

Silage Variety Trials

Barley, Oats, Wheat & Triticale and Fall Rye

Partners:

- Sustainable Canadian Agricultural Partnership
- Results Driven Agriculture Research
- Alberta Seed Processors
- Alberta Beef Producers
- Alberta-British Columbia Seed Growers
- Government of Alberta
- Government of Canada

Objectives:

1. To identify the highest-yielding cereal forage varieties (fall rye, spring barley, oats, triticale, and wheat) for whole-plant forage production in Northeastern Alberta.
2. To identify the cereal forage varieties with the best feed quality (fall rye, spring barley, oats, triticale, and wheat) for cattle in Northeastern Alberta.

Background:

A crucial aspect of crop production is variety selection, as new varieties are continually being introduced. Access to current and comprehensive forage variety yield and quality data is essential for Alberta producers. Previous experience with cereal production and the Regional Variety Trials has demonstrated that selecting the best variety can increase production by approximately 15%, corresponding to an average gain of \$25 per acre.

Variety selection decisions are informed by experience, neighboring producers, and publications such as the Alberta Seed Guide (seed.ab.ca).

However, there has been a lack of comprehensive whole-plant annual forage data to support cropping decisions for forage production. The purpose of this trial is to provide producers with up-to-date, detailed information on annual forage variety yield and quality for silage, greenfeed, or swath grazing in Northeastern Alberta (crop zones 3 and 5) and across the province.

Material & Methods:

Silage trials were conducted in the County of St. Paul and involved five crop types: fall rye, spring barley, oats, spring wheat, and triticale. Each trial block was established using a randomized complete block design (RCBD) with three replicates to reduce experimental error. Spring wheat and triticale were seeded within the same block. Individual plots measured 1.15 m × 6 m.

Seeding was performed using a LARA five-row zero-till small-plot drill, with blended fertilizer side-banded at the time of seeding. Hand weeding was carried out throughout the growing season to maintain weed-free trial conditions.

Prior to harvest, crop height and stage of maturity were recorded. For forage quality analysis, plant material was collected from the inner three rows of each plot prior to harvest and chopped into approximately 2.5 cm (1-inch) lengths using a paper cutter. Approximately 400 g of this freshly chopped forage was dried and submitted to a laboratory for quality analysis. Harvesting was carried out when crops reached the desired harvest stage using a LARA alfalfa–Omega self-propelled forage harvester, and total plot weight was recorded at harvest.

For dry matter determination, a separate subsample consisting of 1 kg of freshly harvested material was collected from each plot after harvest and dried to a constant weight.

Data for forage dry matter yield and quality parameters were subjected to analysis of variance (ANOVA), and treatment means were compared using the least significant difference (LSD) test at the 0.05 probability level with the agricolae (version 1.3-7) package in R (version 4.3.2). Agronomic details for the trials are presented in the chronology table.

Results & Discussion:

Barley

This year, a total of eight barley varieties were grown at the site in St. Paul County. The trial was harvested when most varieties had reached the soft dough stage, approximately 80 days after seeding. Although no statistically significant differences were detected among varieties, most yielded around or above 5 t ac⁻¹ when moisture was adjusted to 65%. The highest-yielding variety was AB Maximizer at 5.67 t ac⁻¹, while the lowest-yielding variety was AAC Lariat at 4.9 t ac⁻¹. CDC Austenson was used as the check variety. AB Maximizer, FB21106, and FERGUSON produced yields that were 7%, 1%, and 1% higher than the check, respectively, whereas all other varieties yielded less than the check.

In terms of forage quality, most varieties met the nutritional requirements of beef cattle from mid-gestation through lactation. Crude protein (CP) values ranged from 10.20% to 11.47% across varieties, while total digestible nutrients (TDN) varied between 66.03% and 68.25%. For reference, recommended dietary CP levels for beef cattle are 7% during mid-gestation, 9% during late gestation, and 11% during lactation. Similarly, TDN requirements generally follow the 55-60-65 guideline, with cows requiring approximately 55% TDN during mid-gestation, 60% during late gestation, and 65% during lactation. For more detailed information, please refer to Table 3a-1 & 2.

Table 3a-1. Forage dry matter (DM) yield, crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and total digestible nutrients (TDN) for all Barley varieties.

Treatment	DM Yield (t/ac)	CP (% DM)	NDF (% DM)	ADF (% DM)	TDN (% DM)
AB Maximizer	5.67 a	10.77 a	42.77 a	23.80 a	67.23 a
FB21106	5.33 a	10.20 a	42.90 a	23.00 a	67.70 a
FERGUSON	5.33 a	11.33 a	42.27 a	22.23 a	67.87 a
CDC Austenson	5.30 a	11.37 a	42.17 a	21.93 a	67.50 a
CDC Durango	5.20 a	11.40 a	41.75 a	22.00 a	68.25 a
FB23618	5.17 a	11.47 a	43.00 a	23.03 a	66.47 a
WCI Fortify	5.00 a	10.57 a	44.27 a	25.10 a	66.03 a
AAC Lariat	4.90 a	11.13 a	42.03 a	22.97 a	67.23 a
Pr (>F)	0.7387	0.7922	0.9607	0.6195	0.4259

Note : Significance Codes : 0 **** 0.001 *** 0.01 ** 0.05 *

Table 3a-2. Forage starch content (Starch) and in-vitro true digestibility (IVTD30) for all Barley varieties.

Treatment	Starch (% DM)		IVTD30 (% DM)	
AB Maximizer	30.60	a	68.07	ab
FB21106	31.30	a	68.13	ab
FERGUSON	31.77	a	68.90	a
CDC Austenson	30.10	a	67.97	ab
CDC Durango	31.70	a	68.50	ab
FB23618	29.03	a	67.17	ab
WCI Fortify	28.80	a	65.93	b
AAC Lariat	31.07	a	67.83	ab
Pr (>F)	0.675		0.4543	

Note : Significance Codes : 0 **** 0.001 *** 0.01 ** 0.05 *

Oats

A total of six oat varieties were grown in the trial this year at the St. Paul site. The trial was harvested when most varieties reached the milk stage. Significant differences among varieties were observed for dry matter (DM) yield, which ranged from 2.74 to 3.56 t ac⁻¹ (at 65% moisture). AAC Wesley was the highest-yielding variety, while ORe Ruminator was the lowest-yielding. CDC Baler served as the check variety. AAC Wesley was the only variety to exceed the check, yielding 2% higher, whereas all other varieties produced lower yields than CDC Baler.

Forage quality was generally adequate across all varieties. Crude protein (CP) concentrations exceeded 11% for all entries, meeting the nutritional requirements of lactating beef cattle. Total digestible nutrient (TDN) concentrations for most varieties were sufficient to meet the energy requirements of beef cows from mid-gestation through lactation, with values ranging from 62.4% to 68.17%. Detailed results are provided in Table 3a-3 & 4.

Table 3a-3. Forage dry matter (DM) yield, crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and total digestible nutrients (TDN) for all Oats varieties.

Treatment	DM Yield (t/ac)		CP (% DM)		NDF (% DM)		ADF (% DM)		TDN (% DM)	
AAC Wesley	3.56	a	11.37	a	46.97	c	25.97	c	68.17	a
CDC Baler	3.48	a	12.20	a	53.47	a	30.87	ab	62.40	e
CDC Endure	3.27	ab	11.70	a	48.83	bc	26.57	bc	66.30	b
CDC Westgate	3.25	ab	11.97	a	51.50	ab	29.90	abc	64.20	cd
ORe Boost	2.81	b	11.33	a	54.27	a	32.07	a	63.47	de
ORe Ruminator	2.74	b	11.93	a	51.50	ab	27.90	abc	65.07	bc
Pr (>F)	0.02687*		0.3537		0.001765**		0.06185.		3.522e-05***	

Note : Significance Codes : 0 **** 0.001 *** 0.01 ** 0.05 *

Table 3a-4. Forage starch content (Starch) and in-vitro true digestibility (IVTD30) for all Oats varieties.

Treatment	Starch (% DM)		IVTD30 (% DM)	
AAC Wesley	16.23	a	64.12	a
CDC Baler	6.27	e	63.24	ab
CDC Endure	13.60	b	63.87	a
CDC Westgate	7.87	de	63.78	a
ORe Boost	9.53	cd	61.84	b
ORe Ruminator	10.43	c	63.08	ab
Pr (>F)	5.942e-06***		0.1432	

Note : Significance Codes : 0 **** 0.001 *** 0.01 ** 0.05 *

Wheat & Triticale

During the 2025 growing season, four triticale and four spring wheat varieties were evaluated at the St. Paul site. The trial was harvested when most varieties reached the late milk stage. Significant differences in forage dry matter (DM) yield were observed among varieties, with yields ranging from 3.85 to 5.28 t ac⁻¹ (at 65% moisture). The triticale variety T301 produced the highest forage yield, while the spring wheat variety Alotta had the lowest yield. AC Sadash served as the check variety in this trial. Five varieties, T301, AB Sunbeam, Trical Surge, T317, and AAC Galore, yielded 18, 16, 11, 8, and 5% more than the check, respectively. In contrast, 15FOR36 and Alotta yielded 3 and 14% less than AC Sadash, respectively.

Regarding forage quality, most varieties met the crude protein (CP) requirements of lactating beef cows, with CP concentrations ranging from 10.43 to 11.90%. Similarly, most varieties provided sufficient total digestible nutrients (TDN) to meet the nutritional requirements of beef cattle from mid-gestation through lactation, with values ranging from 61.43 to 67.33%. For more detailed information, please refer to Table 3a-5 & 6.

Table 3a-5. Forage dry matter (DM) yield, crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and total digestible nutrients (TDN) for all Wheat & Triticale varieties.

Treatment	DM Yield (t/ac)		CP (% DM)		NDF (% DM)		ADF (% DM)		TDN (% DM)	
T301	5.28	a	10.87	abc	49.73	b	27.43	bc	65.23	a
AB Sunbeam	5.19	a	10.43	c	48.83	b	28.33	bc	65.77	a
Trical Surge	4.98	ab	11.13	abc	54.33	a	30.27	ab	62.27	b
T317	4.84	ab	10.50	bc	48.13	b	26.60	bc	66.27	a
AAC Galore	4.68	ab	11.67	ab	48.93	b	27.23	bc	66.00	a
AC Sadash	4.47	bc	11.73	a	47.07	b	26.87	bc	67.33	a
15FOR36	4.35	bc	11.90	a	55.60	a	33.17	a	61.43	b
Alotta	3.85	c	11.33	abc	46.77	b	25.90	c	66.70	a
Pr (>F)	0.008164**		0.1217		0.003698**		0.015*		0.0005657***	

Note : Significance Codes : 0 **** 0.001 *** 0.01 ** 0.05 *

Table 3a-6. Forage starch content (Starch) and in-vitro true digestibility (IVTD30) for all Wheat & Triticale varieties.

Treatment	Starch (% DM)		IVTD30 (% DM)	
T301	7.13	cd	62.58	a
AB Sunbeam	10.60	ab	62.84	a
Trical Surge	3.63	e	60.17	b
T317	9.00	bc	63.64	a
AAC Galore	10.80	ab	63.33	a
AC Sadash	12.77	a	64.36	a
15FOR36	4.90	de	59.67	b
Alotta	9.67	abc	64.57	a
Pr (>F)	0.0002368***		0.002572**	

Note : Significance Codes : 0 **** 0.001 *** 0.01 ** 0.05 *

Fall Rye

This year, fall rye was included for the first time in the regional silage trials, with seven varieties evaluated. Dry matter (DM) yields ranged from 3.14 to 3.85 t ac⁻¹ (at 65% moisture), with SU Performer yielding the least and KWS Aviator the most. AC Hazlet served as the check variety in this trial. KWS Aviator was the only variety to exceed the check, yielding 7% more, while all other varieties yielded less than AC Hazlet.

Regarding forage quality, most varieties met the crude protein (CP) requirements of beef cattle only until late gestation, with CP concentrations ranging from 7.40 to 10.03%. However, all varieties provided more than 65% total digestible nutrients (TDN), sufficient to meet the nutritional demands of beef cows during lactation. For more detailed information, please refer to Table 3a-7 & 8.

Table 3a-7. Forage dry matter (DM) yield, crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and total digestible nutrients (TDN) for all Fall Rye varieties.

Treatment	DM Yield (t/ac)		CP (% DM)		NDF (% DM)		ADF (% DM)		TDN (% DM)	
KWS Aviator	3.85	a	8.00	bc	46.97	abc	27.60	ab	67.13	ab
AC Hazlet	3.59	a	7.40	c	49.53	a	29.00	ab	66.37	b
KWS Serafino	3.38	a	9.10	ab	46.60	abc	30.20	a	67.13	ab
KWS Trebiano	3.38	a	9.65	a	44.65	c	25.50	b	68.85	a
Cossani	3.19	a	10.03	a	45.67	c	26.87	ab	67.30	ab
KWS Receptor	3.16	a	9.10	ab	49.15	ab	29.85	a	66.10	b
Performer	3.14	a	9.80	a	46.07	bc	27.70	ab	67.23	ab
Pr (>F)	0.4021		0.006841**		0.06751.		0.1542		0.1751	

Note : Significance Codes : 0 '****' 0.001 '***' 0.01 '**' 0.05 '.'.

Table 3a-8. Forage starch content (Starch) and in-vitro true digestibility (IVTD30) for all Fall Rye varieties.

Treatment	Starch (% DM)		IVTD30 (% DM)	
KWS Aviator	5.13	ab	64.09	ab
AC Hazlet	4.97	ab	61.93	c
KWS Serafino	6.10	ab	63.91	ab
KWS Trebiano	6.90	a	65.67	a
Cossani	6.73	a	64.52	ab
KWS Receptor	4.50	ab	62.82	bc
Performer	6.27	ab	64.35	ab
Pr (>F)	0.2028		0.03411*	

Note : Significance Codes : 0 '****' 0.001 '***' 0.01 '**' 0.05 '.'.