part of collaborative exchanges or cooperative testing. These tests continue to be a valuable resource for identifying and evaluating oat germplasm that can be used in the CDC crossing block as parents to diversity and improve the genetic base of the CDC oat breeding program. Eight lines grown in these collaborative tests were used in the 2024 crossing block as parents to incorporate traits such as crown rust resistance, beta-glucan and agronomic traits.

Table 2. Collaborative or exchange test grown by the CDC in 2024.

Test	Coordinating Organization	Entries	Reps	Sites
WCORT	AAFC-Brandon (Nilsen)	36	3	1
UMOPN	University of Minnesota (Kianian)	33	3	1
UEOPN	University of Minnesota (Kianian)	25	3	1
ENCORE	AAFC-Ottawa (Yan)	160	2	1
SW Oat	Lantmannen (Ceplitis)	208	1	1
Canterra Oat	Canterra (Badea)	36	3	1
24-OF3401-SKT	Sollio (Chabot)	28	3	1
Quaker Area Trial	PepsiCo (Beattie)	22	3	1
SACGC-Oat	CDC/Sask. Ag. and Food (Struthers)	14	3	1
ION	Louisiana State University (Harrison)	102	1	1

2.9 Disease Nurseries

5,515 lines were evaluated at nurseries coordinated by the University of Saskatchewan (Saskatoon; Dr. Randy Kutcher) for crown rust (534 lines) and stem rust (575), University of Guelph (Guelph, ON; Dr. Duane Falk) for crown rust (3,183 lines), AAFC-Morden for crown rust, stem rust, smut and FHB (Morden, MB; Drs. Jim Menzies and Xiben Wang) (267 lines), University of Minnesota (Minneapolis, MN; Dr. Shahryar Kianian) for crown rust (104 lines), University of Minnesota (Minneapolis, MN; Dr. Ruth Dill-Macky) for smut (422 lines), Murphy et al. (Ft. Whyte, MB; Keith Murphy) for crown rust and stem rust (208 lines) and University of Illinois (Urbana, IL; Dr. Juan Arbelaez) for BYDV (222 lines). This information was obtained on lines entered in the WCORT, SOYTs, POYTs and POMPs. This data was extremely valuable when making selection decisions.

2.10 Molecular Marker-Assisted Selection (MMAS)

A total of 33,855 marker data points was obtained on CDC oat lines harvested from the F5 and F6 space-planted generations, and lines at the F6 and F7 SSD generations. This work was completed in the Crop Molecular Genetics Lab at the University of Saskatchewan. Molecular marker-assisted selection (MMAS) was conducted using the Taq-Man® (ABI) marker system in combination with the ABI StepOnePlus™ Real-Time (RT)-PCR machine. MMAS was conducted for the *Pc91* crown rust resistance gene, the *Pc94* crown rust resistance gene, the *PcKM* (*Pc45*) crown rust resistance gene, the *PcAS* crown rust marker, APR (from MN841801) crown rust resistance, the leaf blotch resistance gene (AvLB651) and the low acid detergent lignin trait.

2.11 Quality Lab

The Grain Quality Lab completed 16,997 analyses over the 2024-25 screening year. Table 3 lists the number of lines tested for each trait at each stage in the breeding program. We continue to develop Near

Infrared Reflectance Spectroscopy (NIR) and Near Infrared Transmittance Spectroscopy (NIT) calibration curves predictive of quality traits. These tools can allow us to screen more samples at earlier generations, thus providing us with other selection criteria on which to discard poor lines. To improve the correlation between predicted and actual values, all lines on which wet chemistry analysis is done are also scanned with the NIR (Foss NIRSystem DS2500) and NIT (Foss Infratec 1241 Grain Analyser and Foss NOVA). These data points are added to the database and the prediction is recalibrated. We currently have very good NIT calibration curves for protein, total oil and groat percentage which are used to cull lines at the hill plot and advanced generation stages of the program. We are currently building calibrations curves for beta-glucan.

Good progress is being made as a result of these screening efforts. Of lines entering the 2025 WCORT, three lines show groat percentage similar to, or better than, CDC Endure (**OT3134**, **OT3135** and **OT3136**) while three lines (**OT3134**, **OT3135**, and **OT3136**) contain beta-glucan equal to or greater than CS Camden. Additionally, three lines show protein content similar to (**OT3135**) or higher (**OT3134** and **OT3136**) than Summit and two lines (**OT3135** and **OT3136**) contains total fat at the low levels shown by CDC Dancer.

Table 3. Summary of analyses conducted at the CDC Grain Quality lab in 2024-25.

Oat Field Trial	NIT	NIR	BG	TDF	Moisture	Protein	Oil	ADL	Totals
Validation	7	7	7	7	7	7	7	-	**49**
SOYT/ENCORE	260	260	238	144	216	144	144	22	**1,450**
Exchange Trials	556	556	556	-	-	-	-	-	**1,668**
POYT	1,020	976	976	282	-	-	-	44	**3,298**
POMP	608	541	300	-	-	-	-	67	**1,516**
Misc. MP Trials	-	-	-	-	-	-	-	-	**-**
Misc. Yield Trials	142	88	54	-	9	-	-	18	**311**
F5 Hill Trials	1,448	180	-	-	-	-	-	-	**1,628**
F6 Hill Trials	1,925	307	-	-	-	-	-	-	**2,232**
F7 Hill Trials	4,232	613	-	-	-	-	-	-	**4,845**
Misc. Hill Trials	-	-	-	-	-	-	-	-	**-**
Totals:	**10,198**	**3,528**	**2,131**	**433**	**232**	**173**	**151**	**151**	**16,997**

ADL=acid detergent lignin content of hulls (wet chemical analysis)
BG=beta-glucan (Gallery Analyzer)
Moisture: measurement of groat moisture to assist with NIR calibration.
Oil= Ankom analysis
Protein=LECO analysis
NIR=near infrared reflectance spectroscopy; building calibration curve to estimate BG.
NIT=near infrared transmittance spectroscopy; estimation of total oil, protein, hull percentage.
TDF: total dietary fiber (Ankom TDF Analyzer)

3.0 Miscellaneous

3.1 Funding to CDC Oat Breeding Program

Beattie AD, Biligetu B
Title: Improving forage barley and oat varieties through novel traits and UAV-based phenotyping (ADF)
Role: co-PI
Funding Source: Saskatchewan ADF
Duration: 2024-2029
Amount: $494,500

The goals of this project are to increase the efficiency of forage breeding at the CDC by decreasing the cost and time required to evaluate key forage traits in breeding lines, increase the nutritional quality of forage barley varieties by improving fiber digestibility, and improve the economic value of forage barley and oat to growers and livestock producers in terms of both production and feeding value. The specific objectives are:

a) Create predictions for yield and quality in both forage barley and oat using UAV-based image data.

b) Evaluate the impact of the orange lemma mutation on NDF digestibility in forage barley.

c) Produce barley and oat forage varieties with improved yield, quality and disease resistance.

Feurtado JA, Beattie AD, Kochian LV
Title: Oat lodging: Identifying key root and shoot traits for improved standability.
Role: co-PI
Funding Source: Saskatchewan ADF, Western Grains Research Foundation, Prairie Oat Growers Association
Duration: 2022-2025
Amount: $286,818

The overall objective of this project is to assess root and stem traits important for lodging resistance to help in the development of cultivars with high standability. The project will utilize a suite of innovative root imaging systems to characterize root system architecture in relevant Canadian oat germplasm and, furthermore, incorporate analyses of stem strength and root anchorage from Prairie field environments. Plant growth habit (shoot architecture) will also be analyzed as this has been associated with lodging in oat. Specific objectives include:

a) Evaluate root system architecture in oat cultivars which vary in lodging resistance.

b) Evaluate stem and root lodging in field trials.

c) Assess impact of seeding rate on key stem and root lodging-related traits in field trials.

Mutsvangwa T, Christensen DA, Beattie AD
Title: Nutritional evaluation of new forage barley and oat varieties as silage sources for high-producing dairy cows.
Role: co-PI
Funding Source: Saskatchewan Ministry of Agriculture and AlbertaMilk
Duration: 2021-2024
Amount: $145,832

The goal of this project is to generate new knowledge that dairy producers and nutritionists can use to make informed decisions on the choice of forage sources based on yield potential and nutritional quality for dairy cows. More specifically, the funds will be used to support the following objectives:

a) To determine the ensiling characteristics of Conlon, Falcon, FB209 and CDC Arborg forage varieties.

b) To compare the effects of feeding Conlon, Falcon, FB209, and CDC Arborg as the major forage sources in dairy cow diets on feed intake, milk yield and composition, diet digestion and rumen function in high-producing dairy cows.

Beattie AD

Title: Breeding milling oat varieties with improved agronomic, quality and disease traits for Saskatchewan oat producers
Role: Project Leader
Funding Source: Saskatchewan ADF and Western Grains Research Foundation
Duration: 2019-2024
Amount: $1,314,500

The objective of this project is to breed oat varieties that meet the requirements of Western Canadian producers and millers. More specifically, the funds will be used to support the following annual activities:

a) Identify new varieties with higher yield, better lodging resistance, improved milling quality (higher groat percentage, plumpness, kernel weight and test weight), improved nutritional quality (higher beta-glucan and protein, lower fat) and improved disease resistance (crown rust, stem rust and smut).

b) Evaluate approximately 10,000 CDC oat breeding lines for protein and fat content and 1,500 lines for beta-glucan which will inform selection decisions within the breeding program.

c) Incorporate the 'hairless' (i.e. low trichome) trait from hulless oat lines (e.g. VAO-51) into milling oat lines by crossing with elite CDC oat varieties.

Beattie AD
Title: Grant-in Aid of CDC Oat R&D, General Mills.
Role: Project Leader
Funding Source: General Mills
Duration: 2024-2027

Beattie AD
Title: Oat R&D Agreement
Funding Source: FP Genetics
Duration: 2024-2029

Beattie AD
Title: Oat Breeding Collaborative Research Agreement
Role: Project Leader
Funding Source: SaskOats
Duration: 2024-2029

Beattie AD
Title: Grant-in-Aid of CDC Oat R&D
Duration: 1997-
Funding Source: Richardson Milling

Beattie AD
Title: Grant-in Aid of CDC Oat R&D
Duration: 2005-
Funding Source: Grain Millers Inc.

3.2 Varieties Released

3.2.1 Eastern Canada

Under our agreement with PhytoGene Resources Inc., CDC lines are evaluated each year in Eastern Canada (Quebec and Ontario) and after several years of evaluation and regional testing, support for registration is obtained through the Ontario Cereal Crops Committee or the Quebec Registration and Recommending Committee. This has proved to be a beneficial relationship. Table 4 indicates the lines which have been registered, or supported for registration, through this relationship with PhytoGene Resources Inc.

Table 4. Summary of varieties registered via PhytoGene Resources Inc. for production in Eastern Canada.

Variety	Test #	Type	Registered	Distribution
Simonds	OT3102	Milling	Mar, 21, 2025; #10393	Carleton AgriSolutions
Acer	OT3104	Milling	Mar. 21, 2025; #10394	Carleton AgriSolutions
Trinity	SA152044	Milling	Mar. 1, 2024; #10146	Céréla Inc.
Iago	SA152054	Milling	Mar. 1, 2024; #10145	Céréla Inc.
Annie	SA150821	Milling	Jan. 19, 2024; #10122	Céréla Inc.
Bolina	SA060123	Milling	April 3, 2014; #7518	La Coop Federee
US4349	SA04349	Milling	Jan. 16, 2013; #7303	Uniseeds Inc.
Riley	SA03259	Milling	Dec. 20, 2012; #7301	C&M Seeds
Hidalgo	SA04213	Milling	Nov. 1, 2012; #7255	Synagri
Avatar	SO04278	Milling	Mar. 3, 2011; #6973	Synagri
Gloria	OT3004	Milling	July 14, 2010; #6853	Ferme Olofée
Tango	SA01627	Milling	June 28, 2010; #6847	Ferme Olofée
Vitality	SA03257	Milling	Feb. 26, 2010; #6749	Synagri
Synasile	SO03354	Forage	July 28, 2009; CSGA #1153-2009	Synagri

3.2.2 Western Canada

Table 5 (following page) indicates the varieties which have been registered (or supported for registration) and are intended for production in Western Canada.

Table 5. Summary of varieties registered (or supported for registration) from 1980-present with intended production in Western Canada.

Variety	Test #	Type	Registered	PBR	Distribution	Comments
	OT3125	Milling	Pending	Pending	FP Genetics	Yield>>CS Camden, VG lodging resistance, short, average maturity, >er TWT, β-glucan=CDC Arborg, fat<CS Camden, groat%>CS Camden, MS to crown rust crown and R to smut.
CDC Hank	OT3121	Milling	January 31, 2025; #10383	Pending	FP Genetics	Yield>>CS Camden, VG lodging resistance, moderate height, earlier maturity, β-glucan=CS Camden, fat>CDC Dancer, groat%>CS Camden, MS to crown rust crown and R to smut.
CDC Westgate	SA152324	Forage	July 25, 2024; 2716-2024	Pending	FP Genetics	ForYld 6% > CDC Haymaker), GrYld 14% > CDC Haymaker, improved lodging resistance, good forage look, incorporates low lignin trait, higher NDFD30, lower ADF and NDF than CDC Haymaker.
CDC Byer	OT3115	Milling	August 18, 2023; #9969	Pending	FP Genetics	Yield>CS Camden, G lodging resistance, short, average maturity, β-glucan=CS Camden, fat=CDC Dancer, groat%>CS Camden, moderate resistance to crown rust and resistance to smut and BYDV.
CDC Anson	OT3112	Milling	June 30, 2022; #9652	Nov. 28, 2023; #6948	FP Genetics	Yield≥CS Camden, VG lodging resistance, very short, moderate maturity, β-glucan>>CS Camden, fat<Summit, groat%>Summit, Pc94 crown rust resistance gene and resistance to smut.
CDC Skye	OT3097	Milling	June 7, 2019; #8822 (Withdrawn)	Mar. 19, 2021; #6402 (Withdrawn)	SeCan Assoc.	Yield<AC Morgan, G lodging resistance, moderate height and maturity, β-glucan=Leggett, fat<Leggett, groat%≤CDC Dancer, Pc94 crown rust resistance gene and resistance to smut.
	OT3098	Milling	Not applied.	Not applied.	None.	Yield<AC Morgan, VG lodging resistance, short height and later maturity, β-glucan=6.0%, fat>>Leggett, groat%=Leggett, Pc94 crown rust resistance gene and resistance to smut.
CDC Endure	OT3087	Milling	March 8, 2019; #8672	Dec. 29, 2020; #6340	Alliance Seeds	Yield>AC Morgan, VG lodging resistance, earlier maturity, β-glucan>Leggett, fat=Leggett, groat %=CDC Dancer, MR to crown rust, R to smut.
CDC Arborg	OT3085	Milling	April 21, 2017; #8247	Mar. 20, 2019; #5954	FP Genetics	Yield>AC Morgan, excellent lodging resistance, earlier maturity, β-glucan=Leggett, fat=CDC Dancer, groat %≤CDC Dancer, I to crown rust.

	OT3080	Milling	Not applied.	Not applied.	None.	Yield≤AC Morgan, excellent lodging resistance, β-glucan=Leggett, fat=CDC Dancer, groat%>CDC Dancer, MR to crown rust.
CDC Norseman	OT3066	Milling	June 11, 2015; #7763	Nov. 14, 2016; #5379	SeCan Assoc.	Yield>AC Morgan, moderate CRR, BG>Leggett, <fat, groat % similar to CDC Dancer.
	OT3061	Milling	Not applied.	Not applied.	None.	BG=CDC Morrison, <fat, Yield>CDC Morrison, strong straw, Pc91, smut R.
	OT3056	Milling	Not applied.	Not applied.	None.	Yield>AC Morgan, ok maturity, strong, good grain, ok groat % and BG, good crown rust resistance.
CDC Ruffian	OT3054	Milling	Feb. 18, 2013; #7318	Feb. 23, 2015; #4993	FP Genetics	Yield>AC Morgan (without increased maturity), shorter, good grain quality, very good groat % (better than CDC Dancer), smut R.
CDC Haymaker	SA04412	Forage	Dec. 20, 2011; CSGA #1401-2011	Mar. 18, 2015; #4999	SeCan Assoc.	Dry matter yield > CDC Baler (8% higher) with slightly lower ADF and NDF values.
CDC Morrison	OT3044	Milling	Mar. 24, 2011; #6989	Aug. 13, 2012; #4357	Canterra Seeds	BG=HiFi, <fat, Yield=Leggett, strong, Pc91, smut R.
CDC Nasser	OT3039	Feed	Mar. 24, 2011; #6988	Not applied.	T&L Seeds	LLH-HOG feed with grain yield similar to AC Morgan and better grain than CDC SO-I.
CDC Big Brown	OT3037	Milling	Feb. 27, 2011; #6960	Feb. 11, 2013; #4457 (Withdrawn)	None. (formerly SeCan Assoc.	Pc94, smut R, Yield 5% > Leggett, excellent grain quality and milling yield.
CDC Seabiscuit	OT3036	Milling	Feb. 8, 2010; #6734	Feb. 16, 2012; #4270	Canterra Seeds	Yield=AC Morgan with similar maturity, milling yield=CDC Dancer, plump grain, high fat, BG≤Leggett.
CDC Minstrel	OT3018	Milling	Feb. 4, 2008; #6371	Dec. 3, 2009; #3691	FP Genetics	Yield 5% > AC Morgan, strong straw, very good grain quality and milling yield.
CDC SO-I	OT3017	Feed	July 25, 2006; #6164	July 9, 2009; #3542	T&L Seeds	First LLH-HOG feed variety, Yield and maturity=CDC Dancer, smut resistant.
CDC ProFi	OT3006	Milling	June 1, 2007; #6223	Not applied.	None. (formerly FP Genetics)	High protein, high beta-glucan, very good milling yield, lower yielding, variety being phased out.
CDC Sol-Fi	OT3009	Milling	June 1, 2004; #5822	Mar. 19, 2008; #3195 (Withdrawn)	None.	BG similar to HiFi, high protein, early, lower yield, tall, lower plumps.
CDC Weaver	OT398	Milling	Dec. 29, 2004; #5899	Mar. 19, 2007; #2717 (Withdrawn)	None. (formerly FP Genetics)	Good yield, good grain quality and excellent milling yield, smut resistant, good forage quality.

CDC Orrin	OT382	Milling	Dec. 5, 2001; #5383	Feb. 17, 2004; #1740	FP Genetics/Cargill	Yield similar to AC Morgan but earlier, good straw strength, excellent grain quality, good milling yield. Popular variety in Quebec.
CDC Dancer	OT373	Milling	Dec. 4, 2000; #5218	Sept. 13, 2002; #1269	FP Genetics/Cargill	Good grain yield, earlier, good straw strength, excellent milling yield and physical grain quality, smut resistant.
CDC Baler	SO93806	Forage	May 31, 1999; CSGA #104-1999	Not applied.	FP Genetics	Good biomass and relative feed value, strong straw and rust susceptible.
Radisson	OT358	Milling	Oct. 30, 1998; #4824	Not applied.	SeCan Assoc.	Joint release with McGill University. Production limited to eastern Canada.
CDC Pacer	OT351	Milling	June 5, 1996; #4361	Not applied.	FP Genetics	Yield>CDC Dancer, good TWT and plumps, earlier than Derby, smut resistant, better milling yield than Derby. Very limited production.
CDC Boyer	OT342	Milling	June 1, 1994; #3966	Not applied.	SeCan Assoc.	Similar yield and maturity to CDC Dancer with good straw strength. Plumpness>Derby and lower TWT.
Derby	OT322	Milling	June 15, 1988; #2959	Not applied.	Viterra	Yield>CDC Dancer with later maturity, good straw strength, good TWT and plumps.
Calibre	OT308	Milling	Mar. 28, 1983; #2315	Not applied.	SeCan Assoc.	Yield<CDC Dancer, lower plumps and weaker straw strength.