Regional Variety Trials

Partners: Alberta Agriculture and Forestry
Alberta Wheat Commission
Alberta Pulse Growers
St. Paul Municipal Seed Cleaning Plant
County of St. Paul
Lac La Biche County
MD of Bonnyville
Agricultural Research and Extension Council of Alberta
Agriculture and Agri-Food Canada
Nutrien Ag Solutions
FP Genetics
SeCan
Canterra Seeds
Alliance Seeds
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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.

The data presented in the following tables is a useful tool for comparing varieties to each other. Information should not be used to determine how much a variety will yield, but **rather as a comparison of how one**

variety will yield in relation to another. The tables will tell how a certain variety yields statistically compared to another variety.

Methods:
The cereal plots for the Regional Variety Trials were seeded at the LARA Fort Kent Research Site (NE25-61-5-W4) and in the County of St. Paul (NE-18-60-9-W4) Agronomic information about the RVTs grown by LARA in 2020 are listed in Table 1. The trials were seeded using the LARA five-row Fabro zero-till small plot seeder. The plots were 1.15m x 6m in area with a 9" row spacing. All trials were seeded to a randomized complete block design with four replicates for pulses and three replications for cereals to reduce error.

Soil samples were taken in spring prior to seeding to check soil fertility and a blend fertilizer was side-banded at seeding for optimum yields. Pre-seeding burn-off and in-crop herbicides were utilized for weed control. Notes on lodging and height were taken during the growing season. The plots were harvested using a Wintersteiger small plot combine and information on yield, bushel weight, 1000 kernel weight and protein were recorded.

Although the varieties in the trials are set by the ABCGAC and seed companies, there is opportunity for local input.

Lodging is rated on a scale of 1-9 where 1 is perfectly erect and 9 is completely flat.

Table 1. Regional Variety Trial Agronomic Information, 2020

Test	Site	# of Varieties	Seeding Date	Fertility	Seeding Rate	Harvest Date	Rain (mm)
Barley	Fort Kent	21	15-May-20	125 lbs/ac 60-30-25-10	270 pl/m2	29-Sep-20	285.8
Barley	St. Paul	21	24-May-20	125 lbs/ac 60-30-25-10	270 pl/m2	02-Oct-20	279.4
CPSR Wheat	Fort Kent	11	15-May-20	125 lbs/ac 60-30-25-10	330 pl/m2	29-Sep-20	285.8
CPSR Wheat	St. Paul	11	24-May-20	125 lbs/ac 60-30-25-10	330 pl/m2	02-Oct-20	279.4
CWSR Wheat	Fort Kent	32	15-May-20	125 lbs/ac 60-30-25-10	330 pl/m2	29-Sep-20	285.8
CWRS Wheat	St. Paul	32	24-May-20	125 lbs/ac 60-30-25-10	330 pl/m2	29-Oct-20	279.4
Oats	Fort Kent	7	25-May-20	125 lbs/ac 60-30-25-10	300 pl/m2	30-Sep-20	260.8
Oats	Lac La Biche	7	20-May-20	125 lbs/ac 60-30-25-10	300 pl/m2	-	-
Triticale	Fort Kent	4	15-May-20	125 lbs/ac 60-30-25-10	310 pl/m2	30-Sep-20	285.9
Triticale	St. Paul	4	24-May-20	125 lbs/ac 60-30-25-10	310 pl/m2	02-Oct-20	279.4
Yellow Peas	St. Paul	13	12-May-20	50 lbs/ac 1-52-0-0	88 pl/m2	02-Oct-20	297
Green Peas	St. Paul	6	12-May-20	50 lbs/ac 1-52-0-0	88 pl/m2	08-Oct-20	297
Faba Beans	St. Paul	7	12-May-20	50 lbs/ac 1-52-0-0	44 pl/m2	08-Oct-20	297

Barley

The RVT barley trials were established at two locations, one in the County of St. Paul (NE-18-60-9-W4) and one at the LARA Fort Kent Research Site (NE 25-61-5-W4). Similar to previous years, all varieties had an overall higher yield at the St. Paul site likely as a result of differences in soil structure and quality as well as the environmental conditions between the locations during the growing season, particularly moisture. Rainfall at the Fort Kent site was 285.8 mm while the rainfall at the St. Paul site was lower at 279.4 mm. The yield data for Fort Kent and St. Paul are shown in table 2 and table 3, respectively.

CDC Churchill was a variety which was in the top five for both Fort Kent and St. Paul. The top variety at in Fort Kent was AB Advantage at 103 bu/ac which was 22% higher than AC Metcalfe. The top variety in St. Paul was KWS Coralie yielding 126 bu/ac which was 38% higher then AC Metcalfe

Overall the barley did very well this year considering the growing conditions and we hope to continue having success growing barley in 2021!

Table 2. RVT Barley Data Fort Kent, 2020

Variety	Yeild (bu/ac)	-	% of check AC Metcalfe	TWT (lbs/bu)	TKW (g)	Height (cm)
AB Advantage	103	a	122	311.23	48	92
CDC Churchill	101	abc	120	314.87	42	68
AB Wrangler	98	abc	116	309.67	41	83
TR18748	96	a-d	114	313.72	45	70
TR18747	96	a-d	114	318.93	46	82
CDC Copeland	89	a-e	106	305.9	42	80
AB Brewnet	89	b-e	105	322.37	48	95
TR 18647	87	b-e	103	306.4	39	83
Sirish	87	b-f	103	303.03	43	76
TR18749	87	c-f	102	317.23	47	85
CDC Copper	87	c-f	102	308.67	43	78
AC Metcalfe	85	a	100	321.67	42	74
AAC Synergy	83	d-g	98	303.37	43	90
KWS Coralie	80	e-h	94	281.57	42	63
AB Tofield	74	f-i	87	307.57	40	91
Esma	74	f-i	87	296.27	45	69
KWS Kellie	71	g-j	84	288.3	42	66
TR16742	67	hij	80	298.93	39	76
FB209	67	hij	80	299.57	46	97
CDC Austenson	67	ij	79	317.2	39	82
Torbellino	59	j	69	284.1	39	75
CV=9.16						

Table 3. RVT Barley Data St. Paul, 2020

Variety	Yield (bu/ac)	-	% of check AC Metcalfe	TWT (lbs/bu)	TKW (g)	Height (cm)
KWS Coralie	126	a	138	310.39	50	73
KWS Kellie	123	a	134	314.9	53	74
AAC Synergy	118	ab	129	331.7	50	105
CDC Churchill	114	abc	125	337.43	51	90
Esma	113	abc	124	323.8	54	75
CDC Copper	112	a-d	123	322.33	51	90
AB Brewnet	111	a-e	122	335.53	53	104
TR18747	110	a-e	121	341.8	57	99
TR18748	104	b-f	114	340.4	56	100
AB Advantage	101	b-f	111	323.47	53	107
TR16742	100	b-f	110	321.3	47	86
CDC Austenson	99	c-f	108	341.93	53	94
AB Tofield	98	c-f	108	329.6	47	102
TR18647	98	c-f	107	332.94	50	95
Sirish	97	c-f	107	325.03	51	77
AB Wrangler	96	def	105	329.4	49	97
Torbellino	95	def	104	310.93	50	77
FB209	93	ef	102	323.87	54	107
TR18749	92	f	101	336.41	55	95
AC Metcalfe	91	f	100	328	49	95
CDC Copeland	89	f	97	330.6	51	102
CV=9.41						

CPSR & CCHNR Wheat

The Canadian Prairie Spring Red (CPSR) and Canada Northern Hard Red (CCNHR) were also wheats grown in both Fort Kent (NE-25-61-5-W4) and St. Paul (NE-18-60-9-W4). WPB Whistler yielded top in both St. Paul and Fort Kent. WPB Whistler yielded 74 bu/ac in Fort Kent which is 18% higher than AAC Brandon and 43% higher than Carberry. AAC Castle was another variety that made top five at both research sites.

The yield data from CPSR & CCHNR wheat from Fort Kent and St. Paul are in tables 4 and 5, respectively.

Table 4. CPSR & CCHNR Wheat Data Fort Kent, 2020.

Treatment	Yeild (bu/ac)	-	% of Check Carberry	% of Check AAC Brandon	TWT (lbs/bu)	TKW (g)	Height (cm)	Protien
WPB Whistler	74	ab	143	118	372.6	39	80	10.96
CDC Reign	70	ab	134	111	380.57	37	74	11.55
HY2068	69	ab	133	110	398.07	34	79	11.38
AAC Castle	69	ab	133	110	376.47	36	84	12.06
CS Accelerate	66	ab	126	105	388.17	31	75	11.48
Pasteur	65	b	124	102	383.8	40	85	11.28
AC Andrew	64	b	124	102	371.3	36	79	10.25
AAC Penhold	63	b	122	101	388.13	42	75	11.97
LNR15-1741	63	b	121	100	380.07	32	75	11.46
AAC Brandon	63	b	121	100	373.9	36	78	11.67
Carberry	52	c	100		393.4	38	77	12.35
CV=8.57								

Table 5. CPSR & CCHNR Wheat Data St. Paul, 2020

Treatment	Yeild (bu/ac)	-	% of Check Carberry	% of Check AAC Brandon	TWT (lbs/bu)	TKW (g)	Height (cm)	Protien
Pasteur	104	a	163	138	358.2	40	92	9.62
WPB Whistler	104	a	163	137	330.47	39	82	8.50
AC Andrew	90	b	141	119	367.81	41	84	8.75
AAC Castle	90	b	140	118	377.4	42	89	10.90
HY2068	88	bc	137	116	373.93	39	94	10.83
CDC Reign	79	bc	124	104	340.56	38	81	10.73
LNR15-1741	79	bc	123	104	378.97	41	86	10.91
CS Accelerate	79	bc	123	104	381.67	39	82	11.30
AAC Penhold	78	c	122	103	385.87	48	82	12.16
AAC Brandon	76	cd	119	100	374.93	44	87	12.46
Carberry	64	d	100	84	372.73	42	85	12.31
CV=8.04								

CWRS & CWHWS Wheat

The Canadian Western Red Spring (CWRS) AND Canadian Western Hard White Spring (CWHWS) were grown in Fort Kent (NE-25-61-5 W4) and St. Paul (NE-18-60-9-W4). The CWRS and CWHWS wheat trial is the largest trial that LARA manages with 32 different varieties in this class. Data for Fort Kent can be found in Table 6. Table 7 illustrates the data that was obtained in St. Paul. The highest yielding variety in St. Paul was PT652 yielding 77 bu/ac which is 30% higher than AAC Brandon and 35% higher than Carberry. The top yielding variety in Fort Kent was AAC Russell yielding 78 bu/ac which was 34% higher than AAC Brandon and 47% higher than Carberry.

Overall, the trial did well and we are looking forward to growing this trial in the 2021season. The yield data for the CWRS and the CWHWS for Fort Kent and St. Paul are in tables, 6 and 7 respectively.

Table 6. CWRS & CWHWS Wheat Data St. Paul, 2020.

Variety	Yeild (bu/ac)	-	% of AAC Brandon	% of Carberry	TWT (lbs/bu)	TKW (g)	Height (cm)	Protien %
PT652	77	a	130	135	389.6	36	85	12.9
SY Gabbro	75	ab	127	132	391.23	43	88	12.59
AAC Redstar	73	abc	124	128	390.83	38	88	12.83
PT599	73	a-d	123	127	386.2	36	89	12.92
Rednet	72	a-e	122	126	386.83	38	85	12.9
AAC Broadacres	72	a-f	121	125	392.3	39	85	11.87
BW5045	72	a-f	121	125	380.6	34	82	12.65
BW5031 CL	70	a-g	119	123	385.73	39	84	12.87
CS11200214-17	68	a-h	116	120	387.43	40	88	12.75
CS Jake	68	a-h	115	120	387.67	37	86	13.98
PT598 CL	68	a-h	115	119	384.43	37	80	12.78
AAC Warman VB	68	a-h	114	118	395.8	38	90	13.09
AAC Russell	68	b-i	114	118	390.77	38	90	12.53
AAC Starbucks	66	b-j	112	116	386.93	35	83	12.4
BW1069	66	b-k	112	116	391.57	35	86	12.98
Daybreak	66	b-k	111	116	391.57	40	82	12.75
LNR15-1405	66	c-k	111	115	375.63	41	80	12.46
AAC Wheatland VB	65	c-k	110	114	385.67	33	80	12.11
Stettler	65	c-k	110	114	386.73	37	84	13.07
AAC Magnet	65	c-l	109	113	390.4	41	87	13.18
CDC Evolve	64	c-l	108	112	362.8	38	107	13
BW1093	64	d-i	107	111	386.33	35	78	12.84
Sheeba	63	e-l	107	111	390.43	40	88	12.49
CDC Ortona	62	f-l	105	109	389.03	36	89	12.64
SY Torach	62	f-l	105	109	383.1	29	77	13.44
SY Steel	61	g-l	103	107	384.67	37	94	13
AAC Brandon	59	h-m	100	104	384.87	38	84	12.55
Ellerslie	58	i-m	98	101	380.63	35	84	12.81
Carberry	57	j-m	96	100	390.1	37	82	12.38
BW5044	57	klm	96	99	384.43	36	81	12.69
CS Tracker	55	lm	94	97	386.1	36	85	13.41
AAC Elie	50	m	85	88	380.4	36	86	12.78
CV=8.98								

Table 7. CWRS & CWHWS Wheat Data St. Paul, 2020.

Variety	Yeild (bu/ac)	-	% of AAC Brandon	% of Carberry	TWT (lbs/bu)	TKW (g)	Height (cm)	Protien %
AAC Russell	78	a-e	134	147	383.9	44	94	11.38
BW5045	78	a	133	146	359.7	39	89	11.99
BW1069	76	ab	130	144	379.7	41	93	11.29
BW5031 CL	75	abc	128	141	370.23	42	86	11.383
CS11200214-17	74	a-d	127	140	378.17	45	97	11.833
Daybreak	74	a-e	126	138	371.1	46	92	11.927
AAC Broadcast	73	a-e	125	137	43.387	381	84	11.26
AAC Starbuck	73	a-e	125	137	375.37	40	89	11.66
LNR15-1405	71	a-f	121	134	358.05	47	90	10.96
AAC Wheatland VB	71	a-f	121	133	385.3	41	83	11.34
PT652	70	a-g	120	132	373.97	38	97	12.513
PT598 CL	69	b-g	118	130	380.73	44	82	11.947
PT599	67	c-g	115	127	385.23	40	97	12.507
Ellerslie	67	c-h	114	125	380.5	42	100	12.74
CDC Orthena	66	d-h	113	125	391.17	41	103	12.413
BW1093	66	d-h	113	124	374	33	84	11.947
AAC Warman	66	d-h	113	124	382.9	40	103	12.04
Stettler	66	e-h	112	124	378.53	42	91	12.45
SY Gabbro	65	e-h	111	123	373.1	48	94	12.65
AAC Elie	64	e-h	110	121	375.1	45	84	12.81
AAC Redstar	64	e-h	110	121	392.63	44	92	12.98
CS Jake	64	fgh	109	121	375.17	41	95	13.65
SY Steel	64	fgh	109	120	368.83	42	86	12.697
Rednet	64	fgh	109	120	380.35	42	101	13.003
SY Torach	63	fgh	108	119	375.73	35	81	12.479
BW5044	63	f-i	107	118	375	44	83	12.19
AAC Magnet	61	ghi	104	115	384.77	44	93	13.457
AAC Brandon	59	hi	100	110	377.57	46	84	12.93
Sheba	58	hi	99	109	379.17	41	100	12.303
CS Tracker	58	hi	99	108	377.43	40	102	14.027
Carberry	53	ij	91	100	384.77	42	91	13.027
CDC Evolve	46	j	79	87	360.37	37	120	13.097
CV= 7.85								

Triticale

The Triticale trial this year was grown in Fort Kent (NE-25-61-5-W4) and in Mallaig (NE-18-60-9-W4). The RVT triticale is the smallest trial held at LARA consisting of four different varieties. Triticale is one of the higher yielding cereals variety trials over the past 12 years. This year T256 was one of the top two varieties both in St. Paul and Fort Kent.

Overall the triticale did well this year and we hope to continue having success growing triticale in the future. The yield from the triticale trial are in tables 8 and 9, respectively

Table 8. Triticale Data Fort Kent, 2020

Variety	Yeild (bu/ac)	% of Check Brevis	TWT (lbs/bu)	TKW (g)	Height (cm)
T267	103	109	323.83	49	90
T256	97	102	333.77	48	97
Brevis	94	100	360.53	50	100
Tyndal	80	85	349.03	53	105
CV=5.39					

Table 9. Triticale Data St. Paul, 2020

Variety	Yeild (bu/ac)	% of Check Brevis	TWT (lbs/bu)	TKW (g)	Height (cm)
Brevis	109	100	317.8	50	102
T256	96	88	318.73	50	105
T267	91	83	295.75	52	97
Tyndal	84	77	322.55	52	119
CV=3.8					

Oats

The Oats trials this year were grown in Fort Kent (NE 25-61-5-W4) and Lac La Biche, unfortunately with environmental conditions we were unable to collect data on the oats from the Lac La Biche site

CDC Endure surpassed the rest of the oat varieties yielding 191 bu/ac, which is 29 bu/ac more than AC Morgan which was the second-best yielding variety. CDC Endure was also 39% higher than the check which was CDC Dancer. The average height on the oats trial in Fort Kent was 111 cm. The yield from the oat trial is shown respectively in the table below

Table 10. RVT Oats Data Fort Kent, 2020

Variety	Yeild (bu/ac)	% of Check Dancer	TWT (lbs/bu)	TKW (g)	Height (cm)
CDC Endure	191	139	236.13	44	113
AC Morgan	162	118	226.67	40	108
CDC Skye	160	117	246.1	41	117
AAC Douglas	158	115	234.8	40	112
CFA 1502	156	114	240.13	42	101
CS Camden	153	112	233.83	44	111
CDC Dancer	137	100	242.1	38	114
CV=12.18					