Regional Variety Trials

Objectives:

1. To detail agronomic characteristics of new varieties and proven varieties in a specific geographic area.
2. To provide information about new varieties to local producers.
3. To conduct these tests yearly to produce long term data.

Background:

Regional Variety Trials (RVTs) have been used as a means of testing superior varieties under different environmental conditions. One of the goals of the RVTs is to help researchers and producers identify varieties that are suitable for each particular environment. Multi-location trials often show genotype x environment interaction due to differential response of genotypes to different environmental conditions. Information on the genotype x environment response obtained through RVT's may be helpful in identifying and selecting high-yielding varieties with specific or broad adaptations to their environmental conditions.

Efficiency in the RVT's depends on selecting a large number of locations within a region with varying environmental conditions and assigning to each location the variety most likely to succeed. It is also essential to assess varieties in the trial in terms of their productivity and quality, and to assess stability in yields across years.

The regional variety trials (RVTs) have been grown in the Lakeland since 1991. Each variety is tested for three years against a common check variety that is kept in the trial long-term. Each year, new varieties are added and older ones are removed from the trial. How a variety does relative to the check variety can be used as a comparison between varieties that are not grown in the trial at the same time.

The information gathered from these trials is important for producers; first, to aid in crop variety selection and, second, to improve economic returns. Determining the cereal varieties that are best suited to production in the LARA area will aid producers in making the most economical decisions for their operations.

Cereal Regional Variety Trials Summary

Regional variety trial chronology in three sites across Northeastern Alberta in 2024

Site	Seeding[a]		Fertilizer[a]		Herbicide[b]									Harvest[c]
					Burndown			In crop			Desiccant			
Regional Variety Trial Fort Kent	Date	Rate plants foot^{-2}	Date	Rate lb acre^{-1}	Date	Name	Rate L acre^{-1}	Date	Name	Rate L acre^{-1}	Date	Name	Rate L acre^{-1}	
Oat	May 13	31	May 13	90N 30P 25K 25.2S	May 14	Bromoxynil	40	June 10	Bromoxynil MCPA	3.2	September 16	Reglone ION	0.83	October 9
Winter cereals	September 4[d]	31	September 4	90N 30P 25K 25.2S	September 4	Glyphosate	1	June 10	Bromoxynil MCPA	3.2	-	-	-	September 6
St. Paul														
Canadian Western Red Spring Wheat	May 11	31	May 11	90N 30P 25K 25.2S	May 13	Glyphosate	1	June 9	Bromoxynil MCPA	1.6	September 17	Reglone ION	0.83	September 25
Canadian Prairie Spring Red Wheat	May 11	31	May 11	90N 30P 25K 25.2S	May 13	Glyphosate	1	June 9	Bromoxynil MCPA	1.6	September 17	Reglone ION	0.83	September 25
Triticale	May 11	31	May 11	90N 30P 25K 25.2S	May 13	Glyphosate	1	June 9	Bromoxynil MCPA	1.6	September 17	Reglone ION	0.83	September 24
Smoky Lake														
Oat	May 14	31	May 14	90N 30P 25K 25.2S	May 14	Bromoxynil	40	June 10	Bromoxynil MCPA	3.2	September 17	Reglone ION	0.83	September 19

[a]No till hoe-drill Fabro seeder with side banding (2008) attached to Ford tractor (1998)
[b]R-Tech Thirty-foot sprayer (2024) attached to John Deere tractor (2010)
[c]Wintersteiger Classic (2020)
[d]Seeded in 2023

Canadian Western Red Spring Wheat

Mean values of yield, height, lodging rating, test weight and tkw in 19 varieties of CWRS wheat in St. Paul Alberta in 2024

Variety	Yield (% of AAC Brandon)		Height		Lodging	Test weight	TKW	
	g plot-1		cm		1-9	lb bu-1	g/1000 seeds	
AAC BRANDON	100%	ab*	68	abcd	3.0	57.9	40.8	abc
AAC DARBY VB	86%	bc	72	ab	1.3	61.8	36.6	ef
AAC HOCKLEY	109%	a	60	fg	2.7	62.0	36.5	efg
AAC SPIKE	92%	abc	61	efg	3.3	61.2	36.2	efg
AAC STOUGHTON	83%	bcd	63	defg	3.0	63.3	39.7	cd
AAC VIEWFIELD	96%	abc	63	defg	2.3	62.9	37.9	de
AAC WALKER	86%	bc	62	efg	3.0	62.7	37.1	ef
AAC WESTKING	97%	abc	65	cdef	1.7	63.7	40.9	abc
AAC Craven VB (BW1127)	93%	abc	63	def	4.0	61.6	37.0	ef
AAC Walsh (BW5089)	101%	ab	68	abcd	1.7	63.2	43.1	a
AAC Oakman (BW5104)	84%	bcd	66	cde	3.0	62.0	36.4	efg
CDC ENVY	64%	d	67	bcde	3.7	58.6	35.2	fg
DONALDA	91%	abc	69	abc	2.3	63.1	37.9	de
Garde (LAR18-04850)	94%	abc	59	g	1.0	60.9	34.2	g
Palisade (LAR19-22198)	94%	abc	67	bcde	2.3	62.5	39.9	cd
Baker (LAR19-23455)	101%	ab	63	defg	2.7	63.2	38.0	de
Breadwinner (LAR19-23465)	98%	abc	67	bcde	2.0	63.6	42.5	ab
Flame (LAR20-25463)	98%	abc	68	abcd	1.3	64.1	40.5	bc
ZEALAND	78%	cd	73	a	2.0	62.4	35.2	fg

Results					
Average	2025.7	65.3	2.4	62.1	38.2
ANOVA p-value	0.0399	0.0006	0.0742	0.2131	<0.0001
CV%	13.5	5.4	44.2	3.88	3.7

*Values followed by different letters are statistically different (P<0.05)

The control variety, AAC Brandon was among the CWRS varieties highest yielding, tallest and with heaviest TKW. As such, wheat from most varieties of CWRS were similar in yield to those in the control (AAC Brandon) except those from the CDC Envy and Zealand variety. These wheat varieties reported 14 and 22% less yield respectively, in comparison to the control. There were two groups of CWRS varieties based on height. One with short stands: AAC Hockley, AAC Spike, AAC Walker, and Garde; and the rest of the CWRS varieties, conformed the group of tallest wheat stand varieties. Thousand kernel weight was lighter in wheat from the AAC Darby, AAC Hockley, AAC Spike, AAC Viewfield, AAC Walker, AAC Craven, AAC Oakman, CDC Envy, Donalda, Garde, Baker and Zealand wheat varieties

compared to the control. Drought occurring in the months of July and August may have been a cause for the low weight in tkw in the previously mentioned varieties. In other words, AAC Westking, AAC Walsh, and Breadwinner seem to be the best options for a CWRS wheat variety, since their yield is on par with the control and their tkw values were among the highest.

Canadian Prairie Spring/ Special Purpose/ Soft White Spring Wheat

Mean values of yield, height, lodging rating, test weight and tkw in 13 varieties of CPS/SP/SWS wheat in St. Paul Alberta in 2024

Variety	Yield (% of AAC Brandon)		Height		Lodging		Test weight		TKW	
	g plot-1		cm		1-9		lb bu-1		g/1000 seeds	
AAC AWESOME	79%	fg*	62.6	abc	1.0	b	59.5	g	49.0	ab
AAC BRANDON	100%	bcde	61.0	bcd	2.0	a	63.3	b	40.6	h
AAC CAMROSE	86%	efg	58.2	cd	1.0	b	61.6	cde	42.9	fg
AAC GALORE	115%	ab	62.3	bc	1.0	b	60.5	efg	47.3	bc
AAC GOODWIN	88%	defg	64.8	ab	2.0	a	63.0	bc	41.7	gh
AAC PENHOLD	94%	def	56.6	d	1.0	b	62.2	bcd	43.2	fg
AC ANDREW	77%	g	58.6	cd	1.0	b	59.9	fg	43.7	ef
AC SADASH	120%	a	68.2	a	1.7	a	63.1	b	45.0	de
ALOTTA	120%	a	59.7	bcd	1.0	b	61.5	de	50.8	a
HY2152	101%	bcde	59.3	bcd	2.0	a	61.2	def	46.2	cd
Fierce VB (LAR20-25760)	111%	abc	62.0	bcd	1.7	a	64.7	a	36.9	i
RECOIL	97%	cde	57.9	cd	1.0	b	62.2	bcd	38.3	i
UA FOREFRONT	102%	bcd	57.2	cd	1.0	b	63.1	b	44.7	def

Results					
Average	2085.8	60.6	1.33	62.0	43.9
ANOVA p-value	<0.0001	0.0132	0.0009	<0.0001	<0.0001
CV%	9.5	5.6	27.7	1.3	2.5

*Values followed by different letters are statistically different (P<0.05)

In contrast to CWRS varieties, some wheat varieties from this group over yielded AAC Brandon (control). Indeed, wheat varieties AAC Galore, AC Sadash and Alotta produced more grain above AAC Brandon by 15, 20 and 20% increase respectively. Moreover AC Sadash wheat stands not only outyielded those from AAC Brandon, but its plant individuals from the former variety were also significantly taller. AAC Goodwin, AC Sadash, HY2152 and Fierce VB wheat varieties were as likely as the control to lodge than the rest. Grain taken from harvest of the Fierce VB wheat variety had the heaviest test weight compared to that of other wheat varieties tested. In addition, tkw was heaviest in grain taken from Alotta and AAC Awesome

wheat variety stands compared to the control. Results showed that Alotta is likely the best choice of CPSR/SP/SWS wheat varieties in comparison to the control as it yielded more, less likely to lodge, and with heaviest tkw for seeding, but if the interest is economic return then Fierce VB would be a better option, despite the fact more seed would be required to achieve optimal number of plants per metre squared (its tkw is among the lowest).

Triticale

Mean values of yield, height, lodging rating, test weight and tkw in three varieties of triticale in St. Paul Alberta in 2024

Variety	Yield (% of Brevis)		Height	Lodging rating	Test weight		TKW
	g plot−1		cm	1–9	lb bu−1		g/1000 seeds
AB Sunbeam (T293)	105%	a*	72.3	3.3	57.3	a	44.6
BREVIS	100%	a	71.9	1.0	56.6	a	47.6
PRONGHORN	91%	b	76.8	3.0	54.6	b	48.6
Results							
Average	2029.5		73.7	2.4	63.0		46.9
ANOVA p-value	0.0116		0.2038	0.06	0.0007		0.4933
CV%	3.2		4.0	36.07	0.6		8.3

*Values followed by different letters are statistically different (P<0.05)

There were only three varieties of triticale in 2024, two of these were compared against the Brevis variety. Thus, the Proghorn triticale variety underyielded Brevis by 9% and grain harvested from this variety was 2.7 pounds per bushel less than Brevis. Conclusively, AB Sunbeam is a better triticale choice as yield and test weight from its stands are on par with Brevis, therefore, compared to Brevis, on par with economic return.

Oat - Fort Kent

Mean values of yield, height, lodging rating, test weight and tkw in 13 varieties of oat in Fort Kent Alberta in 2024

Variety	Yield (% of CS Candem)		Height		Lodging	Test weight		TKW	
	g plot-1		cm		1-9	lb bu-1		g/1000 seeds	
AAC ANTHONY	102%	bcd*	99	bc	3.3	36.7	d	43.8	ab
AAC FEDAK	105%	abcd	96	bcd	1.3	39.8	abc	44.6	a
AAC NEVILLE	105%	abcd	84	fg	2.0	38.2	cd	39.4	efgh
AAC WESLEY	100%	cd	86	fg	2.0	40.0	abc	38.1	gh
AC MORGAN	112%	abc	94	cde	3.0	39.9	abc	42.2	bcd
CDC ANSON	113%	abc	84	g	1.7	38.2	cd	39.4	efgh
CDC ARBORG	116%	a	101	b	3.3	40.7	a	40.9	cdef
CDC BYER	115%	ab	92	de	2.0	40.3	ab	38.6	egh
CS CAMDEN	100%	cd	90	ef	2.0	39.3	abc	38.7	egh
KYRON	112%	abc	90	ef	2.7	39.4	abc	37.7	h
OREBOOST	86%	e	100	b	1.3	35.5	e	42.5	abc
OT3121	118%	a	97	bcd	3.3	38.9	bc	41.5	bcde
CDC Westgate (SA152324)	92%	d	115	a	4.3	38.7	bc	40.1	defg

Results					
Average	3967.5	94.3	2.5	38.9	40.6
ANOVA p-value	0.0014	<0.0001	0.1505	0.0002	<0.0001
CV%	7.7	3.5	50.21	2.8	3.4

*Values followed by different letters are statistically different (P<0.05)

There were thirteen varieties of oat that were sown for grain yield. This trial was duplicated in Fort Kent and Smoky Lake. In Fort Kent, OT3121 and CDC Arborg oat varieties outyielded CS Candem (control) by 18 and 16% percent respectively whereas the OREBoost variety yielded 24% less grain than that of CS Candem. CDC Westgate, OT3121, OREBoost, CDC Arborg, AAC Fedak and AAC Anthony oat stands were significantly taller than CS Candem whereas CDC Anson stands were shorter. Test weight was heavier in the AAC Fedak, AAC Wesley, AC Morgan, CDC Arborg, CDC Byer, and Kyron oat varieties, all of the test weights taken from grain of these varieties were on par with CS Candem. CS Candem oat weight per thousand kernels was lighter than that of AAC Anthony, AAC Fedak, AC Morgan, and OREBoost. Overall, the AAC Fedak oat variety seems to be the best as its yield, test weight and tkw is among the highest.

Oat - Smoky Lake

Mean values of yield, height, lodging rating, test weight and tkw in 13 varieties of oat in Smoky Lake Alberta in 2024

Variety	Yield (% of CS Candem)		Height		Lodging	Test weight		TKW	
	g plot-1		cm		1-9	lb bu-1		g/1000 seeds	
AAC ANTHONY	99%	abcd*	76	bcd	2.7	36.0	bc	41.2	ab
AAC FEDAK	95%	bcd	70	defg	1.3	38.0	ab	44.3	a
AAC NEVILLE	103%	abc	69	efg	1.0	37.3	ab	41.9	ab
AAC WESLEY	85%	cde	65	g	1.3	36.2	bc	36.1	cd
AC MORGAN	93%	bcde	76	bc	1.7	39.8	a	41.3	ab
CDC ANSON	96%	abcd	65	g	1.0	36.9	abc	38.4	bcd
CDC ARBORG	105%	ab	89	a	3.0	39.5	ab	41.4	ab
CDC BYER	111%	ab	75	cde	1.0	38.2	ab	39.3	bcd
CS CAMDEN	100%	abcd	68	fg	1.3	37.3	ab	38.9	bcd
KYRON	116%	a	72	cdef	2.0	38.1	ab	39.9	bc
OREBOOST	82%	de	81	b	1.0	27.9	d	35.7	d
OT3121	94%	bcde	74	cdef	2.0	37.1	ab	38.7	bcd
CDC Westgate (SA152324)	74%	e	88	a	1.3	33.4	c	35.5	d

Results					
Average	2257.0	74.4	1.6	36.6	39.4
ANOVA p-value	153	<0.0001	0.0973	<0.0001	0.0039
CV%	12.3	5.1	52.5	5.8	6.1

*Values followed by different letters are statistically different (P<0.05)

Oat yield from the same varieties sown in Fort Kent behaved differently. The CS Candem oat individuals were amongst the highest yielding, on par with Kyron, CDC Byer, CDC Arborg, CDC Anson, AAC Neville, and AAC Anthony. In contrast, oat stands from CC Westgate underyielded CS Candem by 36% percent. Likewise to Fort Kent, CS Candem oat stands were also shorter than those from the CDC Westgate, OT3121, OREBoost, CDC Arborg and CDC Anthony varieties. In contrast, oat stands from AC Morgan and CDC Byer varieties were also taller than CS Candem,, whereas AAC Fedak and CS Candem were statistically the same height. In Smoky Lake test weight in the CS Candem variety was similar to results obtained in Fort Kent and on the same varieties. In addition, test weight from CS Candem oat stands grown in Smoky Lake was also on par with that of AAC Neville, CDC Anson and OT3121 oat varieties. Thousand kernel weight from grain taken from CS Candem oat was lighter than that from AAC Fedak variety, but heavier than that from OREBoost and CDC Westgate oat varieties. Compared to Fort Kent, oat stands from the CDC Westgate variety were likely more sensitive to drought in Smoky Lake and this would explain why tkw from this oat variety is lower than that of the Control (CS Candem). The

AAC Neville oat variety is a safe option for seeding as it is high yielding, short and with heavy test weight and tkw values. Another good option is CDC Arborg, but since oat stands from this were the tallest, these oat stands are more prone to lodging.

Summer tour of the Fort Kent Cereal Regional Variety Trials.