

Varieties of Cereal and Flax for Alberta

THIS ANNUAL PUBLICATION provides information on cereal and oilseed variety performance in Alberta. Important agronomic characteristics and disease resistance information is provided for varieties of wheat, barley, oat, rye, triticale, and flax. The Alberta Regional Variety Testing program for cereals and flax is coordinated by the Alberta Regional Variety Advisory Committee (ARVAC) and the Alberta Wheat and Barley Commissions (AWC and AB). Funding for the program 2021 program was provided by:

- Alberta Wheat Commission
- Alberta Barley Commission
- Alberta Oat Growers Association
- Alberta Seed Growers
- Alberta Seed Processors
- Results Driven Agriculture Research
- Entry fees for the varieties being tested

Data for the 2021 growing season for this publication come from various sources, including:

- Agriculture and Agri-Food Canada
- Nutrien Ag Solutions
- University of Alberta
- Alberta Innovates Technology Futures
- SARDA Ag Research
- Battle River Research Group (BRRG)
- Chinook Applied Research Association (CARA)
- Gateway Research Organization (GRO)
- Lakeland Applied Research Association (LARA)
- McKenzie Applied Research Association (MARA)
- Olds College
- Prairie Grain Development Committee
- Canola Council of Canada
- Lakeland College

The 2021 growing season was challenging with drought and heat stress. Many research sites didn't produce quality data which met our statistical requirements. The per cent of useable data from the 2021 CWRS trials was 40 per cent, CPSR and CWSP trials were 40 per cent, CWAD was 38 per cent, barley was 46 per cent, oats were 50 per cent, flax was 38 per cent, and triticale was 45 per cent. Overall, only 44 per cent of the 2021 Regional Variety Trial data was useable for inclusion in the January 2022 table publication.

The following individuals are the 2021 Regional Variety Trial and crop specific coordinators:

- Regional Variety Trial Coordinator: S. Strydhorst
- Spring wheat: H. Randhawa and R. Cuthbert
- Barley: J. Anderson
- Oat: K. Nilsen
- Spring Triticale: M. Aljarrah
- Winter Wheat: R. Graf
- Fall Rye: R. Ragupathy
- Flax: B. Tar'an

Sincere thanks are extended to all individuals and organizations who contribute to this publication.

Varieties Reported in the Tables

A variety must be registered to appear in the tables. Publication normally occurs after two years of testing; however, entries are accepted with the understanding testing will occur for at least three years. When there are limited data for a new variety, yield information may only appear in the Overall Yield column. An "XX" is reported in any column when there is insufficient data (less than six site-years of testing, over two growing seasons, within a yield category). Single year data will not be reported as it's often an unreliable indicator of performance.

Varieties without pedigreed seed production in Alberta within the past two years, following five years of full registration to facilitate adoption, and/or the variety has dropped below one per cent of the commercial acreage of the crop kind (or market class) in the province (based on AFSC crop insurance data) will be flagged for removal from the tables. After the variety has been flagged for removal for one year, it may be removed from the tables unless an objection is received for consideration at the annual meeting. Notwithstanding the above criteria, a variety can be retained in a table if a compelling case is made. In cases where both the breeding institution and seed distributor wish to have a variety deleted from the table, removal can occur without a notification flag. Please note that under normal circumstances, removal from a table does not indicate variety cancellation has occurred.

Yield Results and Reporting

Variety choice should never be based solely on yield performance, as it's only one factor that affects net return. The genetic yield potential of a variety is often masked by numerous factors, some of which can be controlled through variety choice and others through astute agronomic management. Producers are encouraged to consider other characteristics such as maturity, plant height, lodging and disease/pest resistance

when deciding which varieties to grow. Long term satisfaction with a variety is often related to non-yield characteristics.

Producers have asked for additional checks in the regional variety trials that reflect more commonly grown varieties. Starting in 2018, two “benchmark” checks were included in the trials and reflect the two most popular varieties for the crop or within a market class during the previous year, based on crop insurance data. There are instances when the benchmark check and the check variety are the same entry. The benchmark checks will change as the popularity of varieties changes.

Exercise caution when making yield comparisons among varieties. A variety’s yield should only be directly compared to the standard reference check. Actual head-to-head testing between other varieties may not have occurred. Small plot agronomic trials are expensive to grow and new varieties are registered every year. It’s simply impractical to grow all varieties at the same time. Following several years of data collection, the yield performance for a particular variety stabilizes relative to the check and further testing is no longer required. It’s for these reasons the check varieties are grown every year (e.g. AAC Brandon for CWRS wheat, CDC Copeland for barley) and changes to these checks are infrequent. The “Overall Station Years of Testing” column provides an indication of the unbalanced nature of the dataset.

In the January 2022 publication, readers will notice the spring wheat check has changed from Carberry to AAC Brandon, the barley check has changed from AC Metcalfe to CDC Copeland, and the oat check has changed from CDC Dancer to CS Camden. These changes required long and careful planning. At least three years of trials in which the old and new check varieties are grown are required so there is sufficient overlapping data. Readers will notice that there are fewer station years of testing for the new check varieties. Data for the currently tested varieties reflect data generated based on the varieties which have generally been grown during the past three years. Data for the previously tested varieties were adjusted relative to the yield difference between the old and new check from the historical database. Since the new check varieties are higher yielding than the previous checks, readers will notice an overall decrease in the yield performance of all entries compared with historical publications.

At least six site-years of yield data collected over two years are required prior to reporting the figures in this publication. For new varieties, Overall Yield is often the first indication of yield potential relative to the check. As additional data become available, yield performance is also expressed on the basis of environmental productivity (Yield Test Categories of Low and High). Where there are less than six site-years of data for a yield column, an indication will be made that there is insufficient data to describe, symbolized by reporting an “XX”. Yield rankings among varieties can change substantially due to growing conditions. To reflect these differences, results from a test site that produced high yield in a particular year are placed into

the database for ‘high’ yielding environments. The same site may contribute to the ‘low’ yield category in a drought year, when yields are low. Consistent performance over all Yield Test Categories indicates a variety has environmental responses similar to the check and may have good yield stability over a wide range of environments. Scientific studies conducted on variety performance in western Canada have shown that Yield Test Category analysis provides a more reliable indication of yield performance than results organized by geographic region.

The yield comparison tables have several features:

- Overall actual yield of the check (bushels/acre) based on all data available to the testing program is provided along with the number of station years of testing.
- The range in yield for each Yield Test Category is defined.
- Actual yield of the check in each Yield Test Category is reported.
- For varieties with sufficient data, the Overall Yield and performance in each Yield Test Category is expressed relative to the check.

To make effective use of the yield comparison tables, producers should set a realistic yield target for the season and determine if it fits within the Low or High Yield Test Categories. This approach facilitates matching of variety choice to expected productivity levels and is similar to that used when making decisions on other levels of inputs. Please note the actual yield levels indicated are from small plot trials, which may be 15 to 20 per cent higher than yields expected under commercial field production.

Maturity Ratings

Based on feedback from producers, the six-category scale for maturity (Very Early, Early, Medium, Late, Very Late, Extremely Late) has been replaced with average differences in days, relative to the check. Be aware these are averages from several years over the vast agricultural production area of Alberta and that growth environment has a tremendous influence on maturity dates. Hot, dry conditions will compress the reported maturity differences just as cool, wet conditions will expand them. For example, a variety of CWRS wheat may mature in 98 days in Lethbridge, but take 103 days in Edmonton. Likewise, a variety that is on average two days later maturing across the province may be only one day later in southern Alberta but could be three or more days later in a northern location.

Falling Number and Resistance to Pre-harvest Sprouting

Falling number is a measurement of the extent to which endosperm starch in the seed has been metabolized to simple sugars during the germination process. There are many inter-related genetic, environmental and management factors that influence seed germination prior to harvest. In general, conditions in which the crop is harvested soon after maturity prior to inclement weather will result in the retention of high

falling number. Thus, the use of earlier maturing varieties with Good or Very Good pre-harvest sprouting resistance in short-season areas is usually an effective management decision for maintaining high quality. A rating for pre-harvest sprouting resistance is provided for most of the reported wheat varieties based on controlled environment conditions. These ratings reflect genetic differences. Varieties with Good or Very Good pre-sprouting resistance will normally retain their falling number for longer periods of time under cool, wet harvest conditions. However, even these varieties will initiate germination when mature and exposed to prolonged conditions favourable to sprouting, resulting in falling number reductions. Note that falling number can be reduced without visible signs of sprouting.

Seed Size and Plant Populations

Seed size within a crop kind will vary from variety to variety, and production environments. Therefore, seeding volumes must be calculated based on the seed size of the seed lot you will be planting to achieve desired plant populations. Some of the tables provide an average 1,000 kernel weight (TKW) which can be used as a guide for variety differences. The best approach is to determine the 1,000 kernel weight of the seed to be planted, germination rate, emergence mortality, and in the case of fall seeded crops, an estimate of winterkill. For more information and user-friendly seeding rate calculators that take into account these and other considerations, please see <http://www.agric.gov.ab.ca/app19/loadSeedRateCalc>.

Plant Breeders' Rights

Plant Breeders' Rights (PBR) are a form of intellectual property rights by which plant breeders can protect new varieties in the same way an inventor protects a new invention with a patent. In 2015, Canada amended the PBR Act to bring it into conformity with UPOV91. Varieties protected under the previous legislation (UPOV78) are indicated with the  logo, whereas those protected under the new UPOV91 legislation that are shown with the new  logo. Varieties pending PBR protection are indicated with the  symbol. For more information on Plant Breeders' Rights, please see www.pbrfacts.ca or the Canadian Food Inspection Agency website at www.inspection.gc.ca.

Variety Use Agreement

A number of new varieties are participating in a Variety Use Agreement (VUA). When producers purchase a VUA variety and then divert some of that grain at harvest for seed use, they will be invoiced a Variety Use Fee for use of the seed. Varieties in which a VUA applies are indicated with the **VUA** logo. For more information please see <http://seeds-canada.ca/variety-use-agreement/>.

Variety Cancellation versus Reclassification

Variety cancellation (often referred to as deregistration) and variety reclassification are two distinct processes that have been subject to some confusion in recent years. Variety cancellation is a process in which the Canadian representative and breeder make a request to the Canadian Food Inspection Agency (CFIA) to cancel the registration of a given variety. Under the protocol, a three-year notification of cancellation period applies to all

crop kinds except hybrid canola and rapeseed, which require a one-year notification period. This timeline provides the Canadian representative and breeder sufficient time to ensure that seed stocks of the variety have been cleared from the marketplace and that producers have been notified, well in advance, to clear seed from their operations. This facilitates planning and helps to minimize financial risk. Notifications are posted on Aug. 1 and the notification period is from that date forward. Following variety cancellation, varieties are removed from the appropriate Canadian Grain Commission Variety Designation List and are only eligible for the lowest grade available. For more information please visit the Canadian Food Inspection Agency website at www.inspection.gc.ca and the Canadian Grain Commission website at www.grainscanada.gc.ca.

In recent years, several wheat varieties have been reclassified, meaning they have been moved from one quality class to another. This process was undertaken by the Canadian Grain Commission in consultation with industry to ensure the varieties designated to a class met the current quality definitions and reflected the expectations of end-use customers of Canadian wheat. Several years of advance notice is provided when this type of change takes place. It's important to note reclassification is not variety cancellation. Reclassified varieties may still be grown and receive grades under the class for which they are designated but must not be misrepresented by declaring their former class. Variety Designation Lists can be found at the Canadian Grain Commission website at www.grainscanada.gc.ca/en/grain-quality/variety-lists/.

Diseases, Seed Treatment and Seed Testing

- Disease ratings are compiled from various data sources in Alberta and other prairie provinces.
- Loose smut resistance ratings for wheat will not be reported after 2020 as it's no longer a registration requirement for wheat and routine testing has been discontinued.
- Treat rye and flax seed to control seedling blight, cereal seed for smuts and fusarium, canola seed to control flea beetle, seedling blight and the seed borne phase of virulent blackleg.
- Wheat with Moderately Susceptible (MS) or Susceptible (S) ratings for common bunt should be treated with a systemic fungicidal seed treatment as low levels of infection will restrict marketability.
- Refer to labels for maximum storage periods of treated seed.
- Treated seed must not be fed to livestock, poultry or wildlife, and cannot be sold for feed.
- Fusarium head blight (FHB), caused by *Fusarium graminearum* and other species, is an increasing problem in Alberta. The relative ranking of crops from most susceptible to least susceptible is durum wheat, spring and winter wheat, triticale, barley and oat. Corn is a host of *F. graminearum* and can serve as a source of infection when residue is left on the ground. FHB infection is highly influenced by the environment and heading date. A resistant (R) tolerance rating for FHB does not equate to immunity. Under severe epidemics, all varieties will sustain damage. All seed should be tested for the presence of FHB and treated with an appropriate seed treatment. Producers are advised to choose varieties with the best FHB tolerance whenever possible and

always use best management practices to slow the spread of this disease.

- *Fusarium graminearum* (Fg) is no longer a designated pest in Alberta. Removal of *Fusarium graminearum* from the Pest and Nuisance Control regulation brings Alberta in line with best practices from other provinces and allows farmers access to the most current seed varieties (which may have improved Fg resistance) and cereal research. As such, we are using best management practices in the Alberta RVTs to responsibly address this disease. <https://www.alberta.ca/alberta-fusarium-graminearum-management-plan.aspx>
- Laboratories participating in the FHB testing program:
- 20/20 Seed Labs Ltd., Nisku, Alta. (877) 420-2099
- SGS Canada Inc., Sherwood Park, Alta. (800) 952-5407
- SGS Canada Inc., Grande Prairie, Alta. (877) 532-8889
- Precision Seed Testing, Beaverlodge, Alta. (780) 354-2259
- Seed Check Technologies Inc., Leduc, Alta. (780) 980-8324

Agronomic Practices Used in Small Plot Trials

Small plot trials are conducted using the following best agronomic practices:

- N, P, K and S fertilizer rates are based on soil test results for 1.25x the area average yield goal of the past 4 years, as reported in the AFSC Yield Alberta publication.
- All wheat, barley, oat and triticale seed are treated with Cruiser Maxx Vibrance Quattro. Flax seed is not treated.
- Seeding rates are adjusted for TKW and germination to reach the following target plant populations listed in Table 1.

Table 1.0 Target Plant Populations Used to Determine Seeding Rates

Crop	Wheat						Winter Wheat
	CWRS	CPSR	CNHR	CWSP	Durum	CWSWS	
Target Plant Population (plants/sq ft)	31	31	31	31	28	31	33

Crop	Barley		Oat	Triticale	Flax	
	2 row	6 row			Brown	Yellow
Target Plant Population (plants/sq ft)	25	25	28	29	75	84

- Foliar fungicides aren't applied to the trials, which allows for expression of genetic differences between cultivars for their disease resistance. Under disease pressure, the application of a foliar fungicide may significantly increase yields on some cultivars.

Abbreviations and Rating Scales

- TKW = Thousand kernel weight.
- XX = Insufficient data to describe.
- NT = Not tested for disease, until a full rating is generated assume that the variety is very susceptible to the disease.

- Resistance Ratings: VP = Very Poor, P = Poor, F = Fair, G = Good, VG = Very Good, EX = Excellent.
- Disease Tolerance Ratings: R = Resistant, MR = Moderately Resistant, I = Intermediate, MS = Moderately Susceptible, S = Susceptible.
- Kernel Type (winter wheat): HR = Hard Red, SR = Soft Red, HW = Hard White, SW = Soft White.
- Awns (wheat): Y = Yes (bearded), N = No (awnless).
- Awn Type (barley): R = Rough, S = Smooth, SS = Semi-smooth.
- Seed Size (flax): S = Small, M = Medium, L = Large.
- Protected under UPOV78 Plant Breeders' Rights legislation.
- Protected under UPOV91 Plant Breeders' Rights legislation.
- pending PBR protection.
- Variety Use Agreement applied (<http://seeds-canada.ca/variety-use-agreement/>)

Fact sheet information and tables prepared, reviewed and approved by Alberta Regional Variety Advisory Committee (ARVAC)

Data preparation and factsheet coordination by Sheri Strydhorst, Alberta Regional Variety Trial Coordinator/Agronomy Research Specialist, Alberta Wheat and Barley Commissions

Alberta and British Columbia Pedigreed Seed Growers Directory of Varieties Produced in 2021

The data in this listing includes all pedigreed seed crops that have successfully received, or are in the process of receiving, seed crop certification from the Canadian Seed Growers' Association (CSGA) in 2021. Fields that were declined pedigreed status are not included in this listing. Data is provided for information purposes only. CSGA is not liable for omitted or incorrect seed listings, and you agree to use the data at your own risk. You agree to fully indemnify CSGA from all losses, damages, liability, judgements, costs and expenses, which you or a user of the CSGA data sustain by disseminating or relying on such data. When purchasing seed, CSGA strongly recommends asking for official seed certification tags as your proof of CSGA certification. A copy of the mechanical purity and germination analysis test certificate should also be made available to you. Pedigreed class code is listed after the grower's phone number. S=Select; F=Foundation; R=Registered; C=Certified; BI=Breeding Institution; Dist=Canadian Distributor(s). NOTE: Varieties with a star (*) after the pedigreed class code are carryover seed listings. These varieties have been supplied by Alberta Seed Grower members as stock being held at their establishment and we recommend that all buyers verify pedigreed class and quality at time of contact.

FLAX

Variety	Overall Station Years of Testing	Yield Category (% CDC Bethune)			Agronomic Characteristics:					Disease Tolerance:		Quality:		
		Overall Yield	Low < 36 (bu/ac)	High ≥36 (bu/ac)	Maturity Rating (Days +/- CDC Bethune)	Seed Colour	Seed Size	Height (cm)	Resistance to Lodging	Fusarium Wilt	Powdery Mildew	Oil Content (%)	ALA Content (%)	Iodine Value
Varieties tested in the 2021 trials (Yield and agronomic data only directly comparable to CDC Bethune)														
CDC Bethune (bu/ac)		36	23	50										
CDC Bethune ☞	103	100	100	100	107	brown	M	61	G	MR	MR	46	55	189
CDC Dorado ☞	19	93	XX	90	-1	yellow	L	60	G	MR	MR	45	64	204
CDC Glas ☞	36	105	105	105	1	brown	M	65	G	MR	MR	46	57	192
CDC Kernen ☞*	9	104	XX	100	1	brown	M	64	G	MR	MR	45	57	191
Previously tested varieties														
CDC Bethune ☞		100	100	100	107	brown	M	61	G	MR	MR	46	55	189
AAC Bravo ☞	22	103	101	105	1	brown	L	61	G	MR	MR	45	60	194
AAC Bright † ☞	16	96	XX	94	2	yellow	S	66	VG	MR	NT	48	55	191
AAC Marvelous ☞	19	106	108	106	2	brown	M	61	G	MR	MR	47	56	192
AAC Prairie Sunshine ☞	16	101	111	95	2	brown	M	63	VG	MR	MR	48	57	193
CDC Buryu † ☞	23	100	102	97	1	brown	L	55	G	MR	MR	46	56	193
CDC Neela † ☞	17	109	113	XX	1	brown	M	54	G	MR	MR	46	59	194
CDC Plava † ☞	26	101	106	91	-2	brown	M	51	G	MR	NT	47	57	196
CDC Rowland ☞	19	111	116	109	3	brown	L	61	G	MR	MR	45	59	195
CDC Sorrel ☞	14	109	115	104	1	brown	L	61	F	MR	MR	45	58	193
Prairie Sapphire ☞	22	96	91	100	2	brown	M	62	G	MR	MR	48	57	193
Topaz ☞	23	102	101	103	0	brown	M	53	G	MR	MR	47	55	189
VT50 † ☞	17	103	106	XX	4	yellow	S	49	VG	MR	NT	47	68	209
WestLin 60 ☞	17	100	102	XX	-1	brown	M	48	G	MR	NT	46	60	198
WestLin 72 †☞	23	101	105	95	3	brown	S	51	VG	MR	MR	47	57	193

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. All varieties are immune to flax rust. NT - Not tested for disease, until a full rating is generated assume that the variety is very susceptible to the disease. XX - Insufficient data to describe. ☞ = Protected by PBR (UPOV 78), ☞ = Protected by PBR (UPOV 91), ☞* = pending PBR protection. † Flagged for possible removal in 2023.