

Regional Silage Trial – Cereals

Partners: Alberta Agriculture and Forestry
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Objectives:

1. To determine the best yielding cereal forage varieties (barley, oats, triticale) for whole plant forage production in Northeastern Alberta.
2. To determine the best quality cereal forage varieties (barley, oats, triticale) for cattle feed in Northeastern Alberta.

Background:

An important aspect of crop production is variety selection and, with new varieties continually becoming available, current and comprehensive forage variety yield and quality data is essential to producers. Previous experience with cereal grain production and the Regional Variety Trials has shown that there can be a 15% increase in production from selecting the best varieties, which, on average, can be an increase of \$25/acre.

Through the use of experience, neighbors and publications such as the Alberta Seed Guide (seed.ab.ca), we make variety selection decisions to benefit producers. However, there has been a lack of whole-plant annual forage production information to aid us in making cropping decisions for forage production.

The purpose of this trial is to supply producers with current and comprehensive annual forage variety yield and quality data for silage, greenfeed or swath grazing in Northeastern Alberta (crop zones 3 and 5) and across the province.

Method:

The cereal trials were grown in three blocks of plots: barley, oats and triticale, in two locations: Fort Kent (NE25-61-5-W4) and St. Paul (SE15-58-11-W4). The trial blocks were seeded as a randomized complete block design (RCBD) with four replicates to reduce error. The plots measured 1.15m by 6m in area.

Agronomic information on the trials can be found in table 1. The trials were seeded using the LARA five-row zero-till small plot drill and fertilizer (30-22-10-12) was side-banded at the time of seeding. The trials in Fort Kent were seeded on May 18th, 2016 and the trials in St. Paul were seeded on May 17th, 2016. Unfortunately, due to seeding error, the oat trial in St. Paul was cancelled. The trials were sprayed with a 3-point hitch sprayer: Fort Kent

Crop height and stage of maturity was recorded prior to harvest with the LARA alfalfa-omega self-propelled forage harvester. The total plot weight was recorded and samples were taken to assess dry

matter content. Additional composite samples were taken from each variety, frozen and sent to A & L Canada Laboratories for wet chemistry analysis. Statistical analysis of the data was conducted using ARM 9, P = 0.05.

The following varieties were grown in the Regional Silage Trials in 2016:

Barley

- *Champion* – high yielding 2-row feed barley variety with excellent standability and improved disease resistance.
- *CDC Coalition* – high yielding 2-row feed barley variety.
- *CDC Cowboy* – tall, 2-row dual purpose barley variety that responds well to low moisture and low fertility.
- *CDC Austenson* – 2-row barley variety with semi-smooth awns, short and strong straw and high feed yield.
- *TR13740* – 2-row feed barley variety.
- *Claymore* – 2-row barley variety developed from CDC Copeland x Xena.
- *CDC Meredith* – outstanding 2-row malting barley variety with high grain yield.
- *Sundre* – high yielding 6-row barley variety with good disease resistance.
- *Amisk* -rough awned, 6-row, semi-dwarf general purpose barley with strong straw for decreased lodging.
- *CDC Maverick* – 2-row forage barley variety with high yields. Ideally suited to low input management and lighter soils or drought conditions.
- *Conlon* – early maturing, 2-row feed and malting barley variety with smooth awns.
- *Canmore* – high yielding 2-row general purpose barley variety with good resistance to lodging.
- *Gadsby* – rough awned, 2-row general purpose barley well adapted to the brown and black soil zones. Excellent disease resistance and good quality feed yield.

Oats

- *CDC SO-1* – early maturing, very digestible brown feed oat variety with a high fat content and does not need to be rolled. Short, strong straw for reduced lodging.
- *AC Morgan* – High yielding, later maturing milling oat with good lodging resistance and is commonly used for silage or greenfeed.
- *AC Murphy* – widely adapted forage oat, with high yields, improved lodging resistance and is well suited for silage, swath grazing and green feed.
- *CDC Haymaker* – later maturing forage oat variety with high forage yield and quality.
- *Derby* – late maturing, general purpose milling oat variety with high yields and low hull content.
- *CDC Seabiscuit* – high yielding milling oat variety with good straw strength for reduced lodging.
- *CDC Baler* – very leafy, forage oat variety.
- *AC Juniper* – early maturing general purpose oat variety with high yields and strong straw.
- *Waldern* – late maturing, high yielding feed oat variety with good lodging resistance.
- *AC Mustang* – high yielding silage and forage oat variety with good lodging resistance.

Triticale

- *Bunker* – early maturing, reduced awn forage variety with great digestibility, high fat content and high silage yields.
- *Sunray* – early maturing, spring triticale variety with improved ergot resistance. Short statured for increased resistance to lodging.
- *Taza* – reduced awn forage and grain triticale variety with good lodging resistance.
- *Tyndal* – early maturing, reduced awn forage and silage variety with good lodging resistance.

Table 1. Agronomic Information, 2016.

Trial	Site	# of Varieties	Seeding Date	Seeding Rate	Fertility (lbs/acre)	Weed Control	Harvest Date
Barley	Fort Kent	13	18-May-16	300 pl/m ²	30-22-10-12 @ 141 lbs/ac	Curtail M	02-Aug-16
	St. Paul	13	17-May-16	300 pl/m ²	30-22-10-12 @ 141 lbs/ac	Tundra, Curtail M	05-Aug-16
Oats	Fort Kent	10	18-May-16	300 pl/m ²	30-22-10-12 @ 141 lbs/ac	Curtail M	02-Aug-16
	St. Paul	10	17-May-16	300 pl/m ²	30-22-10-12 @ 141 lbs/ac	N/A	N/A
Triticale	Fort Kent	5	18-May-16	370 pl/m ²	30-22-10-12 @ 141 lbs/ac	Curtail M	16-Aug-16
	St. Paul	5	17-May-16	370 pl/m ²	30-22-10-12 @ 141 lbs/ac	Tundra, Curtail M	16-Aug-16

Results:

Barley

The barley trials are aimed to be harvested at the soft dough stage. There were 13 barley varieties grown in the trials this year at both locations. The results of the Fort Kent and St. Paul trials can be found in table 2 and table 3, respectively. The Fort Kent trial was harvested after 76 days and the St. Paul trial was harvested after 79 days. Establishment at the beginning of the season was slow due to low rainfall, however a total of 139.7 mm (Fort Kent) of rain fell through the growing period. Historical yield data can be found in table 4. Average moisture content of the Fort Kent trial was 59% and the St. Paul trial was 56%.

The varieties yielded very well at both locations, with the average yield in Fort Kent of 4.22 ton/acre being slightly lower than the average yield achieved in St. Paul of 5.37 ton/acre. The highest yielding variety in Fort Kent was CDC Cowboy at 5.47 ton/acre followed closely by CDC Maverick. CDC Maverick is a fairly new 2-row barley variety suited to low input conditions. Gadsby was also one of the higher yielding varieties at 4.83 ton/acre and was the highest yielding variety in St. Paul at 6.09 ton/acre.

Feed quality was higher in the barley varieties grown at the Fort Kent location when compared to the St. Paul trial. This is likely due to a later harvest stage for the St. Paul trial beyond the recommended soft dough stage, which is seen in the lower moisture content of the samples.

Table 2. RST Barley Fort Kent, 2016 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/acre)	DM Yield (% Austenson)	2016 Quality Data					
			CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)
CDC Cowboy	5.47	119	8.94	23.84	46.21	70.33	0.17	0.25
CDC Maverick	5.10	111	10.14	23.84	42.78	70.33	0.22	0.23
Gadsby	4.83	105	8.99	28.63	50.50	66.60	0.28	0.17
CDC Austenson	4.56	100	10.30	25.16	44.40	69.30	0.22	0.20
Champion	4.49	98	11.62	26.91	50.83	67.94	0.24	0.22
CDC Meredith	4.33	94	10.65	27.36	48.80	67.59	0.23	0.22
Claymore	4.19	91	9.80	25.42	47.00	69.10	0.25	0.21
Sundre	4.19	91	10.37	31.36	56.19	64.47	0.45	0.17
Canmore	4.06	89	10.86	25.57	46.40	68.98	0.27	0.23
CDC Coalition	3.88	85	11.85	29.37	51.40	66.02	0.30	0.20
TR13740	3.65	80	10.23	25.95	47.55	68.68	0.20	0.17
Amisk	3.29	72	11.28	29.49	52.65	65.93	0.41	0.19
Conlon	2.77	60	11.18	25.39	49.41	69.12	0.41	0.20
Average	4.22	92	10.48	26.79	48.78	68.03	0.28	0.20
CV	8.91							

Table 3. RST Barley St. Paul, 2016 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/acre)	DM Yield (% Austenson)	2016 Quality Data					
			CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)
Gadsby	6.09	109	4.97	36.17	57.75	60.72	0.31	0.12
Claymore	5.92	106	5.77	36.10	57.58	60.78	0.41	0.13
Amisk	5.83	104	7.02	26.28	41.00	68.43	0.28	0.20
CDC Meredith	5.64	101	5.62	32.40	53.79	63.66	0.22	0.16
CDC Austenson	5.58	100	5.41	32.66	55.00	63.46	0.30	0.12
Sundre	5.52	99	6.62	36.55	57.57	60.43	0.38	0.16
CDC Cowboy	5.41	97	5.33	33.76	53.72	62.60	0.26	0.16
CDC Maverick	5.40	97	5.95	32.92	54.33	63.26	0.32	0.20
Champion	5.35	96	5.35	35.29	56.50	61.41	0.26	0.13
Canmore	5.24	94	7.45	33.92	56.36	62.48	0.33	0.18
TR13740	5.02	90	8.07	33.39	56.17	62.89	0.25	0.16
CDC Coalition	4.71	84	6.96	34.85	55.28	61.75	0.30	0.16
Conlon	4.15	74	6.38	29.56	50.29	65.87	0.33	0.20
Average	5.37	96	6.22	33.37	54.26	62.90	0.30	0.16
CV	9.69							

Oats

The oat trial is aimed to be harvested at the milk stage. There were 10 oat varieties grown in the trials this year at the Fort Kent location. Unfortunately, due to seeding error, the St. Paul trial was not harvested. The results of the Fort Kent trial can be found in table 5 and the historical yield data can be found in table 6. Average moisture content at the time of harvest was 65%.

The highest yielding oat variety was CDC Baler at 5.30 ton/acre followed closely by Murphy and CDC Haymaker at 5.11 ton/acre and 5.05 ton/acre, respectively. CDC Baler is a well-established forage oat variety that has been widely grown on the prairies. CDC SO-1 has increased in popularity in the last few years although it has consistently yielded low in the regional silage trials over the past three years. The trial was harvested 76 days after seeding.

Table 5. RST Oats Fort Kent, 2016 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/acre)	DM Yield (% Murphy)	2016 Quality Data					
			CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)
CDC Baler	5.30	104	10.44	32.32	52.91	63.72	0.2	0.23
Murphy	5.11	100	8.56	32.22	53.57	63.8	0.13	0.23
CDC Haymaker	5.05	99	10.69	27.46	51.56	67.51	0.15	0.25
Waldern	4.64	91	9.52	34.96	52.25	61.67	0.15	0.22
Derby	4.50	88	9.13	29.37	48.20	66.02	0.18	0.23
AC Morgan	4.33	85	9.51	28.74	52.18	66.51	0.16	0.29
CDC Seabiscuit	4.23	83	10.65	27.25	48.56	67.67	0.16	0.23
AC Mustang	4.14	81	9.41	32.28	52.22	63.75	0.17	0.26
AC Juniper	3.82	75	9.18	28.25	51.21	66.89	0.16	0.23
CDC SO-1	3.55	69	9.99	28.39	50.17	66.78	0.17	0.25
Average	4.47	87	9.71	30.12	51.28	65.43	0.16	0.24
CV	9.96							

Triticale

The triticale trials are targeted to be harvested at the late milk stage. There were 5 spring triticale varieties grown in the trial this year. The results of the Fort Kent and St. Paul trials can be found in table 7 and table 8, respectively. Historical yield data is summarized in table 9. Average moisture content at the time of harvest for both the Fort Kent and St. Paul trials was 55%.

A few variety changes were made to the trial this year, with Bunker being added back in as well as a new and upcoming variety currently known as 94L043057. Sunray was among the highest yielding varieties at both location at 4.25 ton/acre and 5.01 ton/acre in Fort Kent and St. Paul, respectively. Tyndal yielded only slightly higher in the St. Paul trial at 5.09 ton/acre. The upcoming variety of 94L043057 was consistently the lowest yielding variety at both locations.

Quality was comparable between locations, with the Fort Kent trial being slightly higher in crude protein content than the St. Paul trial although both locations are adequate to meet beef cattle nutrient requirements.

Table 7. RST Triticale Fort Kent, 2016 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/acre)	DM Yield (% Taza)	2016 Forage Quality					
			CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)
Sunray	4.25	125	8.32	27.27	46.74	67.66	0.11	0.21
Bunker	3.72	110	7.80	33.80	53.46	62.57	0.14	0.20
Taza	3.39	100	9.33	29.96	47.93	65.56	0.11	0.22
Tyndal	3.27	96	7.86	33.36	57.78	62.91	0.12	0.21
94L043057	2.98	88	8.94	33.47	57.61	62.83	0.12	0.19
Average	3.52	104	8.45	31.57	52.70	64.31	0.12	0.21
CV	7.04							

Table 8. RST Triticale St. Paul, 2016 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/acre)	DM Yield (% Taza)	2016 Quality Data					
			CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)
Tyndal	5.09	104	7.47	35.87	58.45	60.96	0.12	0.18
Sunray	5.01	102	7.18	31.07	48.16	64.7	0.12	0.21
Bunker	4.96	101	6.41	35.36	58.07	61.35	0.12	0.19
Taza	4.89	100	7.08	33.26	54.16	62.99	0.1	0.21
94L043057	4.87	100	6.9	34.69	54.27	61.88	0.1	0.19
Average	4.96	102	7.01	34.05	54.62	62.38	0.11	0.20
CV	9.31							

Look for province-wide results in the 2016 *Alberta Seed Guide*.