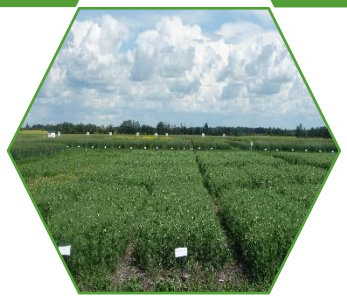
Gateway Research Organization

2019 ANNUAL REPORT

Cropping

Forage & Livestock

Enviroment



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Chairperson's Report

Rusty Bellamy

Greetings on behalf of the board of directors at Gateway Research Organization. This past year has been trying with all the rainy-cooler summer, but great things were able to happen with GRO.

At GRO we have an extra amazing staff lead by Sandeep, our manager who plans events, projects and finds funding to get the work done. Rick, who keeps the equipment maintenance up to sniff, and gets the plots in and keeps the summer staff on track with the plots. Amber is our Outreach Officer and plans extension events. Our staff is the reason for the ability to be successful with over 2500 plots completed.

My name is Rusty Bellamy a regenerative protein producer that's real meat protein from Athabasca. GRO is an important unbiased research group that is directed by farmers who set on the board. This makes GRO's work in our region so important to all of us in the region. I would like to thank all our fellow board members for their commitment to GRO.

So with that our hats are off to the great staff at GRO without them the great work and research is not possible, and the plot quality wouldn't be as good as it is. **GRO is here with localized practical, unbiased, research for the farmer.**

Thanks for your interest and membership in our events in the past year and in the upcoming year.

Manager's Report

Sandeep Nain

Welcome to our 2019 annual report. GRO had the highest number of small plot research (more than 2500) at 5 different sites surrounding Westlock. The highlight of the year was a dedicated site "Xtreme Alberta site for Federated Coop" showcasing more than 80 different products. This year's annual report is the culmination of a lot of hard work and is a tribute to the dedication of **Rick Tarasiuk** and **Amber Kenyon** along with summer students. The work we do truly would not be possible without the support of local producers who believe in the value that farmer-led applied research associations provide to the industry.

We attempt to locate our research sites in locations throughout our membership area and are very thankful for the generosity of our co-operating producers in achieving this. A special thanks to Jubilee Feedlot, Pibroch colony, Randy Pidsadowski, John Guelly, and Dean Wigand, who provided support with our trials at Westlock, Barrhead, and Fort Assiniboine. We are always searching for fresh ideas to put into action. Any suggestions for demonstrations or research trials are always welcome.

I would like to acknowledge the efforts of **Bill Chapman** for sharing his expertise and guidance on the right path over the last few years. I would also like to thank our Co-operators, municipal governments (Westlock, Barrhead, Lac Ste. Anne, Woodlands, and Parkland Counties) and agri-businesses whose continued support has added tremendously to the success of our organization.

I would like to thank the outgoing Board of directors, **Ken Anderson** and **Tom McMillan** for their outstanding commitment to GRO.

We look forward to the upcoming season. No doubt it will be filled with challenges, but I believe 2020 will lead to a perfect vision and mission for our organization. We will reinforce our efforts to meet regularly with the provincial and municipal governments to ensure that we receive the necessary financial support to continue serving the regional farming community. We will continue to keep our members informed of GRO's activities and the benefits of our organization.

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Equipment - Justin Nanninga-Chair, Tom McMillan, Randy Pidsadowski

Acknowledgement to Sponsor

The Board of Directors and staff extends their sincere appreciation for the active support for our research programs

Program Funding

Alberta Government

Westlock County – growing opportunity

County of Barrhead

Lac Ste. Anne County

Parkland County

Woodlands County

Project and Extension Sponsorship

Alberta Wheat Commission

Alberta Barley

Alberta Canola Producers Commission

Prairie Oat Growers Association

FP Genetics

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CropMaxx Inc – Innovative Ag Solutions

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FBC – We make life less taxing

In-Kind Contributors

(Including a combination of goods, land, equipment, product, services, percentage markdowns, etc.)

Special thanks to "Jubilee Feedlot, Pibroch Colony and Randy Pidsadowski" for their support.

- WESTLOCK SEED CLEANING CO-OP LTD
- Agriculture and Agri-Food Canada
- **Greener Pastures Ranching**
- **Anderson Seed Growers**

Greener Pastures Ranching

Westlock Seed Cleaning Co-op

Gateway Research Organization

Our History

Gateway Research Organization was formed from consolidation with the Pembina Forage Association in 1994. The Pembina Forage Association was started in 1975 by local producers interested in pasture management and forage & livestock research. While maintaining its interest in forage & livestock issues, the new organization became more involved in applied research and demonstrations in crops and environmental sustainability.

Our Vision

Gateway Research Organization will be a renowned and respected agriculture research and extension organization that is the preferred source of unbiased farm production information.

Our Mission

Gateway Research Organization provides cost-effective applied agricultural research, demonstration, and extension for producers in order to facilitate greater returns to farms by providing economically and scientifically sound information that enables our clients to make informed decisions.

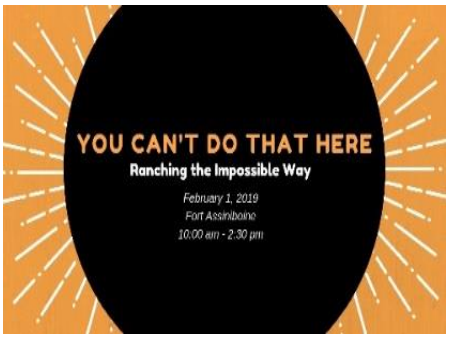
The Goals of our Organization

1. To increase the profitability of our members.
2. To encourage active participation by local producers.
3. To provide a valuable resource for information transfer and extension to producers.
4. To produce high quality, unbiased, and scientifically sound research.
5. To produce research based on local growing conditions and soil properties.
6. To collaborate with specialists from the agricultural industry, government, and educational institutions.

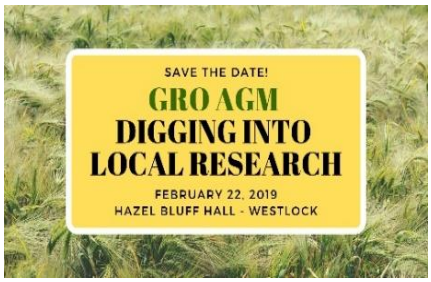
2019 Extension Activities

This past year has been an excellent one for extension events and for working with some terrific partner organizations! With 14 different events spread throughout our region there was something out there for everyone.

The Women in Farming Workshop was held on January 7 in Thorhild. With a fantastic speaker line up and some amazing attendees, this was an event that a lot of the guys were sad to miss. We had Dr. Melissa Hittinger on hand to speak on Calving, Carol Ohler from Thinkin Outside the Barn spoke on Relationships and Boundaries in Agriculture, FBC gave a presentation on Agricultural Tax Savings and Amber Kenyon presented on Women in Farming.



The next two events that we held were Ranching the Impossible Way in Ft Assiniboine on February 1 and then again in Thorhild on February 8. These workshops with Steve Kenyon, Amber Kenyon, Barry Yaremcio and FBC focused on helping producers make the impossible possible on their ranching operations. With presentations on feeding through a feed shortage, grazing high legume pastures, using cattle to manage weeds and saving both money and energy on our farms, these were workshops that had people excited to go home and put some new practices into place!

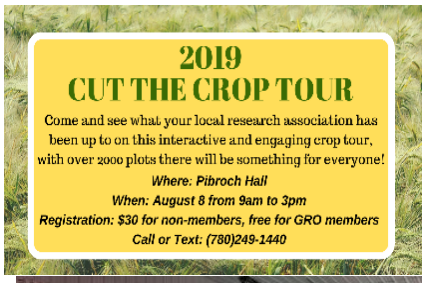


Our AGM in 2019 was held on February 22 in Westlock County. With speakers like Alan Hall, Neil Blue, and Dr. Matt Van Steelandt who was speaking on transitioning into regenerative agriculture, we managed to have a very informative AGM with some terrific producers and contributors in the room.

On June 17 we partnered with Food, Water, Wellness to bring you 'Get the Dirt on Soil Health' with Dr. Kris Nichols in Barrhead County. With a great turnout of producers, we learned a ton about what is happening in the ecosystem beneath our feet, the need for diversity and we even were able to participate in a project which allowed us to take a tool home that allows us to gauge the health of our own soils.

On June 26 we attended canolaPALOOZA on our annual bus trip down to Lacombe! Not only is canolaPALOOZA itself an informative and interactive event relating to all things canola, but the bus trip is always a great time of networking!

We also held our annual pasture walk in collaboration with Greener Pastures Ranching Ltd. on July 6 near Busby. With Steve Kenyon and Brent Thygesen speaking, this day was full of pastures water systems, fencing ideas, grazing management, direct marketing and of course water and soils!



Our annual crop tour was held on August 8 this year at Pibroch Hall. This is always the perfect opportunity to see what your research association has been up to on the cropping side of things. With so many trials this year, there was sure to be something for everyone.

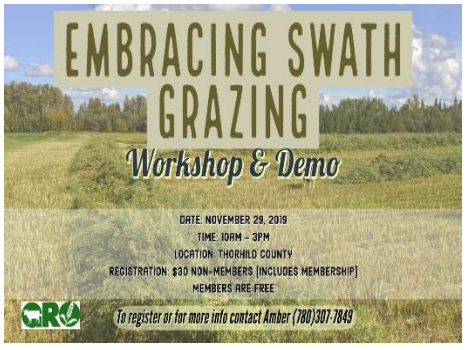
On August 9 we partnered with Young Agrarians Alberta to bring our producers a tour of 3 of our local farms. Our first stop was at Rosy Farms, where we learned about haskap berries and had the chance to sample to our stomach's content. Then we went to Greener Pastures Ranching to talk about rotational grazing, and we ended the tour at Swiss Leaf Farms, where we were treated to ice-cream topped with basil and had the chance to see a cubic farm system at work!

On August 20 we had the extreme pleasure of partnering with West Central Forage Association to bring Gabe Brown to Entwistle to speak on cover crops and soil health. If you have yet to hear Gabe's story it is well worth your time and effort to seek out more information from him.

As corn grazing is starting to make inroads in some grazier's winter feeding plans, we wanted to make sure that this was a topic that was touched on this year. Our A-Maize-ing Grazing Workshop was held on November 7 in Athabasca. After an informative morning, we finished up with a tour of Ole Farms corn fields.

On November 13 we had the pleasure of hosting Dr. Kris Nichols for a second time, while originally planned for Mayerthorpe, we were excited to have Dr. Nichols right in the GRO office, in Westlock, with a full of room of people interested and excited about soil health.

Teaming up with Greener Pastures Ranching, FBC and Victory Life Church for the People, Pasture and Profit charity school in St. Albert was one of our highlights this year. Not only was the school a fantastic mix of grazing, water systems and fencing, but we were able to take in a human resources session from Ron Denotter, as well as take home some tax tips from FBC. All of this and we managed to raise $1450 for two terrific charities!



We finished the year off with our Embracing Swath Grazing Workshop & Demo on November 29 in Thorhild. Swath grazing is an excellent way to feed cattle throughout the winter. It gives us that diversity that we learned so much about throughout the summer and puts manure out on the land. This was an excellent workshop to end the year off on a strong note.

Gateway Research Organization

Regional Cereal Variety Trials

Co-operators: Randy Pidsadowski – SW-17-61-26-W4

Objectives: To provide yield and agronomic information of current cereal varieties as well as newer varieties to producers in central Alberta.

Introduction

Variety selection plays an important role in production management due to the impact that yield, maturity, and other agronomic characteristics can have on producer profitability. Variety testing continues to be important in providing producers with information on the performance of newly registered and established varieties.

Table: 1 The yield and characteristics of cereals grown in our region are presented below.

RVT - Project Description	
Seeding Date	Wheat/Barley/Oat/Triticale on **May 09**; May 07 for Flax
Seeding Specifics	Fabro zero-till drill Seeding depth: 1 inch for Cereals and 0.75 for Flax **Seeding Rates:** 27 plants/ft^2 - 2-Row & 6-Row Barley 31 plants/ft^2 - HRS & Utility Wheat, 28 plants/ft^2 - Oats 75 plants/ft^2 - Flax Seed treatment: Raxil
RVT - Project Description	
Fertilizer/ac	**Fertilizer:** Seed placed: 11-52-0 at 60 lbs/ac **31.2 lbs/ac Actual P** **6.6 lbs/ac Actual N** Side banded: 28.5-0-17.8-3.6 at 421 lbs/ac **120 lbs/ac Actual N** **75 lbs/ac Actual K** **15 lbs/ac Actual S**

Herbicide	Cleanstart Label rates	May 8 ;
	Curtail M, 810ml/acre	June 21
	Axial **(Wheat and Barley)** 500 ml/ac	June 21
	Poast 180ml/acre @ Curtail M 810ml/ac	June 18 (Flax only)
	Roundup @ 360gai/ac **Sept 18**	
	Reglone @ 750ml/ac Oct 7 (Flax)	
Rainfall	Recorded from May 1 to Sept 30, 2019: **374.5mm**	
Harvest Date	Oct 3 (2-Row & 6-Row Barley) Oct 3 (Wheat) Oct 10 (Oat) Oct 24 (Flax)	

2-Row Barley – The majority of malt-grade barley produced is two-row. Two-row barley is characterized by having only one fertile spikelet at each node. Six-row barley has three fertile spikelets at each node. This lack of crowding in two-row barley allows for straight, symmetrical kernels with low dormancy; key characteristics essential for malting. The malting process begins by soaking the grain and causing it to germinate. The low dormancy and high seed viability in two-row barley are important for this process.

6-Row Barley- The world's most important crop for feeding livestock. As feed, it is nearly equal in nutritive value to corn, which is very high in energy. This leads it to be valuable in feedlots and as hog feed. Six-row barley allows for desirable portions of firm fat and lean meat.

Table 2. Barley Varieties: Westlock

	Name		Height CM	Lodging 1-9 scale	Yield kg/ha	Yield % of AC MetCalfe	Yield bushel/acre	Bushel wt lb/bu	Test Wt kg/HL	TKW(g) 1000 Seed
1	**AC METCALFE**	TWO row	101 gh	**6.3** -	5973 d	**100**	**111** d	51.8 -	64.0 -	45.1 b-e
2	**AAC CONNECT**	TWO row	105 e-h	**9** -	6733 cd	**113**	**125** cd	51.8 -	63.9 -	49.5 abc
3	**AAC SYNERGY**	TWO row	101 fgh	**7** -	7918 abc	**132**	**147** abc	54.5 -	67.3 -	50.8 ab
4	**ALTORADO**	TWO row	98 gh	**7** -	7384 a-d	**123**	**137** a-d	55.3 -	68.2 -	49.7 abc
5	**CDC AUSTENSON**	TWO row	109 c-g	**4** -	7273 a-d	**122**	**135** a-d	55.3 -	68.3 -	49.9 abc
6	**CDC COPELAND**	TWO row	112 c-f	**8** -	6496 cd	**109**	**121** cd	52.5 -	64.8 -	46.6 a-e
7	**CDC COPPER**	TWO row	95 h	**2.7** -	6770 cd	**113**	**126** cd	52.9 -	65.3 -	47.0 a-e
8	**CDC GOLDSTAR**	TWO row	108 d-g	**6.3** -	7182 a-d	**120**	**133** a-d	53.1 -	65.5 -	46.8 a-e
9	**CLAYMORE**	TWO row	100 gh	**6.7** -	7591 abc	**127**	**141** abc	54.7 -	67.5 -	48.6 abc
10	**OREANA**	TWO row	79 i	**6.7** -	6569 cd	**110**	**122** cd	55.0 -	67.8 -	50.3 abc
11	**TR15155**	TWO row	98 gh	**4** -	7473 abc	**125**	**139** abc	53.3 -	65.8 -	45.1 b-e
12	**TR16629**	TWO row	115 b-e	**4** -	7169 a-d	**120**	**133** a-d	53.3 -	65.7 -	47.3 a-e
13	**TR16742**	TWO row	98 gh	**3.7** -	7055 bcd	**118**	**131** bcd	51.7 -	63.8 -	42.5 de
14	**TR17163**	TWO row	**109 c-g**	5 -	**8326 ab**	**139**	**155 ab**	**55.4 -**	**68.3 -**	**52.0 a**

15	**TR17639**	TWO row	105	e-h	8.7	-	7386	a-d	**124**	**137**	a-d	54.0	-	66.6	-	46.6	a-e
16	**AB ADVANTAGE***	SIX row	**126**	**a**	7	-	**8585**	**a**	**144**	**159**	**a**	**53.3**	**-**	**65.8**	**-**	**48.0**	**a-d**
17	**AB CATTLELAC**	SIX row	122	ab	4	-	7546	abc	**126**	**140**	abc	52.2	-	64.4	-	42.3	de
18	**SR17515**	SIX row	119	abc	8.3	-	7740	abc	**129**	**144**	abc	53.6	-	66.2	-	42.0	e
19	**SR17519**	SIX row	**116**	**bcd**	5.7	-	**8518**	**ab**	**142**	**158**	**ab**	**52.0**	**-**	**64.2**	**-**	**44.4**	**cde**
LSD P=.05				6.92		5.01		844.1			15.81		2.632		3.262		3.46
Standard Deviation				4.18		3.02		509.74			9.54		1.589		1.97		2.089
CV				3.94		50.4		6.93			6.99		2.97		2.99		4.44

Means followed by the same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Varieties that **share a letter did not differ significantly** from one another (p>0.05). Check variety is AC Metcalfe; *Smooth Awn

Hard Red Spring (HRS) Wheat – The Canadian Grain Commission currently classes 56 varieties under the Canadian Western Red Spring (CWRS) class. HRS is known for its hard texture, high protein, and high gluten content. These attributes contribute to making superior bread-making flour. The top two grades, No. 1 and No. 2, are segregated by protein level, with guaranteed minimum protein contents.

Utility Wheat – The Western Canadian wheat classes consist of eight individual descriptions. This trial consisted of two classes: Canadian Prairie Spring Red (CPSR) and Canadian Wheat Soft White Spring (CWSWS).

CANADA PRAIRIE SPRING RED (**CPSR**) has medium to hard kernels and medium to hard dough strength. It has two milling grades and is used for the hearth, flat, and steamed bread, and noodles.

CANADA WESTERN SOFT WHITE SPRING (CWSWS) is soft white wheat with low protein. It has three milling grades used for cookies, cakes, and pastry. CWSWS is also highly sought after by the industrial ethanol industry on account of its low protein content (i.e. high starch content).

Canada Northern Hard Red (CNHR) is the red spring wheat with medium to hard kernels, very good milling quality and medium gluten strength (lower than both the CWRS and CPSR classes). Introduced on August 1, 2016, the target quality of this class is for it to have sound kernels. There are three milling grades available. Depending on protein content, CNHR will be suitable for the production of pan bread, hearth bread, flatbread and noodles.

Canada Western Special Purpose (CWSP): special-purpose wheat class is for varieties for ethanol or livestock feed markets.

Table: 3 Canada Western Red Spring :Wheat 2019

Rating Type		Height		Protein		Yield			Bushel wt		Test Wt		TKW(g)	
Rating Unit		cm		%		% of Carberry	bu/ac		lb/bu		kg/HL		1000 Seeds	
1	CARBERRY	99	ghi	13.6	ab	100	105	c-g	62.9	a-e	77.7	a-e	42.1	bcd
2	AAC ALIDA VB	108	b-i	13.2	ab	96	100	d-g	63.1	a-e	77.8	a-e	41.5	b-e
3	AAC BRANDON	101	e-i	13.3	ab	99	103	c-g	64.0	a-d	79.0	a-d	44.9	b
4	AAC CIRRUS	102	e-i	13.1	ab	103	108	a-f	64.6	ab	79.7	ab	35.0	hi
5	AAC JATHARIA VB	115	abc	12.9	ab	104	109	a-f	64.9	ab	80.1	ab	43.8	bc
6	AAC LEROY VB	105	b-i	12.7	ab	108	114	a-e	64.3	abc	79.3	abc	41.6	b-e
7	AAC MAGNET	105	b-i	14.0	ab	101	106	b-g	63.0	a-e	77.8	a-e	40.8	c-g
8	AAC STARBUCK	101	e-i	13.3	ab	105	110	a-f	63.2	a-e	78.1	a-e	41.2	b-f
9	AAC VIEWFIELD	97	ij	13.0	ab	117	123	a	64.1	abc	79.1	abc	40.3	c-g
10	AAC WARMAN VB	119	a	12.4	b	101	106	c-g	63.8	a-d	78.8	a-d	40.3	c-g
11	AAC WHEATLAND VB	100	f-i	13.3	ab	111	117	abc	63.5	a-e	78.4	a-d	41.7	b-e
12	BOLLES	91	j	13.6	ab	105	111	a-f	60.2	e	74.3	e	38.9	d-g
13	BW1046	110	a-f	13.2	ab	99	103	c-g	63.4	a-e	78.3	a-e	37.0	gh
14	BW5028	100	f-i	12.7	ab	105	110	a-f	63.6	a-d	78.5	a-d	41.4	b-e
15	BW5031	101	e-i	13.6	ab	103	108	a-f	62.4	b-e	77.0	b-e	41.9	bcd
16	BW5056	108	b-h	13.0	ab	104	109	a-f	61.8	cde	76.3	cde	44.9	b
17	CDC GO	102	e-i	13.4	ab	109	114	a-d	62.4	b-e	77.0	b-e	48.5	a
18	CDC LANDMARK VB	104	d-i	12.9	ab	116	121	ab	65.2	a	80.4	a	43.7	bc
19	CDC SELECT 1	115	ab	13.6	ab	109	114	a-e	64.0	a-d	79.0	a-d	42.3	bcd
20	CS JAKE	110	a-f	13.4	ab	105	110	a-f	63.8	a-d	78.6	a-d	38.1	d-h
21	CS TRACKER	107	b-i	13.6	ab	110	115	a-d	63.4	a-e	78.2	a-e	38.6	d-g
22	CS11200104-11	98	hij	13.6	ab	105	110	a-f	63.1	a-e	77.9	a-e	40.0	c-g
23	CS11200214-17	102	e-i	13.1	ab	101	105	c-g	62.8	a-e	77.5	a-e	37.6	e-h
24	ELLERSLIE	110	a-f	13.0	ab	109	114	a-e	63.5	a-e	78.4	a-d	38.4	d-h
25	PARATA	105	b-i	14.1	ab	89	93	g	63.3	a-e	78.1	a-e	38.2	d-h
26	PT252	106	b-i	13.0	ab	108	114	a-e	63.5	a-e	78.4	a-d	42.2	bcd
27	PT488	111	a-f	13.7	ab	94	99	efg	62.9	a-e	77.6	a-e	39.1	d-g
28	PT596	111	a-f	13.0	ab	101	105	c-g	63.4	a-e	78.3	a-e	37.2	fgh
29	PT598	91	j	13.1	ab	99	104	c-g	61.4	de	75.7	de	34.2	i
30	PT652	113	a-d	12.8	ab	98	103		62.6	a-e	77.3	a-e	38.8	d-g
31	SHEEBA	114	a-d	12.8	ab	103	108	a-f	63.2	a-e	78.0	a-e	38.9	d-g
32	STETTLER	109	b-g	14.5	a	93	98	fg	60.9	e	75.2	e	38.4	d-h
33	SY CHERT	110	a-f	12.8	ab	98	102	c-g	62.6	a-e	77.2	a-e	40.4	c-g
34	SY GABRO	111	a-e	13.4	ab	112	117	abc	62.5	a-e	77.2	a-e	43.2	bc
35	SY OBSIDIAN	102	e-i	12.9	ab	101	106	c-g	62.7	a-e	77.3	a-e	40.9	c-g
36	SY TORACH	104	c-i	13.7	ab	104	109	a-f	63.0	a-e	77.7	a-e	33.8	i
LSD P=.05		5.69		0.924		8	8.127		1.367		1.681		2.222	
Standard Deviation		3.5		0.567		5	4.988		0.839		1.032		1.365	
CV		3.31		4.28		4	4.59		1.33		1.32		3.39	

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Table 4: Utility Wheat: CANADA PRAIRIE SPRING RED: (CPSR) – Westlock

Canadian Prairie Spring Red: Wheat 2019

		Height		Protein		Yield				Bushel wt		Test Wt		TKW(g)	
		cm		%		kg/ha		% of AC CARBERRY	bushel/acre		lb/bu		kg/HL	1000 Seeds	
1	**CARBERRY**	99	bc	13.6	a	6857	c	**100**	102	c	63	ab	77 -	44	c
2	**AAC BRANDON**	99	bc	13.6	a	6831	c	**100**	102	c	63	a	78 -	48	b
3	**AAC CASTLE**	99	bc	12.3	b	7285	bc	**106**	108	bc	61	c	75 -	52	a
4	**AAC PENHOLD**	92	c	12.6	b	8030	ab	**117**	119	ab	64	a	78 -	48	b
5	**AC FOREMOST**	94	bc	11.3	c	7771	ab	**113**	115	abc	63	a	78 -	43	c
6	**CDC TERRAIN**	111	a	12.3	b	7342	abc	**107**	109	bc	64	a	78 -	48	b
7	**HY2068**	102	b	12.2	b	7542	abc	**110**	112	abc	61	bc	75 -	36	e
8	**HY2077**	97	bc	12.5	b	8232	a	**120**	122	a	62	abc	76 -	38	d
LSD P=.05		5.75		0.419		613.53			9		1.26		2	1.85	
Standard Deviation		3.28		0.24		350.35			5.14		0.53		0.85	1.06	
CV		3.31		1.91		4.68			4.62		0.86		1.1	2.36	

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

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Table 5: Utility Wheat - Westlock

		Soft White General Purpose wheat 2019													
Rating Type		Height		Protein		Yield				Bushel wt		Test Wt		TKW(g)	
Rating Unit		cm		%		kg/ha		% of AC CARBERRY	bushel/acre		lb/bu		kg/HL		1000 Seeds	
1	**CARBERRY**	98	c	13.9	a	6585	bc	100	98	bc	64.0	a	79.0	a	44.4	c
2	**AAC BRANDON**	100	c	13.8	a	6775	bc	103	101	bc	63.7	a	78.6	a	48.1	b
3	**AAC PARAMOUNT**	107	a	10.5	c	8404	a	128	125	a	59.5	b	73.5	b	42.8	a
4	**AC ANDREW**	102	bc	11.0	b	7848	ab	119	117	ab	61.3	b	75.6	b	41.7	b
5	**GP214**	86	d	11.4	b	6180	c	94	92	c	60.4	b	74.5	b	43.5	c
6	**PASTEUR**	98	c	11.3	b	8451	a	128	125	a	66.4		81.9		45.9	b
7	**AC SADASH**	105	ab	10.4	c	8311	a	126	123	a	61.5	b	75.8	b	39.2	e
LSD P=.05		4.07		0.4069		1121.99		16.53			1.833		2.242		5.135	
Standard Deviation		2.29		0.2287		630.69		9.29			1.007		1.232		2.887	
CV		2.3		1.94		8.4		8.33			1.63		1.62		6.61	
Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).																

Varieties that share a letter did not differ significantly from one another (p>0.05).

Oats – Oats are a valuable part of crop rotation. They provide disease and insect breaks for wheat, barley, and canola. Their rapid establishment and growth provide excellent weed suppression. Oats also work well as a "catch crop" for taking up and storing excess nitrogen, and the straw provides a nutrient source for the following year's crop. The straw also protects against soil erosion and contributes to an increase in the soils organic matter content.

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Table 6. Oats

	Height	Yield			Bushel wt	Tst Wt	TKW(g)
	cm	kg/ha	% AC of CDC Dancer	bu/ac	lb/bu	kg/HL	1000 Seeds
1 **CDC DANCER**	137.0a	8628 b	**100**	226 b	48.6 b	60.0 c	38.1 c
2 **AC MUSTANG**	138.3a	9384 ab	**109**	246 ab	48.3	59.6	42.1 b
3 **CDC ARBORG**	132.0ab	10060 ab	**117**	**264 ab**	50.7 ab	62.5 abc	44.4 ab
4 **CDC RUFFIAN**	125.0b	8776 ab	**102**	230 ab	51.3 a	63.3 ab	40.6 bc
5 **CFA1502**	124.3b	10273 ab	**119**	**269 ab**	51.7 a	63.8 a	43.2 ab
6 **CS CAMDEN**	131.3ab	9852 ab	**114**	258 ab	49.7 ab	61.3 abc	44.9 ab
7 **ORE 3541 M**	124.0b	8503 b	**99**	223 b	49.1 ab	60.6 bc	41.7 b
8 **ORE 3542 M**	126.7b	8487 b	**99**	223 b	49.9 ab	61.5 abc	47.3 a
9 **OT2122**	129.7ab	9391 ab	**109**	246 ab	49.2 ab	60.7 abc	44.3 ab
10 **CDC Endure**	131.7ab	10408 a	**121**	**273 a**	50.0 ab	61.7 abc	46.8 a
11 **CDC Skye**	139.0a	8849 ab	**103**	232 ab	50.2 ab	61.9 abc	45.0 ab
LSD P=.05	6.19	1062.801		27.882	1.572	1.923	2.840
Standard Deviation	3.64	624.009		16.370	0.916	1.121	1.668
CV	**2.78**	**6.69**		**6.69**	**1.83**	**1.82**	**3.83**

Varieties that **share a letter did not differ significantly** from one another (p>0.05).

Triticale: is the first man-made crop species, is initially produced by crossing wheat (genus Triticum) with rye (Secale). When crossing wheat and rye, wheat is used as the female parent and rye as the male parent (pollen donor). The development of triticale as a cereal crop in Canada first began in 1954 at the University of Manitoba, Winnipeg. Triticale is still a minor crop in Canada. Triticale is grown mostly for forage or fodder, although some triticale-based foods can be purchased at health food stores and can be found in some breakfast cereals.

Table 7. Triticale

Treatment	Height (cm)		Yield kg/ha		Yield bu/ac		Bushel wt lb/bu		TKW(g) 1000 Seeds	
BREVIS	114	*b	10029	a	149	a	58	*	47.3	b
T256	120	*a	9401	b	140	b	57	*	48.8	a
T267	110	b	9341	b	139	b	57		47.5	
T270	121	a	10209	a	152	a	58		52.2	
LSD P=.05		5.59		543.9		8.1		4.60		6.57
Standard Deviation		2.97		272.7		4.06		3.09		3.28
CV		6.41		2.79		2.79		8.71		6.71

Flax: -grown mainly in cool northern climates. High omega-3 fatty acid and fiber in flax are some of the health benefits. Used in livestock feeding, human consumption, and many other industrial uses.

Table 8. Flax

		Height cm		Yield* kg/ha		% of CDC Bethune	bushel/acre	
1	**CDC BETHUNE**	64	-	1056	b	**100**	16.8	b
2	**CDC GLAS**	63.8	-	1515	a	**143**	24.1	a
3	**AAC BRIGHT**	60	-	1071	b	**102**	17.1	b
4	**AAC MARVELOUS**	60.8	-	1323	ab	**126**	21.1	ab

5	**AAC PRAIRIE SUNSHINE**	63.5	-	1294	ab	**123**	20.6	ab
6	**CDC DORADO**	60.3	-	1139	ab	**108**	18.1	ab
7	**CDC ROWLAND**	61.3	-	1402	ab	**133**	22.3	ab
LSD P=.05		5.9		288.737			4.601	
Standard Deviation		3.97		194.36			3.097	
CV		6.41		15.46			15.48	

Means followed by the same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

*** Poor yield for Flax:2019 Immature at harvest.** Overall 2019 and 2018, were not good years for growing flax in our region. Delayed maturity and less growing temperature in later season posed many challenges for a decent economic viable crop.

Regional Pulse Variety Trial

Co-operators: Jubilee Feedlot- SW-9-59-26-W4

Objectives:

- To provide yield and agronomic information of Green pea, Yellow peas and Fababeans commercial varieties and experimental lines for adaptability and yield potential to producers in west central Alberta.
- To promote crop diversification and increase pulse production acres in area

Introduction:

Variety selection plays an important role in production management due to the impact that yield, maturity, and other agronomic characteristics, such as standability or harvestability for pulses crops that can affect a producer's profitability. Variety testing continues to be important in providing producers with information on the performance of newly registered and established varieties.

Table 1: Agronomic details:

Trial	Date Seeded Soil Temp	Seed Depth (in)	Fertilizer Seed Placed	Fertilizer Side Banded	Herbicides Fungicides Insecticides	Rate	Date
RVT Peas	May 7 12.0 C	2.25	11-52-0 58 lbs/ac	0-0-60-0 132 lbs/ac	Viper ADV + UAN Reglone Ion @ 826ml/ac	404ml/acre 810ml/acre	June 17 August 29
RVT Fababeans	May 7 12.0 C	2.25	11-52-0 58 lbs/ac	0-0-60-0 132 lbs/ac	Viper ADV + UAN Reglone @ 1.0L/ac	404ml/acre 810ml/acr	June 17 Sept 18

Harvest Peas: September 20 and **Fababeans: October 24**

Soil Test at site

Nitrogen (lbs/ac)	Phosphorus (lbs/ac)	Potassium (lbs/ac)	Sulphur (lbs/ac)	pH
20.00	34.00	216.00	27.00	5.5

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Table 2: The yield and characteristics of Yellow Pea varieties presented below.

Yellow Peas	Maturity	% of Check CDC Amarillo	VINE Length (cm)		Yield kg/ha		Yield bu/ac	
CDC Amarillo	Medium	100	103	ab	3129	abc	46.5	abc
AAC Barrhead	Early	101	94	a-d	3158	abc	47.0	abc
AAC Chrome	Medium	85	81	d	2671	c	39.7	c
AAC Delhi	Early-Medium	102	81	d	3202	abc	47.6	abc
AAC Lacombe	Medium	99	94	a-d	3104	abc	46.2	abc
CDC Ardill	Medium	119	93	a-d	3718	ab	55.3	ab
CDC Canary	Medium	107	91	bcd	3352	abc	49.8	abc
CDC Inca	Early	124	101	ab	3890	ab	57.8	ab
CDC Lewochko	Medium	108	109	a	3379	abc	50.2	abc
CDC Meadow	Medium	105	85	bcd	3280	abc	48.8	abc
CDC Spectrum	Medium	115	100	abc	3603	abc	53.6	abc
LN4228	Medium	93	80	d	2921	bc	43.4	bc
N13022-7	Medium	122	79	d	3817	ab	56.8	ab
N13029-10	Medium	100	83	cd	3126	abc	46.5	abc
N13057-4	Medium	130	86	bcd	4061	a	60.4	a
N13057-5	Medium	121	94	a-d	3789	ab	56.3	ab
N13068-1	Medium	132	87	bcd	4128	a	61.4	a
AAC Aberdeen	Early	100	101	abc	3130	abc	46.5	abc
CV			8.21		12.25		12.25	

Varieties that share a letter did not differ significantly from one another (p>0.05).

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Table 3: The yield and characteristics of Green Pea varieties presented below.

Green Peas	Maturity	% of Check CDC Limerick	VINE Length (cm)	Yield kg/ha	Yield bu/ac
CDC Limerick	**Medium**	**100**	87	2123 ab	**31.6 ab**
Bleuman	**Early**	**118**	80	2509 ab	**37.3 ab**
12CP3032	**Medium**	**112**	87	2372 ab	**35.3 ab**
AAC Comfort	**Late-Medium**	**90**	78	1900 b	**28.3 b**
CDC Forest	**Medium**	**113**	89	2406 ab	**35.8 ab**
CDC Spruce	**Medium**	**132**	92	2796 a	**41.6 a**
N13073-17	**Early-Medium**	**129**	76	2746 a	**40.8 a**
N13073-19	**Early-Medium**	**110**	78	2342 ab	**34.8 ab**
CV			8.98	12.05	12.05

Varieties that share a letter did not differ significantly from one another (p>0.05).

Table 4: The yield and characteristics of Green Pea varieties presented below.

Fababeans	Type	Maturity	% of Check Snowbird	VINE Length (cm)	Yield bu/ac
Snowbird	Zero Tannin	Early	100	98	**80.4** a
CDC219-16	Zero Tannin	Early	70	96	**56.3** c
DL Tesoro	Zero Tannin	Medium	84	107	**67.6** bc
Fabelle	Tannin	Medium	94	107	**75.6** ab
LG Cartouche	Zero Tannin	Medium	92	105	**74.3** ab
Malik	Tannin	Medium	94	108	**75.4** ab
CV				5.31	**9.49**

Maturity for our region should be taken into consideration, Tannin varieties have colored flower whereas non-tannin one has a white flower.

Trials Funded by Alberta Wheat Commission 2019

Co-operators: Randy Pidsadowski- SW-17-61-26-W4

GRO - Local wheat varieties comparison trial"

Problem: The Gateway Research Organization has been involved in the regional variety trials (RVTs) organized by the government of Alberta and contributed to datasheets for the Alberta seed guide since 1988. However not all locally grown varieties of wheat are included in the RVTs. The producers in our region want to see a close comparison of the newer varieties grown in the RVT program with most popular varieties grown in our region.

Justification: Prior to planting each year, wheat producers have to make the important and difficult decision of selecting wheat seed varieties from a long list of choices. Since public and private wheat breeders continue to develop higher-yielding wheat varieties over time, wheat producers are confronted with a difficult question about whether to purchase new certified seed or go with older proven choices. As producer run applied research organization, it is mandated for GRO to provide an unbiased source of information regarding decision-making process. If producers can choose from the information suited close to their individual set of growing conditions including average rainfall, soil type, and agronomic practices, they would most likely to maximize performance for selected wheat variety and their profitability,

Objective: Side by side comparison of all the locally popular wheat varieties in our area (Surrounding Westlock County) to analyze yield and other agronomic characteristics.

Table:1

Canada Western Red Spring				Canada Prairie Spring Red	
AC Carberry	1	AAC Crossfield	7	AAC Penhold	11
AAC Viewfield	2	AAC Redwater	8	AAC Foray	12
AAC Redberry	3	AC Stettler	9	AAC Goodwin	13
AAC Brandon	4				
AAC Connery	5	Soft White Spring		Canada Northern Hard Red	
AAC Elie	6	AAC Chiffon	10	AC Foremost	14

Seeded May 10 Harvest: Oct 2

Rainfall recorded from May 1 to Sept 30, 2019: 374.5mm

Fertilizer: Seed placed: 11-52-0 58 lbs/ac 30 lbs/ac Actual P
6.4 lbs/ac Actual N

Side banded: 31.8-0-13.8-3.5 347 lbs/ac
110 lbs/ac Actual N
47.9 lbs/ac Actual K
12 lbs/ac Actual S

Herbicide: Curtail M 810 ml/ac June 21, 2019; Axial 500 ml/ac June 21, 2019

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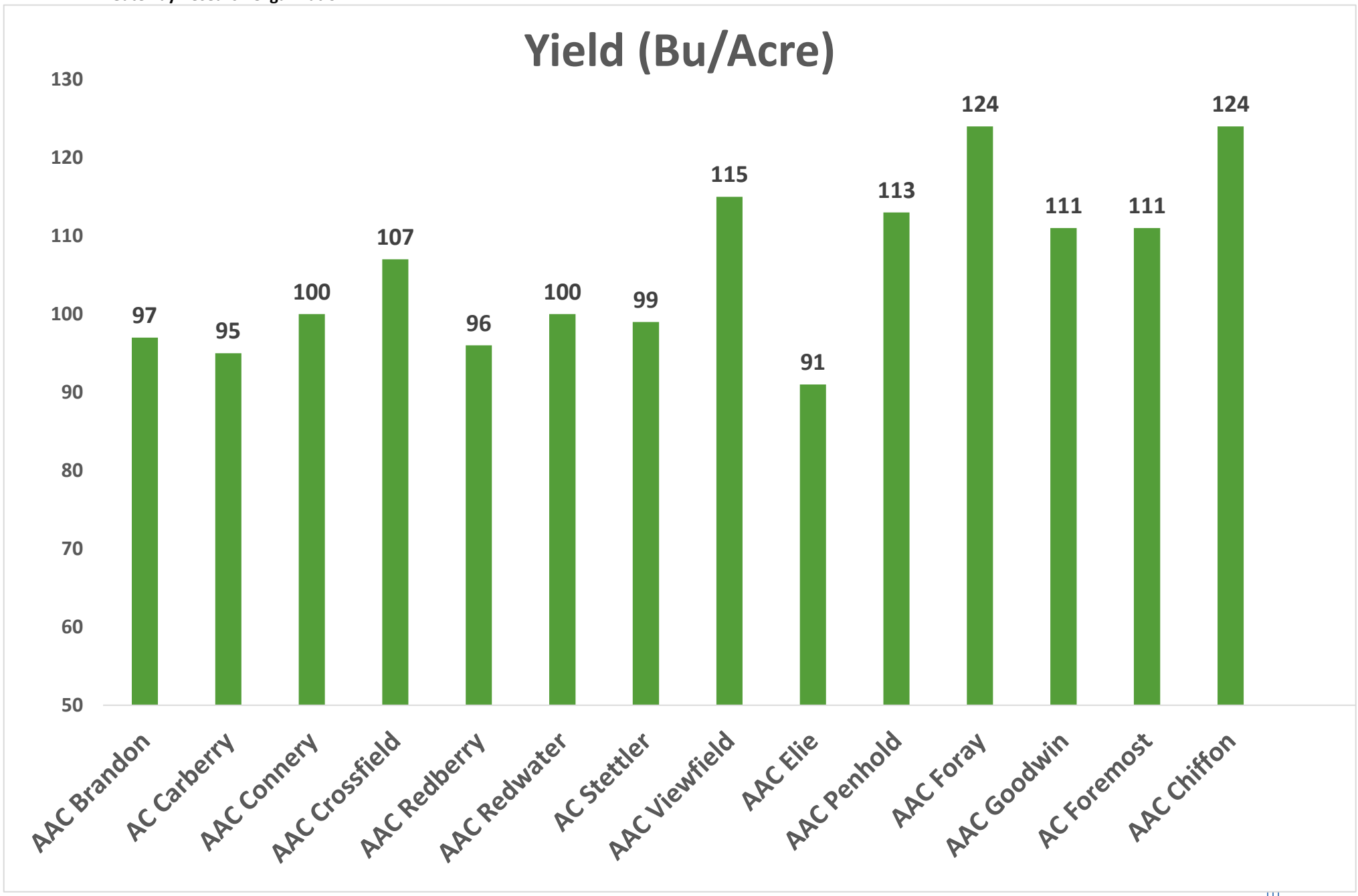
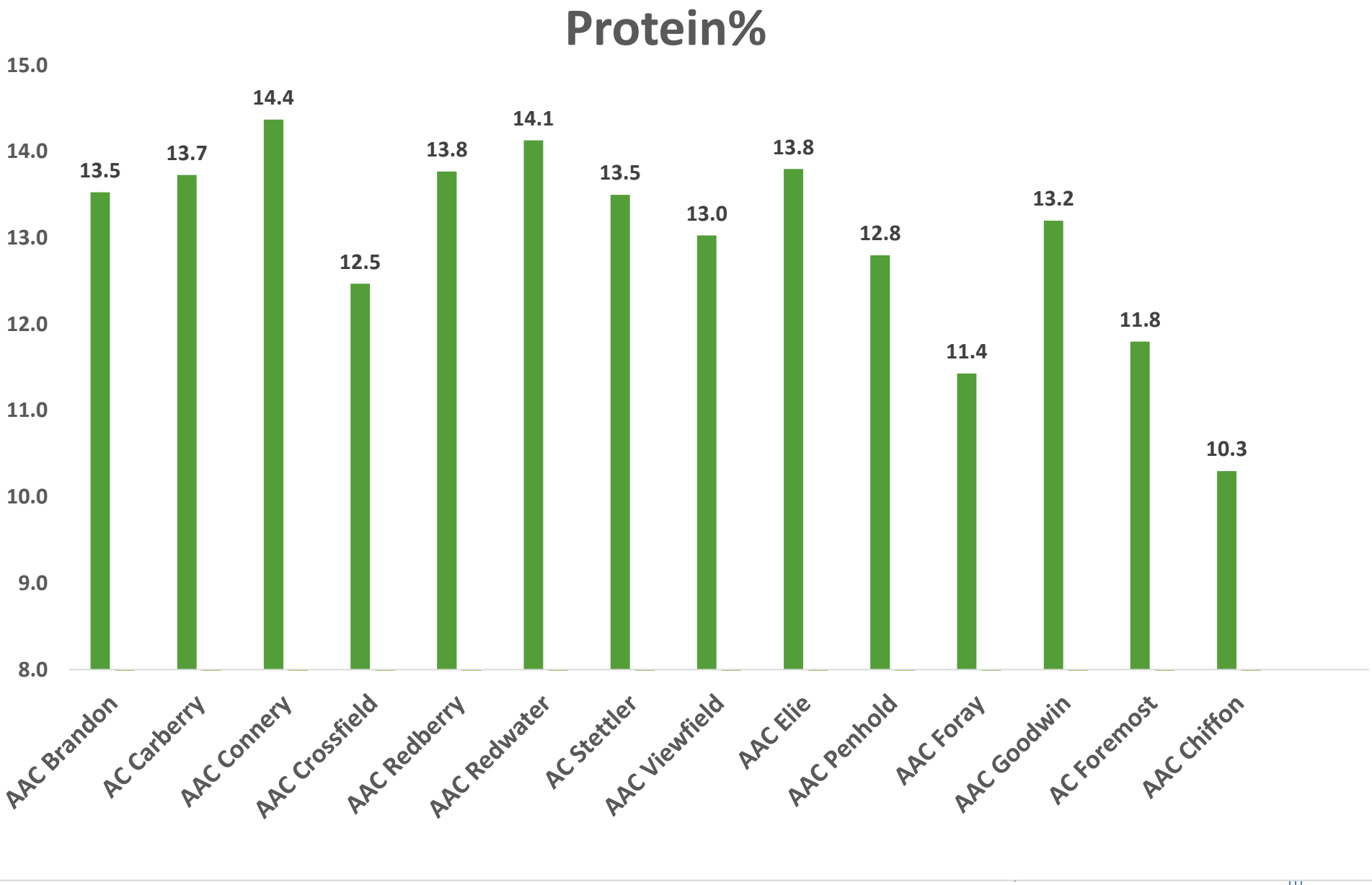
Table: 2 Results GRO local RVT 2019

Rating Type		Protein		Gluten		Yield				Bushel wt		Test Wt		TKW(g)	
Rating Unit		%		%		kg/ha		% of AC Carberry	bu/ac		lb/bu		kg/HL		1000 Seeds	
1	**AAC Brandon**	13.5	bcd	32	c	6558.3	cd	**102**	97	cd	63.2	abc	77.9	abc	45.8	abc
2	**AC Carberry**	13.7	abc	32	c	6369.1	d	**100**	95	d	62.4	abc	77	abc	43.6	bcd
3	**AAC Connery**	**14.4**	a	35	a	6706.3	cd	**105**	100	cd	64.2	a	79.2	a	46.3	abc
4	**AAC Crossfield**	12.5	f	30	d	7230.4	bc	**113**	107	bc	61.8	bc	76.3	bc	42.4	cd
5	**AAC Redberry**	13.8	abc	33	bc	6449.6	d	**101**	96	d	63.0	abc	77.7	abc	43.9	bcd
6	**AAC Redwater**	**14.1**	ab	34	ab	6732.2	cd	**105**	100	cd	63.0	abc	77.8	abc	39.4	d
7	**AC Stettler**	13.5	bcd	33	bc	6695.5	cd	**104**	99	cd	61.9	bc	76.4	bc	43.0	bcd
8	**AAC Viewfield**	13.0	de	32	c	7748	b	**121**	115	b	63.4	abc	78.3	abc	41.9	Cd
9	**AAC Penhold**	12.8	ef	30	d	7613.3	b	**119**	113	b	64.1	a	79.1	a	47.7	ab
10	**AAC Foray**	11.4	g	29	d	8374.1	a	**131**	124	a	62.3	abc	76.9	abc	49.8	
11	**AAC Goodwin**	13.2	cde	31	c	7461	b	**117**	111	b	62.0	abc	76.5	abc	45.6	abc
12	**AC Foremost**	11.8	g	28	e	7452.6	b	**117**	111	b	62.4	abc	77	abc	43.6	bcd
13	**AAC Chiffon**	10.3	h	24	f	8375.7	a	**131**	124	a	61.4	c	75.8	c	46.5	abc
14	**AAC Elie**	13.8	abc	32	c	6147.6	d	**96**	91	d	63.7	ab	78.5	ab	44.4	bc
LSD P=.05			1.1		0.46		495.76			7.4		1.29		1.57		3.08
Standard Deviation			0.6		0.274		295.39			4.4		0.77		0.93		1.84
CV			2.03		2.11		4.14			4.14		1.22		1.21		4.12


Yield (Bu/Acre)
130
120
110
100
90
80
70
60
50
97
95
100
107
96
100
99
115
91
113
124
111
111
124
AAC Brandon
AC Carberry
AAC Connery
AAC Crossfield
AAC Redberry
AAC Redwater
AC Stettler
AAC Viewfield
AAC Elie
AAC Penhold
AAC Foray
AAC Goodwin
AC Foremost
AAC Chiffon


Protein%
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
13.5
13.7
14.4
12.5
13.8
14.1
13.5
13.0
13.8
12.8
11.4
13.2
11.8
10.3
AAC Brandon
AC Carberry
AAC Connery
AAC Crossfield
AAC Redberry
AAC Redwater
AC Stettler
AAC Viewfield
AAC Elie
AAC Penhold
AAC Foray
AAC Goodwin
AC Foremost
AAC Chiffon

2) AWC funded trial: Optimizing Nitrogen Application Rate for Wheat in Our Area

Objectives:

- To find a strategy for effective use of fertilizer and that can, in turn, reflects to optimize the input cost and increases profitability for the producers.
- The optimization in fertilizer use will also be beneficial for the sustainability of the land and reducing the environmental footprints due to a reduction in leaching of excessive fertilizers to the environment.

Background: Nitrogen recommendations for major crops using different rates of Urea and ESN alone as compared to a mix of Urea with ESN are not yet developed for different regions of Alberta. The results from current research will provide optimum knowledge for the application of nitrogen fertilizer rates and will provide an economic benefit to growers. Based on literature references, it was speculated that Spring Wheat yield, quality, and economics differ significantly by applying different N application rates from urea, and ESN. The integrated use of slow-release nitrogen fertilizers (ex. ESN) along with readily available nitrogen fertilizers (ex. urea) would be able to meet the quick initial (urea) and later (ESN) nutrient demand during the growing season to meet the nutrient uptake pattern of crops. This would also reduce environmental nitrogen loss and may increase return on fertilizer investment (Haben et al 2014). Variation of agronomic management practices such as fertilizer application rates has a significant influence on grain yield and grain quality in terms of wheat protein percentage (Campbell et al., 1977). The efficiency of using urea, ESN or their mix will facilitate the need for N fertilizer only when a crop response is expected and thereby can increase the profitability (Mullen et al., 2003). Grain protein concentration is an bread-making quality measure which is essential for the nutritional value and end-use rheological characteristics of the bread making process (Johansson et al., 2001). The amount of nitrogen affects the wheat protein and can account for variability of up to 35% for the total protein content at a lower temperature condition (Malik et al., 2013).

Methodology and Experimental Approach:

RCBD (Randomized Complete Block Design) with 3 replications. Three Nitrogen fertilizer regimes (Urea, ESN and Urea plus ESN) and, five rates of N (20, 40, 60, 80, and 100 pounds N/acre (side band) + C2 (with Seed) was combined in factorial and their influence on grain yield and grain quality components was determined.

Treatments: Fertilizer packets for individual plots was weighed for accurate application rate through the second cone on seeder.

Three controls were used:

a) No-Fertilizer (check)

b) MAP (Mono-ammonium phosphate) @ 25 lbs P2O5/acre with seed (C2)

c) Required N/acre (After soil test + needed Fertilizer = as suggested lbs N/acre)

Three Nitrogen fertilizer regimes (Urea, ESN, and Urea plus ESN) and, five rates of N (20, 40, 60, 80, and 100 pounds N/acre (side band) so a total of 15 treatments were randomized with 6 replications. Here is treatment plan chart:

No fertilizer Control	C1	Phosphorus only Control	C2	80 pounds N/acre (soil test + Fertilizer = 80 lbs N/acre)	C3
Trt Urea 20lb N/acre	U1	Trt ESN 20lb N/Acre	E1	Trt Urea + ESN 20lb N urea	M1
Trt Urea 40lb N/acre	U2	Trt ESN 40lb N/Acre	E2	Trt Urea + ESN 40lb N urea	M2
Trt Urea 60lb N/acre	U3	Trt ESN 60lb N/Acre	E3	Trt Urea + ESN 60lb N urea	M3
Trt Urea 80lb N/acre	U4	Trt ESN 80lb N/Acre	E4	Trt Urea + ESN 80lb N urea	M4
Trt Urea 100lb N/acre	U5	Trt ESN 100lb N/Acre	E5	Trt Urea + ESN 100lb N urea	M5

Hard Red Spring Wheat (Variety – Plentiful) seeded after Canola. Variety Brandon is selected because it has very good resistance to lodging, and moderately resistant to stripe rust and fusarium head blight (Alberta Seed Guide - spring 2015). For Grain Quality (Protein), a composite sample about 500-gram cleaned for protein analysis.

We noticed a higher protein content in wheat throughout all treatments in 2018. The protein content in wheat was noticed for 100 lb of Urea treatment. Increasing urea from 20 lbs/acre to

even 100 lbs/acre increased in the yield. Similarly, there was an increase the protein content with increased rate of fertilizers inclusion. The increasing rate of ESN from 20 to 100 lbs/acre had a trend of increasing yield as well as protein. The ESN inclusion at the rate of 100 lbs/acre had significantly higher yield advantage compared to no fertilizer control. The Urea-ESN mix also showed a linear increase in yield as well as protein content in wheat.

Table:3- Yield data for the 2019

Rating Type / Rating Unit		**Protein** %	Gluten %	Yield kg/ha	**Yield** bu/ac	**Bushel Wt.** lb/bu	**Test Wt.** kg/HL	**TKW(g)** 1000 Seeds
1	**Urea 20 lbs**	11.5 d	29.1 cd	4843 cde	72 cde	62.2 -	76.8 -	44.9 -
2	**Urea 40 lbs**	11.6 d	28.8 d	5019 b-e	75 b-e	62.2 -	76.7 -	46.8 -
3	**Urea 60 lbs**	12.2 a-d	30.1 a-d	5286 abc	79 abc	61.1 -	75.4 -	45.6 -
4	**Urea 80 lbs**	12.3 a-d	30.6 a-d	5202 a-d	77 a-d	61.1 -	75.4 -	46.7 -
5	**Urea 100 lbs**	12.4 a-d	30.8 abc	5670 a	84 a	61.3 -	75.7 -	45.8 -
6	**ESN 20 lbs**	11.9 bcd	30.3 a-d	5042 b-e	75 b-e	61.1 -	75.4 -	46.4 -
7	**ESN 40 lbs**	12.0 a-d	29.8 a-d	5171 a-d	77 a-d	62.7 -	77.4 -	46.5 -
8	**ESN 60 lbs**	12.3 a-d	30.6 a-d	5452 ab	81 ab	61.9 -	76.3 -	47.3 -
9	**ESN 80 lbs**	12.3 a-d	30.6 a-d	5456 ab	81 ab	61.6 -	76 -	47 -
10	**ESN 100 lbs**	12.8 a	31.4 a	5543 ab	82 ab	60.8 -	75.1 -	47.4 -
11	**Urea ESN Mix 20 lbs**	11.9 bcd	29.6 a-d	5031 b-e	75 b-e	61.8 -	76.3 -	45.5 -
12	**Urea ESN Mix 40 lbs**	11.9 bcd	29.5 bcd	5147 a-d	77 a-d	61.9 -	76.4 -	45.2 -
13	**Urea ESN Mix 60 lbs**	12.0 a-d	29.9 a-d	5472 ab	81 ab	61.9 -	76.3 -	46.2 -
14	**Urea ESN Mix 80 lbs**	12.5 abc	31.0 abc	5542 ab	82 ab	61.4	75.8	46.9 -
15	**Urea ESN Mix 100 lbs**	12.7 ab	31.1 ab	5696 a	85 a	60.7 -	74.9 -	46.1 -
16	**Check No fertilizer**	11.8 cd	29.3 bcd	4571 e	68 e	62.2 -	76.7 -	45.5 -
17	**Only Phosphorus**	11.7 cd	29.3 bcd	4695 de	70 de	62.4 -	77 -	45.6 -
18	**Best Acc. Soil test**	12.3 a-d	30.3 a-d	5530 ab	82 ab	62 -	76.6 -	45.9 -
LSD P=.05		0.474	1.071	362.1	5.39	1.39	1.71	1.79
Standard Deviation		0.286	0.645	218.22	3.25	0.84	1.03	1.08
CV		2.36	2.14	4.16	4.17	1.36	1.35	2.34

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Table 4: Economic Analysis:

CWRS	Urea	ESN	MAP
Wheat	46-0-0	43-0-0	11-52-0
$7.00/ bu	$0.243/lb	$0.307/lb	$0.227/ lb
$257.18/tonne	$535/ t	$675/ t	$500/t

Fertilizer actual N in $/lb		Protein Discount under 13.5%		
Urea	ESN	/bushel	1% : - $	0.40
0.528	0.714	/ tonne	1% : - $	14.7

Trt	Urea 46-0-0 actual lb/ac	ESN 43-0-0 actual lb/ac	Yield bu/ac	Yield kg/ha	Protein %	$/acre @ 7.00	Protein adj. 13.5% base Revenue $/acre	Fertilizer Costs Urea $/acre	Urea $/ha	ESN $/acre	ESN $/ha	Adjusted Revenue $/acre	$/ha
Urea 20 lbs	20		72	4843	11.5	503.25	445.74	10.6	26.1			435	1075
Urea 40 lbs	40		75	5019	11.6	521.54	464.92	21.1	52.2			444	1096
Urea 60 lbs	60		78	5286	12.2	549.29	508.48	31.7	78.2			477	1178
Urea 80 lbs	80		77	5202	12.3	540.56	503.49	42.2	104.3			461	1139
Urea 100 lbs	100		84	5670	12.4	589.19	552.16	52.8	130.4			499	1233
ESN 20 lbs		20	75	5042	11.9	523.93	476.03			14.3	35.3	462	1141
ESN 40 lbs		40	77	5171	12.0	537.34	491.28			28.6	70.5	463	1143
ESN 60 lbs		60	81	5452	12.3	566.54	527.69			42.8	105.8	485	1198
ESN 80 lbs		80	81	5456	12.3	566.95	528.08			57.1	141.1	471	1163
ESN 100 lbs		100	82	5543	12.8	575.99	552.95			71.4	176.4	482	1189
Urea ESN Mix 20 lbs	10	10	75	5031	11.9	522.79	474.99	5.3	13.0	7.1	17.6	463	1143
Urea ESN Mix 40 lbs	20	20	76	5147	11.9	534.84	485.94	10.6	26.1	14.3	35.3	461	1139
Urea ESN Mix 60 lbs	30	30	81	5472	12.0	568.62	519.88	15.8	39.1	21.4	52.9	483	1192
Urea ESN Mix 80 lbs	40	40	82	5542	12.5	575.89	542.98	21.1	52.2	28.6	70.5	493	1218
Urea ESN Mix 100 lbs	50	50	85	5696	12.7	591.89	564.83	26.4	65.2	35.7	88.2	503	1242
Check No fertilizer	*	*	68	4571	11.8	474.99	428.85					429	1059
Only Phosphorus	*	*	70	4695	11.7	487.87	437.69	-$6.57 for MAP				431	1065
Best Acc. Soil test	*	*	82	5530	12.3	574.64	535.24	-$6.57 for MAP, -$42.24 for Urea				486	1201

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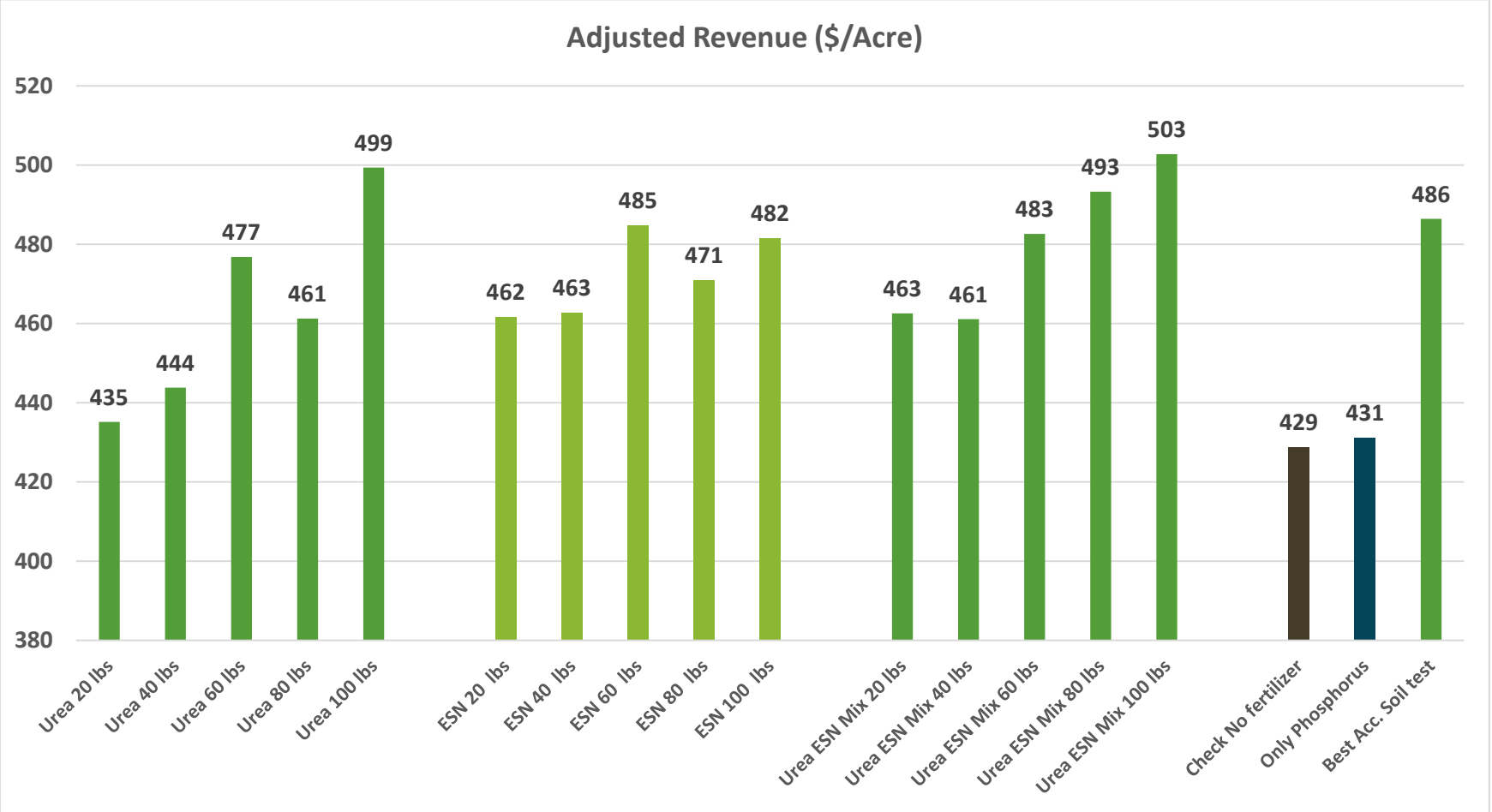
*Notes	trt. 16 : no fertilizer	trt 17: 28.85 lbs/acre 11-52-0	trt 18: 173.91lbs/acre 46-0-0	80lbs/acre actual N
	check plots	no nitrogen, MAP only	28.85lbs/acre 11-52-0	15lbs/acre actual P



3). AWC funded Trial: Ultra early vs Regular seeding dates and its effect on maturity, yield and quality parameter

Treatment were:

2 varieties (*AAC Brandon*, medium-late maturity and *AAC Connery*, early maturity)

2 planting dates (ultra-early date, 2 - 6 C soil temp and normal seeding date, 8 – 10 C soil temp, (approximately 12-14 days apart))

3 seeding rates (Low: 200, Medium: 300 and High: 400 viable seeds/m2),

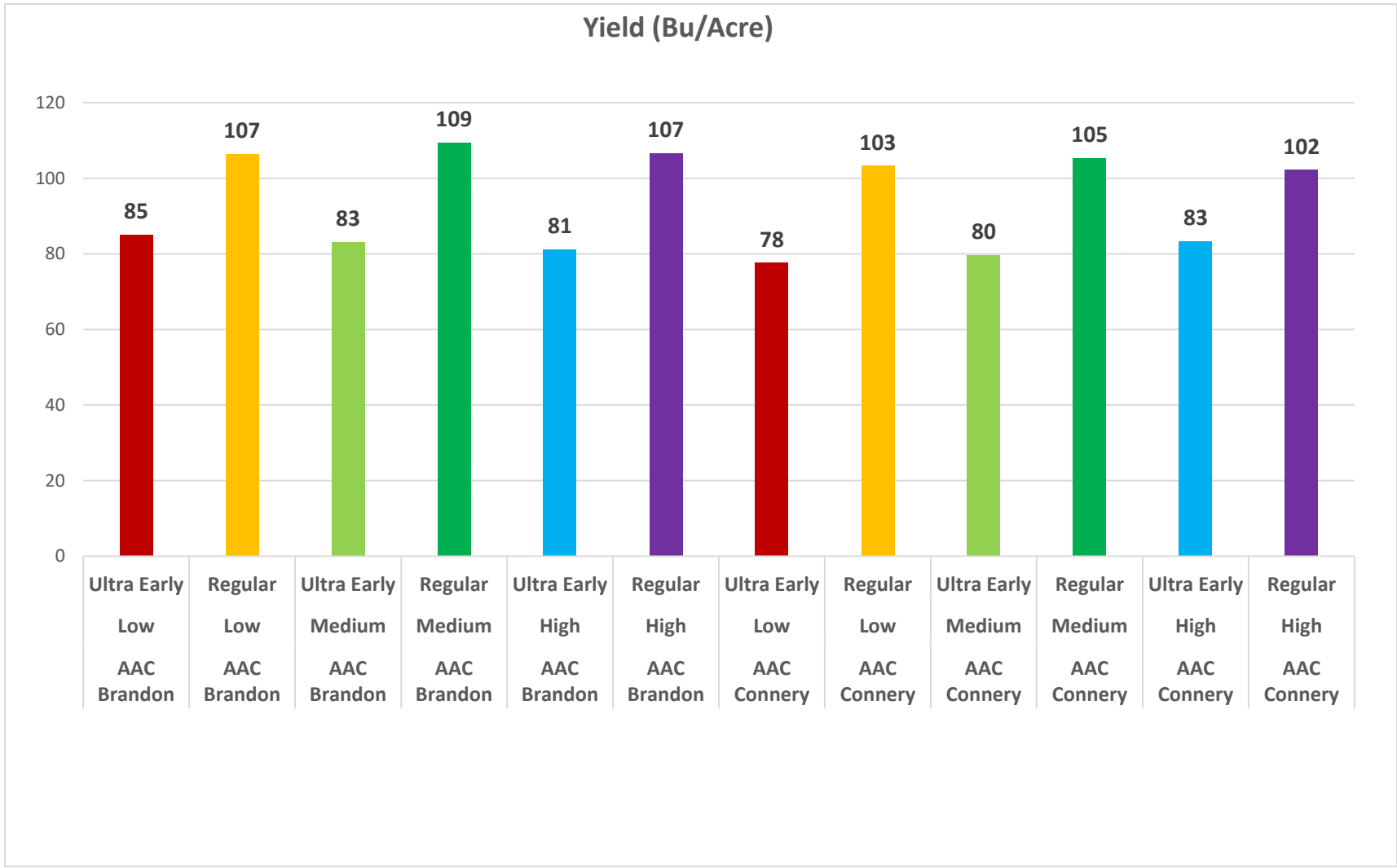
Trial is seeded in randomized block design with 4 replications.

Table 5: Agronomic details for the trial:

Ultra Early: Seeded April 17, 2019 Seed depth: 1.5 inch Soil Temp: 5 C Harvest date : Sept 23	Regular: Seeded May 13, 2019 Seed depth: 1.0 inch Soil Temp: 14 C Harvest date : Oct 2
Rainfall recorded from May 1 to Sept 30, 2019: 374.5mm	
Fertilizer: Seed placed: 11-52-0 58 lbs/ac 6.4 lbs/ac Actual N 30 lbs/ac Actual P Side banded: 31.8-0-13.8-3.5 347 lbs/ac 110 lbs/ac Actual N 47.9 lbs/ac Actual K 12 lbs/ac Actual S	
Herbicide: Curtail M 810 ml/ac June 21, 2019 Axial 500 ml/ac June 21, 2019	
Observation: May 6: 4 out of 5; No emergence May 11: Ultra Early emergence better but uneven Maturity: A difference of 9 days for the physiological maturity	

Table 6: Yield Data for the trial: 2019

	VARIETY	Seeding rate	Seeding Time	Harvest Moisture %	Protein %	Gluten %	YIELD Bu/Acre	Test weight Kg/Hl	TKW 100 seeds (g)
1	AAC Brandon	Low	Ultra Early	17.3 bc	13.4 a	31.6 ab	**85 b**	79.1 ab	45.7 a-d
2	AAC Brandon	Low	Regular	19.0 a	13.0 ab	31.7 ab	**107 a**	78.7 b	48.0 abc
3	AAC Brandon	Medium	Ultra Early	17.3 bc	13.5 a	32.2 a	**83 b**	79.8 ab	45.8 a-d
4	AAC Brandon	Medium	Regular	18.3 ab	13.0 ab	31.3 ab	**109 a**	79.8 ab	48.0 abc
5	AAC Brandon	High	Ultra Early	17.6 bc	13.5 a	32.4 a	**81 b**	78.7 ab	44.7 bcd
6	AAC Brandon	**High**	Regular	17.9 abc	12.6 ab	30.6 ab	**107 a**	80.1 ab	48.9 a
7	AAC Connery	**Low**	Ultra Early	17.6 bc	12.8 ab	31.2 ab	**78 b**	79.2 ab	44.1 cd
8	AAC Connery	**Low**	Regular	19.0 a	13.2 a	32.1 a	**103 a**	78.9 ab	48.6 ab
9	AAC Connery	**Medium**	Ultra Early	16.9 c	13.0 ab	31.0 ab	**80 b**	80.5 ab	43.4 d
10	AAC Connery	**Medium**	Regular	18.6 ab	12.8 ab	31.3 ab	**105 a**	80.8 ab	47.3 abc
11	AAC Connery	**High**	Ultra Early	16.8 c	13.2 a	31.9 ab	**83 b**	80.2 ab	42.9 d
12	AAC Connery	**High**	Regular	18.1 abc	12.1 b	29.8 b	**102 a**	81.4 a	46.6 a-d
LSD P=.05				0.0586	0.854	0.63	7.46	2.493	1.616
Standard Deviation				0.0408	0.593	0.438	5.17	1.733	1.119
CV				0.55	3.33	3.36	5.44	3.75	1.4


Yield (Bu/Acre)
120
100
80
60
40
20
0
85
107
83
109
81
107
78
103
80
105
83
102
Ultra Early Low AAC Brandon
Regular Low AAC Brandon
Ultra Early Medium AAC Brandon
Regular Medium AAC Brandon
Ultra Early High AAC Brandon
Regular High AAC Brandon
Ultra Early Low AAC Connery
Regular Low AAC Connery
Ultra Early Medium AAC Connery
Regular Medium AAC Connery
Ultra Early High AAC Connery
Regular High AAC Connery

POGA Milling Oats Trial

Co-operator: Randy Pidsadowski- SW-17-61-26-W4

Increase the Oat Acres in Alberta by Finding a High Yielding Oat Variety that maximizes Producer Income and Meets the Demands of the Millers.

"Year 2019"

Summary:

This study is a continuous effort to collect data on 11 milling variety oats in Central and Northern Alberta. The goal was to determine how variety and growing location will influence the **yield** and functional property attributes linked to **beta-glucan** levels of the oats. Similar to what's been recorded, there were noticeable varietal differences between the two locations for the yields as well as beta-glucan content. This year the average yield was higher for Westlock location compared to peace location, but the beta-glucan content averaged higher for the Peace site. Most of the milling oats varieties surpassed the 4% mark for the total beta-glucan content. Westlock and peace both sites had ample to a little too much of the moisture during the season.

Background

Oat production in Alberta has been on a relatively steady decline since 2011. Oats has earned the status of major Canadian export crop from a domestic crop status. According to Prairie Oat Grower's Association (POGA), an estimate of 3.1 million acres of oat were seeded in the year 2015-16 but there is a decline in Alberta due to lack of markets and non-competitive pricing with other crops. Many major millers will not accept oats from Alberta or look to Alberta only after Manitoba and Saskatchewan's supply is gone, because the main two oat varieties grown in Alberta, Morgan and Derby contain low amounts of Beta Glucan (β-glucan). **A minimum of 4% β-glucan is required for companies to be able to label their products with the Heart Healthy Claim** and both Morgan and Derby are consistently below that amount. Therefore, oat producers in Alberta need an oat variety that can consistently beat the yields of Morgan and Derby but has the higher β-glucan amounts that the oat miller desire. To emphasize this fact, since 2015 two millers are helping to fund this variety trial hoping to identify oat varieties that will help Alberta producers access the milling market more consistantly.

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Oats are a valuable part of crop rotation and are therefore beneficial to producers. They provide disease and insect breaks for wheat, barley, and canola. Their rapid establishment and growth provide excellent weed suppression. Oats also work well as a "catch crop" for taking up and storing excess nitrogen, and the straw provides a nutrient source for the following year's crop. The straw also protects against soil erosion and contributes to an increase in the soil's organic matter content (Campbell et al., 1991). Well-Planned management and appropriate selection of variety make oats a profitable crop due to their low input requirements and favorable effects on succeeding crops in a rotation.

Test weight is the most commonly used indicator of grain quality. High test-weight varieties should be chosen by growers who intend to market oat grain. However, the functional attribute such as β-glucan solubility and viscosity are the main criteria for the processing industry. Many studies have shown that oat β-glucan can lower blood cholesterol levels, glucose and insulin response and therefore decrease the risk of cardiovascular diseases and prevention of diabetes (Wang and Ellis, 2014).

Oats are regularly affected by crown rust in other parts of Western Canada, but this issue is moving west, towards Alberta. Neither Morgan nor Derby varieties have crown rust resistance but selecting a new disease resistance varieties can overcome the problem. The information for a producer to choose the newer and higher-yielding varieties specific to their region is, therefore, a very important step to stay profitable in the oat production. The β-glucan content in oat may vary with change in growing conditions (Perez Herrera et al., 2016). The current trial will provide valuable agronomic information for the producers in Alberta to grow oat varieties with higher yield and increased functional properties (β-glucan) attribute.

Objective

- To investigate the impact of genotype and growing condition on the yield and β-glucan content of milling oat varieties in Alberta.

Methodology

Eleven milling oat varieties and four forage oat varieties were tested in 2016 (Table 1). Based on the soil fertility recommendations, fertilizers were added to maintain the optimal levels of growing condition. Seeding rates were calculated based on 1000 kernel weight of each variety with a Seed

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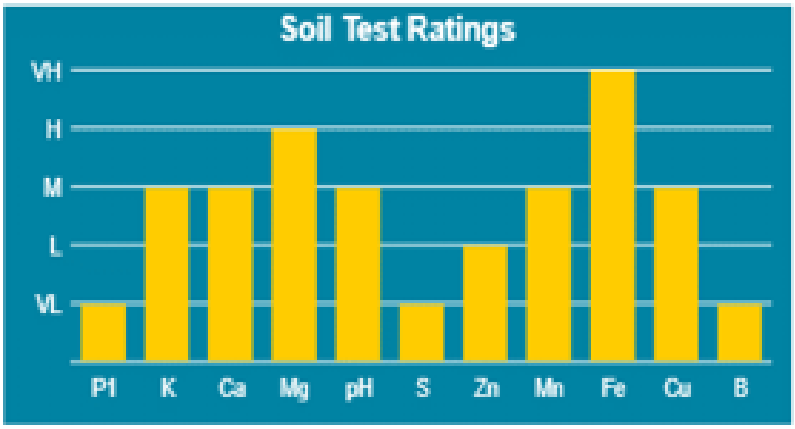
Counter, desired plant density and germination percentage. A 9-inch spaced 6 rows Fabro small plot seeder was used for the seeding. Each plot of a variety occupied 10.96 sq. m. (1.37 m width and 8 m long) and there were four replications. The trial site was maintained weed-free with the use of herbicides or hand weeding methods (Table 1). The trial was harvested with a Wintersteiger Nursery Mate Elite combine (5-foot header) and grain yield from each plot was measured using Electronic Scales. A clean composite sample (500g) was collected and sent to laboratory analysis for the β-glucan estimation. The growing season of 2019 was very high moisture throughout the year.

Table 1: Agronomic details for the POGA Trail 2019

Location:	Peace region	Westlock
Seeding Date:	May 16th, 2019	May 10th, 2019
Harvest Date:	Sept 23th, 2019	Oct 10th, 2019
Soil Temp:	7.5 Celsius	10.1 Celsius
Soil Moisture:	adequate	Very good
Seeding Depth:	¾ inch	¾ inch
Fertility total Nutrients (Actual lb/acre)	**110N-40P2O5-15K2O-25S**	**127N- 31P2O5- 75K20- 15S**
Herbicides applied to the trial	Pre-burn Koril 0.5L/Ac and Roundup 1L/Ac on May 16	Pre-burn Roundup 1L/Ac on May 9
Herbicides applied to trial	In crop Broad leaf: stellar A (400 ml/ Acre) + stellar B (240 ml/ Acre) on 16 June	In crop Broad leaf: Curtail M (600 ml/ Acre) on 21 June
Fungicides applied to the trial	none	none
Rainfall (mm)	251 mm	374 mm
Comment:	Pre-harvest weed control on Sept 5	Best possible harvest conditions

The decision for applying fertilizer at higher level was made to allow all varieties to express their best performance potential based on the soil test at both locations.

	Value		Value		Value		Value
OM	3.2	Na	29	Cu	0.6	Cl	0
ENR	44	pH	5.9	Al	467	% K	2.3
P1	9	BpH	6.8	P Bray 1	0	% Mg	23.5
P2	0	S	13	P Morgan	0	% Ca	55.5
Bicarb	6	B	0.2	Mo	0	% Na	1
K	117	Zn	2.7	NO3-N	9	% H	17.8
Mg	374	Mn	19	NH3-N	0	H	2.4
Ca	1470	Fe	74	Salt	0	CEC	13.3



Westlock	
pH	6.7
OM	7.0
CEC	23
N03-N	7
P1	11
S	20
K	83

Results and Discussion

The overall yield averaged at Westlock site was 249 Bu/acre compared to an average of 222 Bu/Acre in the peace area. At Westlock site, except OT 3087 and Summit, no other oat varieties come close to beat AC Morgan in 2019. At peace site **CDC Arborg**, **CDC Seabiscuit** and **CS Camden were top-yielding milling oats varieties as compared to** AC Morgan.

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Table.2: Yield - 2019 Comparison

		Westlock		Peace Region	
		% of AC Morgan	Bu/Acre	% of AC Morgan	Bu/Acre
1	**AC Morgan**	100	**262 ab**	**100**	**224 -**
2	**CS Camden**	95	**250 bc**	**104**	**232 -**
3	**CDC Seabiscuit**	91	**238 cd**	**107**	**240 -**
4	**Triactor**	96	**252 bc**	**100**	**224 -**
5	**CDC Ruffian**	89	**234 d**	**91**	**203 -**
6	**AC Summit**	100	**262 ab**	**101**	**227 -**
7	**CDC Arborg**	96	**252 bc**	**105**	**236 -**
8	**CDC ENDURE**	104	**273 a**	**100**	**225 -**
9	**CDC SKYE**	99	**260 ab**	**95**	**213 -**
10	**ORE3542M**	85	**223 d**	**92**	**205 -**
11	**CDC Norseman**	88	**230 d**	**96**	**214 -**

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Table.3: Other results from the POGA trial 2019 Westlock Site.

		HEIGHT cm		Lodging 1-9 scale		Test Wt kg/HL		TKW(g) 1000 Seed	
1	**AC Morgan**	140	a	1.0	d	60.3	ab	46.7	ab
2	**CS Camden**	129	b	1.0	d	61.2	ab	46.1	ab
3	**CDC Seabiscuit**	140	a	**8.5**	**a**	59.6	b	48.0	a
4	**Triactor**	138	a	1.0	d	59.8	b	46.4	ab
5	**CDC Ruffian**	122	c	2.3	c	**63.5**	**a**	42.3	b
6	**AC Summit**	109	d	1.0	d	62.3	ab	39.2	c
7	**CDC Arborg**	139	a	1.0	d	62.5	ab	45.2	ab
8	**CDC ENDURE**	138	a	1.2	d	62.2	ab	44.9	ab
9	**CDC SKYE**	136	ab	1.4	d	62.2	ab	44.6	ab
10	**ORE3542M**	130	b	1.0	d	60.2	ab	43.7	ab
11	**CDC Norseman**	134	ab	4.5	b	61.6	ab	43.8	ab
LSD P=.05		5.51				2.073		2.851	
Standard Deviation		3.23				1.435		1.974	
CV		2.45				2.34		4.42	

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Table.4: Other results from the POGA trial 2019 Peace Site.

		HEIGHT cm		Lodging 1-9 scale		Test Wt kg/HL	
1	**AC Morgan**	103	ab	2.5	a	48.8	ab
2	**CDC Ruffian**	91	e	0.3	ab	48.1	ab
3	**AC Summit**	95	cde	1.3	ab	48.2	ab
4	**CDC Arborg**	107	a	0.7	ab	**49.2**	**a**
5	**CDC Norseman**	101	abc	2.0	ab	45.9	cd
6	**CDC ENDURE**	103	ab	0.9	ab	48.1	ab
7	**CS Camden**	102	abc	1.3	ab	48.1	ab
8	**CDC Seabiscuit**	104	ab	**2.9**	**a**	45.4	d
9	**ORE3542M**	93	de	0.7	ab	46.1	cd
10	**Triactor**	102	abc	0.0	b	45.1	d
11	**CDC SKYE**	98	bcd	1.3	ab	47.2	bc
LSD P=.05		5.51				2.073	
Standard Deviation		3.23				1.435	
CV		2.45				2.34	

Test weight is an important indicator of grain milling quality. CDC Seabiscuit, Triactor and Norseman were among the three lowest oat varieties for the test weight at Westlock as well as the peace region.

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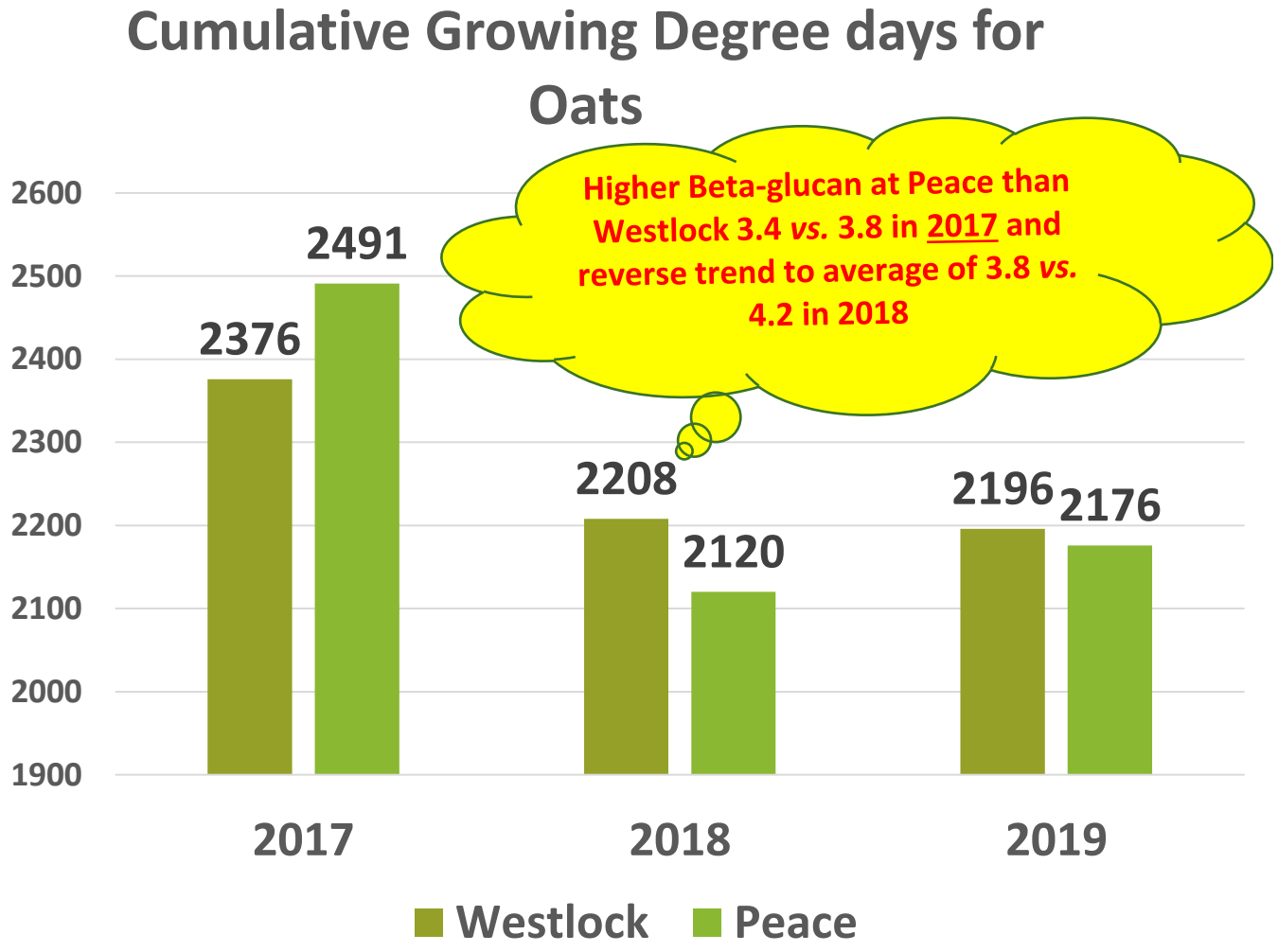
Table 5: The Beta-Glucan results from the POGA trial of 2019.

		Westlock			Peace Region		
		1000 groat weight (g)	Hull percentage (%)	Flour BG (%, db)	1000 groat weight (g)	Hull percentage (%)	Flour BG (%, db)
1	AC Morgan	39.9	21.3	3.9	38.1	22.6	3.7
2	CS Camden	39.2	18.7	4.4	34.4	21.9	5.2
3	CDC Seabiscuit	42.2	16.7	4.5	37.5	23.0	4.2
4	Triactor	38.4	21.4	4.1	32.6	27.9	4.3
5	CDC Ruffian	38.1	17.2	3.6	35.1	15.3	3.7
6	AC Summit	34.6	17.6	4.3	34.1	23.6	4.6
7	CDC Arborg	38.4	16.5	4.2	33.9	29.1	4.3
8	ORE3542M	41.0	15.2	3.8	37.4	25.2	4.2
9	CDC Norseman	37.5	20.7	4.7	37.1	21.7	4.4
10	CDC SKYE	39.8	23.1	4.5	36.5	19.6	5.0
11	CDC ENDURE	39.8	17.5	4.5	37.6	25.0	4.7

Beta Glucan results: The beta-glucan content of the 11 different milling varieties ranged between 3.6% and 5.2%, with the lowest reported for Ruffian at both sites similar to the last years' findings. **CDC Norseman, CDC Seabiscuit, CDC ENDURE and CDC SKYE were the highest beta-glucan varieties at** Westlock, whereas **CS Camden, CDC ENDURE and CDC SKYE** had higher beta-glucan levels in the peace region as compared to AC Morgan.



Conclusion:

Significant effect of location and varietal difference for the yields as well as beta-glucan levels in 2016, 2017 2018 and 2019. The year we had observed good yield overall with higher level of Beta-glucan levels in most oat varieties at Westlock. Environmental conditions effect yield capacity of a **variety** to a higher degree than the effect on Beta-glucan levels. Example: CDC Ruffian lowest beta-glucan irrespective of the location in all years.

Since the year 2018, we added a few newer entries to the trial. The newer varieties are performing better for the yield as well as the beta-glucan content. In 2019 similar to 2018 CDC Endure had shown to be

great milling oat with **high yield, specifically in Westlock,** and **high beta-glucan** and **good test weight,** which are preferred characteristics for the grain millers.

Table 6: Overall Summary of the trial: Yields from 2016 to 2019

	Yield	Overall Average	2019	2018	2017	2016
Milling oats	% of AC Morgan	Yield (Bu/Ac)	Yield (Bushel/Acre)			
AC Morgan	**100**	215	243	226	212	178
CS Camden	**98**	210	241	206	226	167
CDC Seabiscuit	**99**	212	239	212	208	189
Triactor	**98**	212	238	229	208	172
CDC Ruffian	**100**	216	219	207	245	193
AC Summit	**97**	208	245	203	217	167
CDC Arborg	**108**	233	244	221	-	-
Akina	**96**	206	-	221	222	176
ORE3542M	**97**	208	214	201	-	-
CDC Norseman	**101**	218	222	213	-	-
CDC Endure	**110**	238	249	226	-	-
CDC SKYE	**110**	237	237	-	-	-
CDC Orrin	**94**	202	-	218	221	168
Souris	**81**	174	-	-	194	155
Kara	**92**	199	-	-	222	175
CDC Minstrel	**88**	188	-	-	202	174

Top 3 varieties at **Westlock**

2019	CDC Endure	CDC Arborg	AC Morgan
2018	CDC Endure	CDC Arborg	Triactor
2017	CS Camden	Akina	CDC Ruffian
2016	CDC Seabiscuit	CDC Ruffian	CDC Orrin

Top 3 varieties at **Peace Region**

2019	CDC Seabiscuit	CDC Arborg	CS Camden
2018	Triactor	AC Morgan	CDC Endure
2017	CDC Ruffian	CS Camden	CDC Orrin
2016	CDC Ruffian	AC Morgan	CDC Seabiscuit

Table 7: Beta glucan (%) contents in milling oats from 2016 to 2019.

Milling oats		2016		2017		2018		2019	
	Average	Westlock	Peace	Westlock	Peace	Westlock	Peace	Westlock	Peace
AC Morgan	3.9	3.9	4.1	3.8	4.2	3.9	3.4	3.9	3.7
CS Camden	4.3	3.7	3.9	4.4	4.6	4.4	3.8	4.4	5.2
CDC Seabiscuit	4.2	3.7	3.7	4.6	4.6	4.4	3.7	4.5	4.2
Triactor	4.1	3.5	3.7	4.4	4.5	4.4	4.0	4.1	4.3
CDC Ruffian	3.4	2.7	3.3	3.8	3.9	3.6	2.7	3.6	3.7
CDC Orrin	3.8	3.2	3.7	4.4	4.0	4.1	3.4		

AC Summit	4.1	3.6	3.7	4.3	4.4	4.3	3.7	4.3	4.6
Souris	4.3	3.6	4.4	4.9	4.4				
Akina	4.4	3.8	3.7	5.0	4.9	4.8	4.0		
Kara	4.2	3.6	3.7	4.3	5.0				
CDC Minstrel	3.6	2.9	3.5	3.9	4.3				
CDC Arborg	4.2					4.4	3.8	4.2	4.3
ORE3542M	3.9					4.0	3.5	3.8	4.2
CDC Norseman	4.4					4.5	3.8	4.7	4.4
CDC Endure	4.8					4.7	4.2	4.5	4.7
CDC SKYE	4.5							4.5	5.0

Acknowledgments: We would like to thank **Prairie Oat Growers Association (POGA) and Grain Millers Canada** for their full financial assistance. Special thanks to FP Genetics for their contribution to lab analysis for this trial.

We would also like to thank Canterra seeds, Canada Seed depot, alliance seed and FP Genetics for their generous seed donation with this trial. This information is presented with the understanding that no product discrimination is intended and neither endorsement of any variety/product mentioned, nor criticism of named variety/products is implied.

GRO Plant Growth Regulator Trial

Cooperator: Randy Pidsadowski
Location: SW-17-61-26-W4

Objectives

1. Compare yield and height reduction if applied manipulator at the correct stage.
2. If cutting the rate will have any impact on the product efficacy.
3. This trial was an industry sponsored trial work done by GRO.

Background: Manipulator™ is a plant growth regulator that was advertised as Engage AGRO, a tool for preventing crop lodging in Wheat. The U.S. Environmental Protection Agency published the regulation establishing a maximum residue limit for **chlormequat chloride** — the active ingredient in Manipulator last year in April. The manipulator is registered for application between the two-leaf stage (Zadoks stage 12) to the flag leaf collar visible stage (Zadoks stage 39). According to Sheri Strydhorst, Alberta Agriculture and Forestry, the most effective application time for consistent height reductions is between Zadoks GS 30-32 (the beginning of stem elongation, when the first internode begins to elongate and the top of the inflorescence is at least 1 cm above the tillering node, to the time when the second node is at least 2 cm above node one).

Agronomic The 6 most common spring wheat varieties for our area were selected for the trial. A total of 5 HRS (AAC Brandon; AAC Connery; AAC Elie; AAC Redwater and AAC Viewfield). And 1 CPS (AAC Penhold). The other treatments analyzed in this trial were to use a reduced rate compared to full rate of recommended level and a no treatment control.

The trial was seeded in a randomized block design with three replications in a split-plot arrangement. Plots were seeded 14 m in length and then one-third of the plot was sprayed with manipulator at half rate and one-third of plot was sprayed at full rate the middle one-third was left untreated. The manipulator was applied at Zadoks GS 37-39. A bit later than the best management practices but still within the range as mentioned on the product labels. The crop was combined with a Wintersteiger plot combine on September 23. Each plots sample was cleaned and weighed to determine the yield. A

subsample was taken for analysis of protein and bushel weights. The other agronomic information for trial is mentioned in below.

- **Seeded:** May 13, 2019
    - Seed depth: 1.0 inch
    - Soil Temp: 14 C
- **Harvest date** : Sept 23
- **Rainfall** recorded from May 1 to Sept 30, 2019: 374.5mm
- **Fertilizer:**
    - Seed placed: 11-52-0 60 lbs/ac
        - 31.2 lbs/ac Actual P
        - lbs/ac Actual N
    - Side banded: N P K S 28.5-0-17.8-3.6 421 lbs/ac
        - 120 lbs/ac Actual N
        - 75 lbs/ac Actual K
        - 12 lbs/ac Actual S
- **Herbicide:**
    - Curtail M 810 ml/ac June 21, 2019
    - Axial 500 ml/ac June 21, 2019
- Observation:
    - Manipulator applied July 2, 2019
    - Growth stage in between Zadoks 37-39
- **Half-rate at 0.9 L/Ha or 0.35 L/Acre**
- **Full rate at 1.8 L/Ha or 0.7 L/Acre**

Results and Summary

The results showed that Manipulator application at full rate was effective in height reduction in almost all varieties (statistically significant). As previous research has suggested that the timing of the application of a manipulator is crucial between Zadoks GS 30-39. The correct timing gives Manipulator to interfere with the functioning of the elongation hormone and therefore the growth regulator was equally effective across all varieties. However, for the yield, there was a tendency, not statistically significant, for a greater yield with manipulator application compared to untreated. The difference ranged with an increase of 14, 12, 13 bushels for AAC Brandon, AAC Viewfeild and Penhold respectively to almost none in AAC Redwater.

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Protein in Wheat

The manipulator application has shown a tendency to lower the quality parameter in wheat in terms of reduction of test weight as well as protein content. As we observed in our data from 2018. There was a minimal reduction to a 0.5 percentage point reduction in wheat protein to most varieties tested. However, in 2019 the quality parameter either protein content or Test weight was not different among the varieties tested.

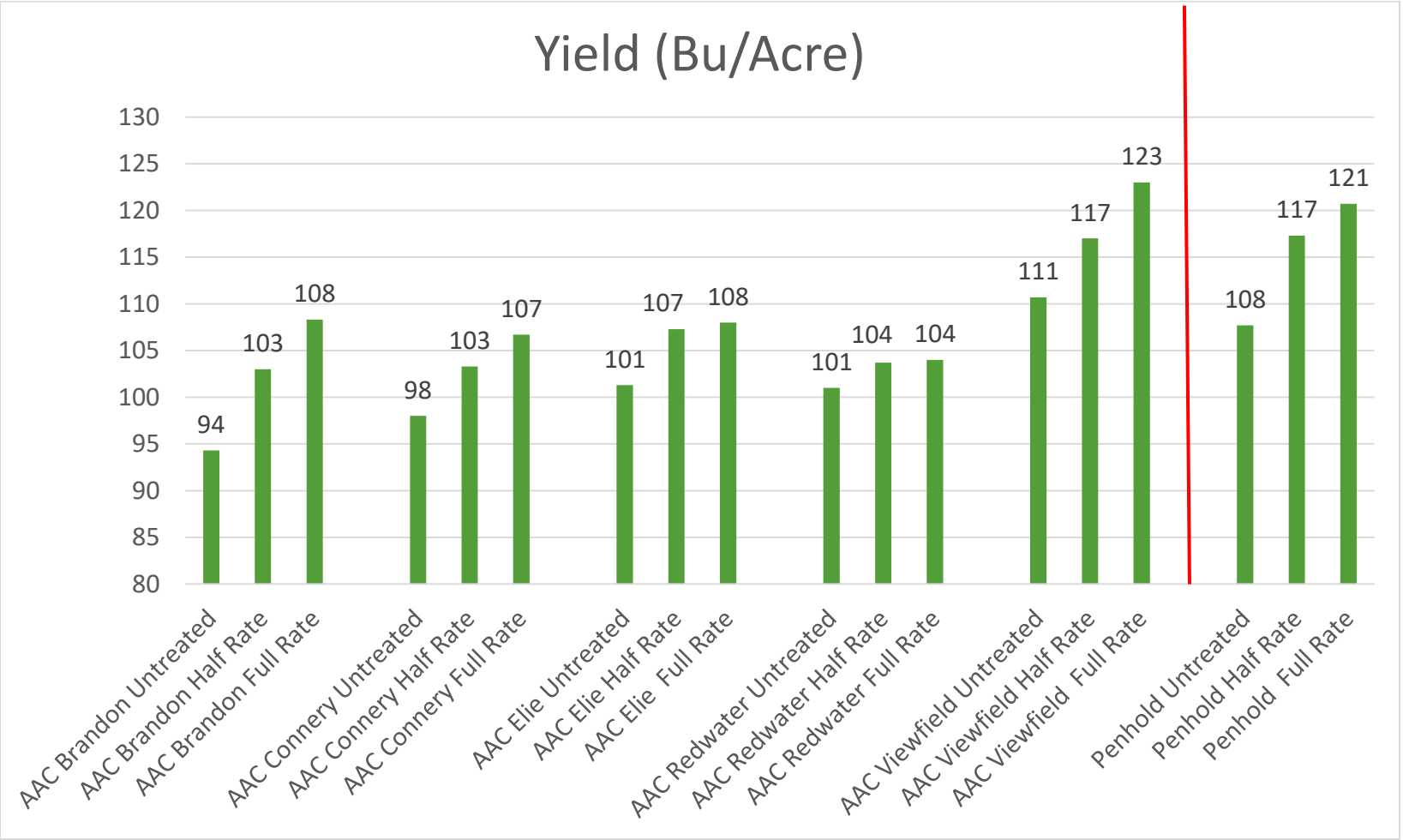
Acknowledgments: This information is presented with the understanding that no product discrimination is intended and neither endorsement of any variety/product mentioned, nor criticism of named variety/products is implied.

We would like to thank **(BELCHIM)** for providing funding for this trial and providing the Manipulator™ requirements for this trial.

Please find detailed results on the table below.

Results and Summary

	Treatment Variety- Manipulator treatment	Height cm		Protein % %		Gluten % %		Yield kg/ha		Yield bu/ac		Bushal wt lb/bu		Test Wt kg/HL		TKW(g) 1000 Seed	
1	AAC Brandon **Untreated**	99	ab	12.8	a-d	30.6		6349	d	**94**	d	67.3	-	83.7	-	45.7	ab
2	AAC Brandon **Half Rate**	86	d	13.1	abc	31.4	a	6940	cd	**103**	cd	67.0	-	84.0	-	44.3	bc
3	AAC Brandon **Full Rate**	89	cd	13.2	ab	31.7	a	7307	a-d	**108**	bcd	66.7	-	83.3	-	46.0	ab
4	AAC Connery **Untreated**	105	a	12.8	a-d	31.0	a	6575	d	**98**	d	67.3	-	83.7	-	46.3	ab
5	AAC Connery **Half Rate**	95	bc	12.8	a-d	31.1	a	6964	cd	**103**	cd	68.0	-	84.7	-	46.3	ab
6	AAC Connery **Full Rate**	95	bc	13.2	abc	31.7	a	7177	bcd	**107**	bcd	68.0	-	85.0	-	45.7	ab
7	AAC Elie **Untreated**	95	bc	13.1	abc	30.9	a	6823	cd	**101**	cd	66.0	-	82.3	-	45.7	ab
8	AAC Elie **Half Rate**	90	cd	13.2	ab	31.1	a	7228	a-d	**107**	bcd	67.7	-	84.3	-	46.3	ab
9	AAC Elie **Full Rate**	87	d	13.3	a	31.6	a	7273	a-d	**108**	bcd	67.3	-	84.0	-	47.0	ab
10	AAC Redwater **Untreated**	103	a	13.0	a-d	31.0	a	6792	cd	**101**	cd	66.3	-	82.7	-	37.7	e
11	AAC Redwater **Half Rate**	89	cd	13.1	abc	31.3	a	6979	cd	**104**	cd	66.7	-	83.0	-	36.7	e
12	AAC Redwater **Full Rate**	94	bc	13.3	a	31.7	a	7009	cd	**104**	cd	66.7	-	83.0	-	35.7	e
13	AAC Viewfield **Untreated**	96	bc	12.5	a-d	29.8	ab	7440	a-d	**111**	a-d	67.3	-	84.0	-	41.7	cd
14	AAC Viewfield **Half Rate**	83	d	12.2	a-d	29.7	ab	7878	abc	**117**	abc	68.7	-	85.7	-	39.0	de
15	AAC Viewfield **Full Rate**	83	d	12.7	a-d	30.5	a	8274	a	**123**	a	68.3	-	85.7	-	39.3	de
CPS Wheat variety																	
16	Penhold **Untreated**	93	bc	12.0	d	28.3	b	7248	a-d	**108**	bcd	68.0	-	85.0	-	49.7	a
17	Penhold **Half Rate**	84	d	12.2	bcd	28.8	b	7909	abc	**117**	abc	68.3	-	85.0	-	48.0	ab
18	Penhold **Full Rate**	85	d	12.1	cd	28.6	b	8126	ab	**121**	ab	68.0	-	85.0	-	49.0	a


Yield (Bu/Acre)
130
125
120
115
110
105
100
95
90
85
80
94
103
108
98
103
107
101
107
108
101
104
104
111
117
123
108
117
121
AAC Brandon Untreated
AAC Brandon Half Rate
AAC Brandon Full Rate
AAC Connery Untreated
AAC Connery Half Rate
AAC Connery Full Rate
AAC Elie Untreated
AAC Elie Half Rate
AAC Elie Full Rate
AAC Redwater Untreated
AAC Redwater Half Rate
AAC Redwater Full Rate
AAC Viewfield Untreated
AAC Viewfield Half Rate
AAC Viewfield Full Rate
Penhold Untreated
Penhold Half Rate
Penhold Full Rate

Field Crop Development Centre - Barley Varieties Demo Trial

Cooperator: Randy Pidsadowski Location: SW-17-61-26-W4

Objectives

- **Compare yields of the newly developed or close to registration barley cultivars developed by FCDC.**
- **To see the potential of FCDC varieties that are developed at Lacombe in grey wooded soil environmental conditions.**

Field Crop Development Centre (**FCDC**) at Lacombe, Alberta is a premier cereal breeding research organization. They are constantly working to develop high yielding enhanced cultivars of barley, wheat, and triticale. Gateway research organization (**GRO**) in our effort to extend knowledge from the premier research association to the farmer's field hosted the demonstration for the barley varieties that are previously released by FCDC and upcoming new varieties that are still under development for commercialization.

Seeded	Fertilizer	Herbicides Fungicides Insecticides	Rate	Date
Date: May 13 **Soil Temp:** 12.3 C **Seeding rate:** 27 plant/ft^2 **Seed Depth (in):** 1.0 **Harvest Date:** Oct 10	**Seed Placed** 11-52-0 @ 58 lbs/ac **Side Banded** 31.8-0-13.8-3.5 347 lbs/ac	Cleanstart Curtail M Axial	Label 810ml/acre 243ml/acre	May 17 June 21

We used 20 different cultivars for the barley in this demo trial. The other details are as follows:

Results: The trial was seeded in just two replications compared to the usual 3 replication in full research trial. Therefore the data might not be statistically strong however, the aim of this demonstration was to see how FCDC varieties perform in Westlock conditions. The highlighted varieties trended as the best of the tested barleys.

Barley Varieties	Type of Barley	Yield kg/ha		Yield bu/ac		Bushel wt lb/bu	Test Wt kg/HL	TKW(g) 1000 Seeds
HB18635	Hulless Food	**7355**	*	**137**	*	**62.5**	**77.1**	45.8
HB18637	Hulless Food	**6075**	*	**113**	*	**62.5**	**77.1**	42.7
SR 17515	6 row Feed	**6621**	*	**123**	*	**50.6**	**62.4**	40.3
SR 17519	6 row Feed	**8018**	*	**149**	*	**51.5**	**63.5**	47.0
SR 18522	6 row Feed	**8136**	*	**151**	*	**51.0**	**63.0**	45.9
SR 18524	6 row Feed	**9160**	*	**170**	*	**52.3**	**64.5**	42.6
SR 18530	6 row Feed	**7649**	*	**142**	*	**55.0**	**67.9**	46.3
SR 18533	6 row Feed	**6565**	*	**122**	*	**50.0**	**61.8**	42.3
TR 17639	2 row Feed	**7733**	*	**144**	*	**51.5**	**63.6**	49.8
TR 18645	2 row Feed	**8986**	*	**167**	*	**55.4**	**68.3**	52.0
TR 18647	2 row Feed	**8032**	*	**149**	*	**53.5**	**66.1**	50.2
TR 16629	2 row Malting	**6335**	*	**118**	*	**51.6**	**63.7**	48.0
TR 17635	2 row Malting	**6437**	*	**120**	*	**52.8**	**65.2**	49.6
TR 17640	2 row Malting	**6947**	*	**129**	*	**53.2**	**65.6**	50.2

Means followed by same letter or symbol do not significantly differ (P=0.05).

Canola Performance Trial 2019

Co-operator: Pibroch Colony – SW-16-61-26-W4

Objectives: to evaluate currently available commercial canola seed varieties available to farmers. Yield differences should be due to genetic differences only, not due to high weed, disease or insect pressure.

- To compare the agronomic characteristics of new varieties and proven varieties in our localized growing condition.
- To provide information on newer varieties to local producers

Introduction: Canola Performance Trials (CPT) are independent trials for Western Canadian canola growers to evaluate (current) commercially available varieties. The funding for these trials comes from Alberta Canola, MCGA and SaskCanola.

The current version of the CPT program dates back to 2011. However, 2018 was the first year for GRO to host the site for the trial once again. In 2019, the trial includes a total of 21 standard varieties from three herbicide-tolerant systems (Liberty Link, Roundup Ready and TruFlex).

CPT - Project Description	
Seeding Date	May 17
Seeding Specifics	Fabro zero-till drill Seeding Depth: ¾ inch **Seeding Rates:** 14 plants/square foot
CPT - Project Description	
Fertilizer/ac	**Side Banded at seeding** 20.8-13.8-20.8 144 lbs/ac • 30lbs/ac Actual N • 20lbs/ac Actual P • 30lbs/ac Actual K • **Fall Applied (producer applied)** • 90 lbs/ac actual N from 82-0-0 • 31 lbs/ac actual N from 21-0-0-24 • 4.2 lbs/ac actual N from 11-52-0 • 20 lbs/ac actual P from 11-52-0 • 30 lbs/ac actual K from 0-0-60 • 36 lbs/ac actual S from 21-0-0-24

Herbicide	• Roundup (RR entries) 270 gai/ac	June 26, 2019
	• Liberty (LL entries) 1.6 l/ac	June 26, 2019
	• Centurion 50 ml/ac	June 26, 2019
Harvest Date	October 14	

The trial was sprayed at the 3-6 leaf stage. 2019's poor growing conditions resulted in a slow maturing crop. Dry-down of the trial was very slow causing a late harvest at high moisture (12 - 15%). The bagged samples were air-dried to approx. 10% moisture before processing for the yield.

Results:

The results of the CPT trial grown at Westlock are summarized in the table. The average yield in the trial for LL entries, RR entries, and TruFLEX was 84.8, 84.4 and 83. bu/ac. The highest yielding canola variety was **L241C** at 94 bu/ac (Liberty Link system) and **45CM39** at 97 bu/ac (Roundup Ready system). The **P501L** at 91 bu/ac **DL 171680 RR** at 95 bu/ac were also top-yielding varieties in LL and Roundup Ready systems.

CS2600 CR-T yielded quite well **91 bu/ac** for the TruFlex varieties.

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Canola Performance trial 2019: Westlock

	Name of Variety	System	Height (cm)		Days to Maturity		Yield (Bu/Acre)	
1	**L230**	Liberty Link	141	b	112	c	**72**	ab
2	**L241C**	Liberty Link	144	b	119	abc	**94**	a
3	**L252**	Liberty Link	148	ab	115	abc	**81**	ab
4	**P501L**	Liberty Link	148	ab	117	abc	**92**	ab
5	**6076 CR**	Round up Ready	155	ab	121	ab	**89**	ab
6	**6090RR**	Round up Ready	156	ab	122	ab	**89**	ab
7	**D3155C**	Round up Ready	155	ab	122	ab	**93**	ab
8	**CS2300**	Round up Ready	164	ab	121	ab	**88**	ab
9	**74-44 BL**	Round up Ready	148	ab	118	abc	**74**	ab
10	**75-42 CR**	Round up Ready	142	b	117	abc	**73**	ab
11	**75-65 RR**	Round up Ready	155	ab	114	bc	**67**	b
12	**DL 1634 RR**	Round up Ready	156	ab	123	a	**91**	ab
13	**DL 171680 RR**	Round up Ready	151	ab	119	abc	**95**	a
14	**540G**	Round up Ready	150	ab	120	abc	**77**	ab
15	**581GC**	Round up Ready	151	ab	118	abc	**92**	ab
16	**45CM39**	Round up Ready	147	ab	119	abc	**97**	a
17	**45CS40**	Round up Ready	158	ab	121	ab	**77**	ab
18	**45H33**	Round up Ready	151	ab	122	ab	**82**	ab
19	**45M35**	Round up Ready	156	ab	116	abc	**82**	ab
20	**CS2600 CR-T**	TruFlex™	146	b	121	ab	**91**	ab
21	**DL 187300 TF**	TruFlex™	168	a	121	ab	**76**	ab
LSD P=.05			12.12		4.56		14.02	
Standard Deviation			8.57		3.22		8.489	
CV			5.64		2.72		10.05	

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)

Gateway Research Organization

Demonstrating the Seeding Rate Calculator and Stand Establishment Tools Project – 2019

Co-operators: John Guelly Location: NW 35-58-27-W4

GOALS OF THIS DEMO:

- Demonstrate to growers how to use the seeding rate calculator to calculate seeding rates for a target plant stand https://www.canolacalculator.ca/seeding-rate
- Demonstrate how the value of doing plant stand counts to assess your seeding rate calculation and to determine mortality rates https://www.canolacalculator.ca/seeding-rate/plant-survival
- Demonstrate the free Canapeo app as tool to measure canopy closure determine canopy closure http://www.canopeoapp.com/#/login

DEMO PLOT DESIGN

Treatment: 2 replications

- 2 seeding depths targeting optimum (0.75” and deep (1.5”)
- 4 target plant stands of 2,5,8,11 plants per square foot – calculate seeding rates based on the TSW, assuming 50% mortality and using the seeding rate calculator.

The trial was seeded with following a randomized layout.

Seeding Map

EAST

Gaurd	**5 plants**	**2 plants**	**5 plants**	**2 plants**	s
Gaurd	**11 plants**	**8 plants**	**11 plants**	**8 plants**	o
Gaurd	**8 plants**	**11 plants**	**8 plants**	**11 plants**	u
Gaurd	**2 plants**	**5 plants**	**2 plants**	**5 plants**	t
	Deep		**Shallow**		h
	1.5"		0.75"		

Data for the plant counts were collected at 7, 21 and after swath to access the emergence and the plant density at the different crop growth stages.

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Results: The results from plant count at 21 days indicated that there was an uneven emergence with either increasing the seeding depth. However, the difference in the plant count was narrowed at 21 days count.

	Average Emergence Count plants per square foot			
	DEEP		Shallow	
Seeding Rate	Count	Emergence	Count	Emergence
2 plants/square ft	2	50%	3	75%
5 plants/square ft	6	60%	6	60%
8 plants/square ft	10	62%	9	56%
11 plants/square ft	13	59%	15	68%

Acknowledgment: Many thanks to and our producer partner John Guelly for their support during this trial.

Gateway Research Organization

2019 Heifer Pasture Summary

Coordinator: **Amber Kenyon,** Outreach Officer

Location: Heifer Pasture SE-23-61-26 W4

Stocking Rate: 98 heifers & 2 bulls;

Contributors:

Keith Wiart	**Matt Haisan**
Georges Kerckhof	**Jacob Boychuk**
Maurice Kruk	**Glen Siegle**
Chelsea Geiger	

Entry Date: June 11, 2019

Exit Date: August 19, 2019

Objectives:

1. To demonstrate a rotational grazing system and its effect on carrying capacity.
2. To provide a site for further research and educative activities.
3. To demonstrate the benefits and drawbacks to different cell designs
4. To demonstrate the benefits and drawbacks to different record-keeping types

History & Field Design

The pasture was established in 1979 and was originally used for steers. In 1988, the first heifers were put into the pasture and have remained ever since. The 160-acre pasture is split into 16 paddocks; approximately 10 acres each. There is a central watering/ loafing area as well as a handling facility. The perimeter is fenced with 4 double strand barbed wire, and cross fencing is done with 2 single strand barbed and high tensile wire that is powered with a solar electric fencer. Each paddock is rotationally grazed to allow alternate periods of grazing and rest. If managed properly, these rest periods allow the grass a chance to replenish nutrients after

defoliation and therefore, increase grass production. In a continuous grazing situation, some forage resources are continually stressed (no rest); while others may be underutilized as the animals will repeatedly graze the most palatable species. In this situation, the preferred species will begin to decline and less palatable species, or weeds, will begin to dominate the pasture. In 2015, much-needed repair work was performed on the fencing and solar. In 2018, the GRO board of directors decided to use the pasture for educational purposes and started planning some changes to the pasture layout. In 2019 the 160 acre pasture layout was redesigned to represent different cell designs and management types. The 16 paddocks now allow for 6 different management types.

Water

In September 2002, the dugout and Dutch Industries windmill water system was replaced with a free flowing well delivering a rate of approximately 2 gal/min (cut back from 4 gal/min). A 580 gallon poly trough was installed with an over-flow pipe to prevent over filling and spillage into the watering area. In 2014 the flow rate was assessed again, it took approximately 2 minutes and 54.6 seconds to fill a 20L pail, which translates into a flow rate of 1.5 gal/min. In 2019 a gravity flow water source was added to the current system. In addition to the trough and well based watering system a gravity flow system was added. Using a gas powered pump, water is transferred to a 1200 gal tank that has been placed at the top of the turkey's nest. This then supplies water to two 450 gal troughs on the south and north sides of the pasture via gravity flow. The system uses 1 ½ inch above ground poly pipe with a high PSI rating. There are now 3 locations for water, providing access to accommodate the new fencing structure and management styles.

Herd Health

All heifers were weighed and inspected for overall health and soundness on entry day in June. The heifers were weighed again on exit day in August. All animals were vaccinated for hoof-rot and CyLence® pour-on insecticide (fly control) was applied on entry day. A pasture blend of loose mineral was fed as per product indications in each paddock. Two heifers showing signs of hoof-rot were treated with oxy-tetracycline on July 15th and August 13th.

Breeding

Two bulls were used in the pasture, entering at the same time as the heifers (June 11) and they remained in the pasture until August 19th when the heifers were removed. Because of the earlier exit day the heifers were not checked for pregnancy rates on exit.

Discussion

The GRO Heifer Pasture was established in 1979, making the pasture 35 years old, which is a well-aged pasture. The pasture was originally seeded to a mixture of grasses and legumes but is now predominantly meadow foxtail. A variety of other grass species, including orchard grass, Timothy, meadow brome, and other brome species, can still be found out on pasture. In terms of forbs or legume type species, these are limited on the pasture with some paddocks having no broad leaf species other than Canada thistle. The species that do still exist in some of the paddocks are clovers, alfalfa and cicer milkvetch.

The order that the paddocks were grazed varied this year, as the fencing for the new paddock structure was being constructed in early July and the new gravity flow water system was not in place until the end of July. A more accurate trial of the impact of different management types and cell designs will begin at the start of the grazing season in 2020. Soil sampling was completed in September with samples being sent to the CARA lab for analysis as part of their soil carbon project. The total number of grazing days were shortened this year to allow for rest and recovery of the pasture, the intent of this is to help combat the growing weed pressure and to allow for an earlier entry day in 2020. For more information on our grazing rotation this year see our Grazing Chart, Grazing Calendar and Maia Grazing records.

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2019 GRO Heifer Pasture Calculations Summary

Total # of Heifers	**98**
Total # of BULLS	**2**
# of Grazing Days	**69**
Average Weight of Heifers at Entry (lbs)	**895**
Average Weight of Heifers at Exit (lbs)	**997**
Average Weight Gain/Heifer Entry to Exit (lbs)	**102**
Average Daily Gain/Heifer @ EXIT (lbs)	**1.3**

The breeds of the heifers in 2019 varied, so the information in the above table contains the overall average of the group as a whole.

If you are interested to participate in GRO heifer pasture contributor-run program. Please email grohome@telus.net. We plan to meet in end of March to discuss next year's course of action.

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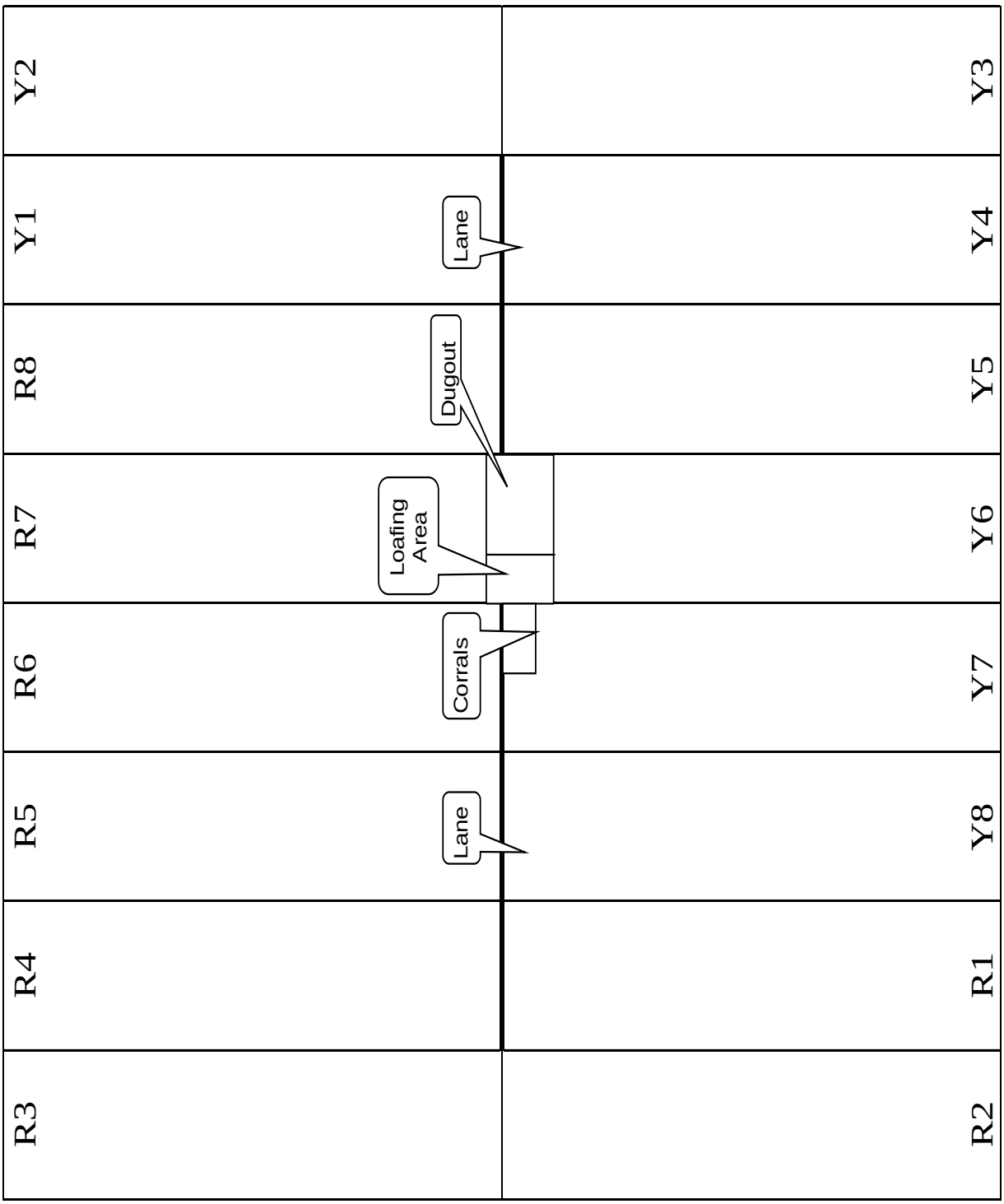
GRO Heifer Pasture Map

North

Previous : Single Alley System



Updated: 6 Management Type System

Feb 13, 2020

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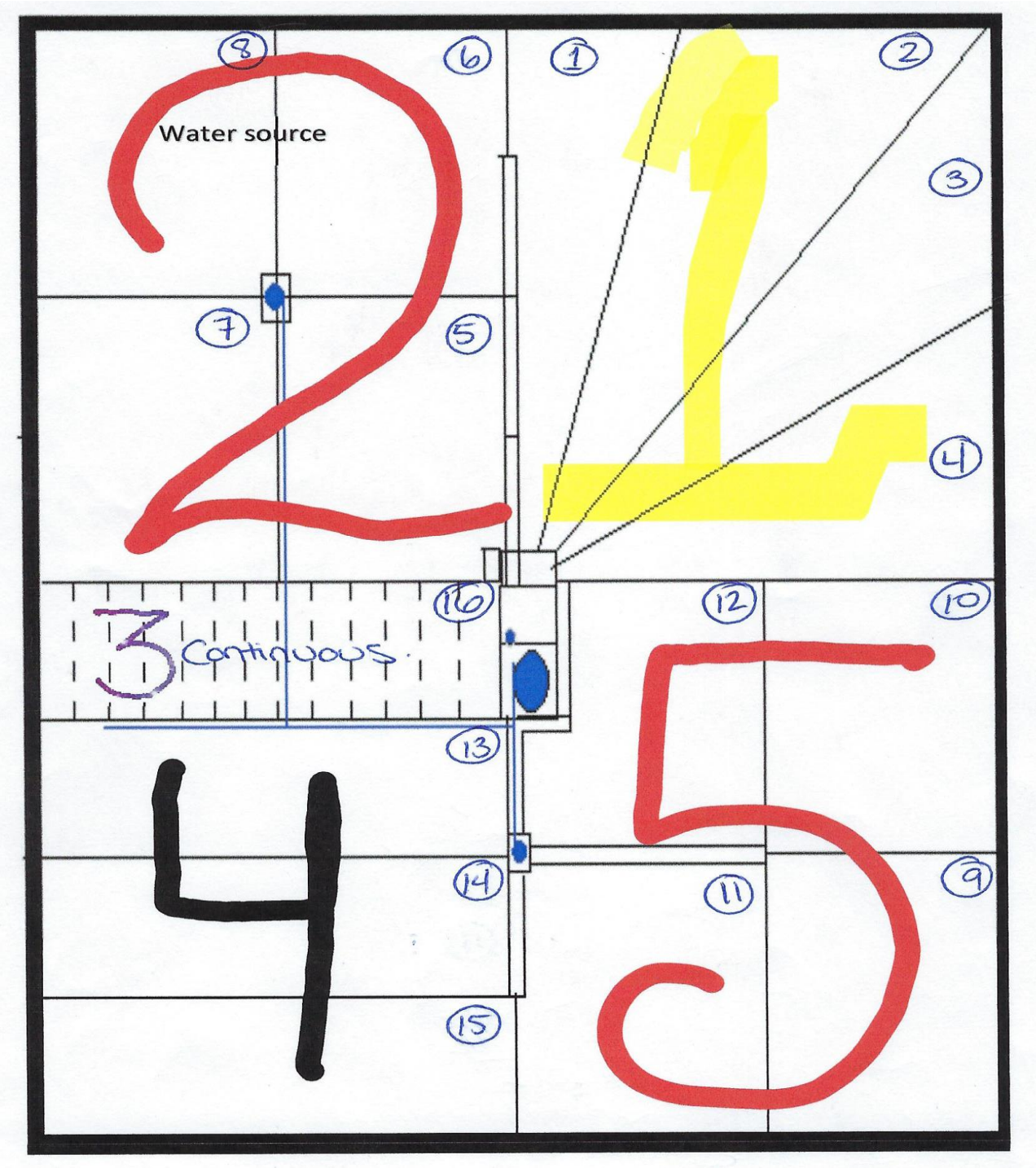
GRO Heifer Pasture Map



Feb 13, 2020

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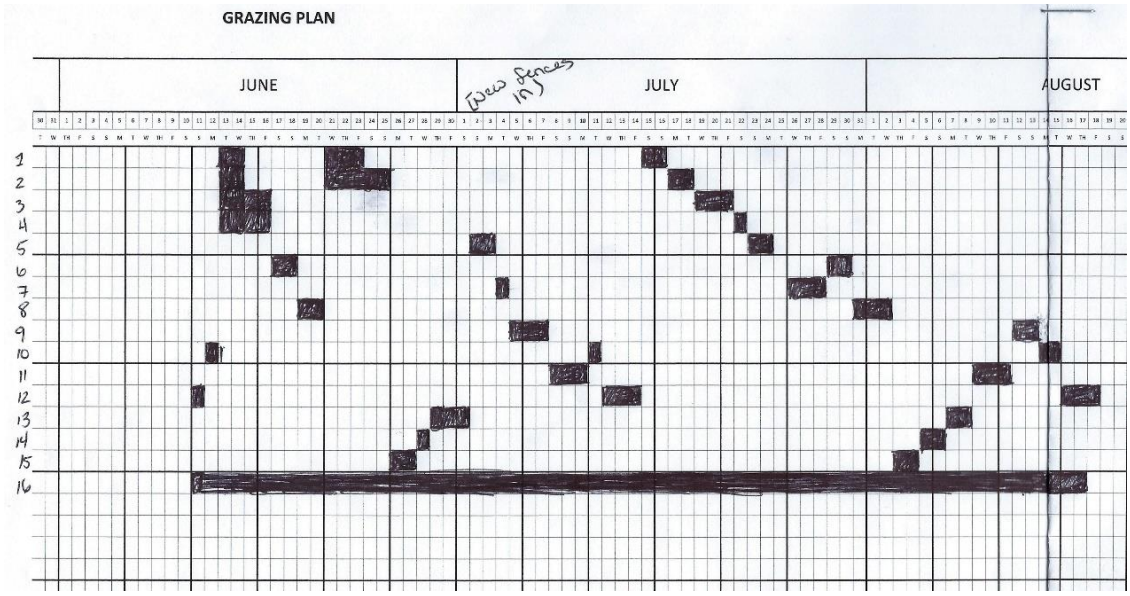
Grazing Record Keeping Methods

Hand Written Grazing Chart



Hand Written Calendar

2019 JUNE

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11 Heifers in	12 Moved back and paddock access to front	13 Moved	14 Moved Access to front	15 Moved
16	17 Moved	18	19 Moved access to front	20	21 Moved	22
23	24 Moved access to front	25 Moved	26 Moved	27 Moved	28 Moved access to two paddock	29
30						

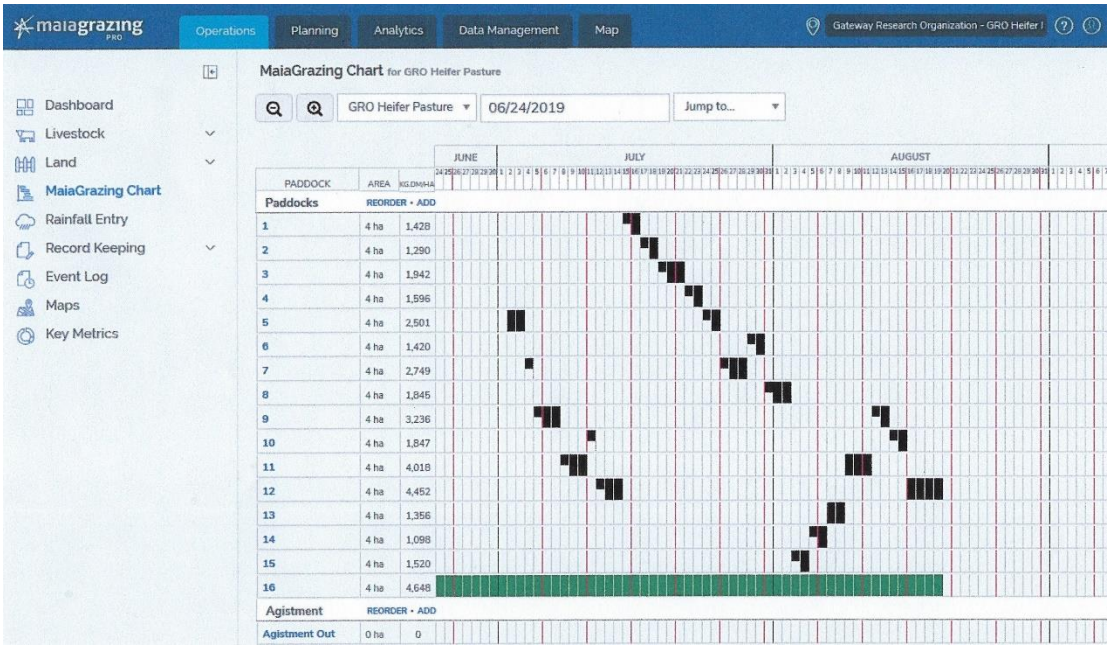
JULY 2019

SUN	MON	TUE	WED	THU	FRI	SAT
		Moved to #5		Moved to #7	Moved to #9	Moved to #12
		1	2 New Fencing in 3	4	5 35 days	6
	Moved to #11			Moved to #10	Moved to #12 (moved themselves)	
7	29 days 8	9	10	33 days 11	32 days 12	13
	Moved to #1 no electricity in fence Moved #2 to front		Moved to #2		Moved to #3	
14	15	16	17	18	Very muddy on exit 19	20
	Moved to #4		Moved to #5 22 days & New water system put in 22 days		Moved to #7	
21	22	23	24	25	22 days R 26	27
	Moved to #6		Moved to #8			
28	10 days rest 29	30	31 10 days rest			

AUGUST 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3 Moved to #15 36 days
4	5 Moved to #14 34 days	6	7 Moved to #13 Mob Grazing 36 days	8 Mob Grazing	9 Moved to #11 29 days	10
11	12 Moved to #9 35 days	13	14 Moved to #10 33 days	15	16 Moved to #12 32 days.	17
18	19 Exit Day	20	21	22	23	24
25	26	27	28	29	30	31

Maia Grazing App



Discussion

Part of the trial that we started this year included the use of multiple sources of record keeping. For tracking animal movement in 2019, we used the MaiaGrazing app, a hand written grazing chart and tracking moves on a hand written calendar. With the transition happening this year at the heifer pasture we had limited findings, but will be looking at the benefits and drawbacks to each method with the next grazing season.

Regional Silage Trial

Co-operators: Jubilee Feedlot- SW-9-59-26-4

Objectives

- Compare silage yield and nutritional value of new and commonly used barley, oat and triticale silage varieties.
- To provide yield and agronomic data for use in the Alberta Agriculture publication "Silage Varieties for Alberta."

Background

A randomized complete block with 4 replicates of each treatment was used. Plot size was 1.37 meters wide (6 rows with 9-inch spacing) by 10 meters long. Silage was harvested, samples were weighed and sent for wet chemistry analysis to obtain moisture and feed quality. Seeding rates were based on 1000 kernel weight and germination in order to achieve 300 seeds/m^2, 300 seeds/m^2, and 370 seeds/m^2 that translates to about 28, 28, and 34 plants per square foot for barley, oat and triticale respectively. It is very important to calculate seeding rates using this method (using germination % and 1000 kernel weight) to prevent under or overseeding. Crops with larger seed size have fewer seeds per pound/bushel. They need to have more pounds/bushel seeded per acre to keep viable seed counts the same as crops with small seed size.

Table 1: Project description

Action	Barley Silage	Oat Silage	Triticale/Wheat Silage
Seeding	May 31	May 31	May 31
Seeding Specifics	Depth: 1.25 inch Row Spacing: 9 inches		

Equipment	Fabro zero-till drill with atom jet openers		
Fertilizer applied	**Seed Placed** 11-52-0 @ 58 lbs/ac **Side Banded** 29-0-18-4 @ 316 lbs/a		
Herbicides applied	Curtail M 610ml/acre June 17		
Precipitation (mm)	384		
Harvest Stage	soft dough stage	late milk stage	Early dough stage
Harvest date	August 27	August 28	Sept 16

Barley Varieties Used in the Trial

- **CDC Austenson** - A two-row, rough-awned hulled feed barley with very high grain yield and short, strong straw. Large plump kernels. A top-yielding two-row with improved, performance over Xena. Resistant to stem rust and covered and false loose smut. Medium maturity. Susceptible to scald and true loose smut.
- **Altorado** – A two-row, spring feed barley with good resistance to lodging and a fair to good resistance to drought conditions.
- **Canmore** – A two-row, medium height, and general-purpose barley. This variety fits in the feed market with the added food-grade opportunities in the pearling and Shochu markets. (Shochu is an alcoholic beverage that is replacing Sake in Japan). Canmore Barley has excellent pearling qualities, starch content and alcohol yields. Other features include High yielding, improved disease resistance, increased percentage of plump seed and improved lodging resistance.
- **CDC Coalition** – high yielding A two-row, feed barley variety.
- **Claymore (TR12733)** – A two-row, spring feed barley, semi-erect growth habit at tillering. good resistance to lodging and shattering, good tolerance to straw breakage, fair to good tolerance to drought.
- **Seebe** – A two-row, rough awned feed barley. Improved yields and later maturity in comparison to Bridge. Well adapted to Alberta's growing conditions.
- **Amisk –** Rough awned, 6-row, semi-dwarf general-purpose barley with increased feed efficiency, strong straw for decreased lodging.
- **Sundre** – High yielding 6-row barley variety with good disease resistance.
- **AB Cattlelac** - is a NEW semi-smooth awned barley. Coupled with good lodging resistance, good grain yield, and excellent disease resistance.

- **AB Advantage –** 6-row smooth-awned feed and forage barley with high grain yield and good agronomic performance.
- **SR17515 –** Six-rowed and has a semi-smooth awn, newer variety that can be used for making silage or green feed, and it can be used for swath grazing. It has excellent standability and lodging resistance.

Table 2: Barley Silage Yield

	Yield (tonne/ac) at 65% H2O	Yield as % of check
CDC AUSTENSON	12.8	100
AD ADVANTAGE	13.2	103
AB CATTLELAC	11.5	90
ALTORADO	12.9	101
AMISK	14.6	114
CANMORE	12.2	96
CDC BOW	13.1	103
CDC COALITION	12.6	99
CDC COWBOY	15.4	121
CDC MAVERICK	12.1	95
CLAYMORE	12.8	100
SR17515	12.5	97
SR17519	12.6	99
SUNDRE	12.3	96
TR17639	13.3	104

CDC AUSTENSON consider as a Check

Oat Varieties Used in the Trial

- **CDC Baler –** A forage oat with very long wide leaves, slightly taller than the standard forage variety, excellent lodging resistance, and exceptional forage yield. It generally has higher energy and protein values than other forage oats.
- **CDC Minstrel –** Good lodging resistance, sensitive to day-length, Short stature, easy harvesting, High yields.

- **AC Morgan –** High yielding, later maturing milling oat with good lodging resistance and is commonly used for silage or green feed. Susceptible to crown and stem rust, moderately susceptible to smuts. Adapted to black and grey wooded soil zones of Alberta.
- **CDC Haymaker –** A spring oat with high forage yield potential and forage quality, good grain quality and improved grain yield over CDC Baler. Plump grain with high seed weight, grain yield better than CDC Baler. Crown rust resistance similar to CDC Dancer, susceptible to smut.
- **CDC Seabiscuit –** high yielding milling oat variety with good straw strength for reduced lodging.
- **CDC SO-1 –** Designed for ruminant feeding programs. Low lignin hull with high oil groat (better digestibility). Early maturing, very digestible brown feed oat variety with high fat content and does not need to be rolled. Short, strong straw for reduced lodging.
- **AC Murphy –** widely adapted forage oat, with high yields, improved lodging resistance and is well suited for silage, swath grazing, and green feed.
- **ORe3542M –** High yielding, high quality, white-hulled milling oat. Medium maturing with strong straw and crown rust resistance.

Table 2: Oat Silage Yield

	Yield (tonne/ac) at 65% H2O	Yield as % of check
CDC BALER	**14.8**	100
AC MORGAN	**14.4**	97
AC JUNIPER	**14.0**	95
CDC HAYMAKER	**14.2**	96
CDC NASSER	**13.9**	94
CDC SEABISCUIT	**14.1**	96
CDC SO-1	**14.7**	100
MURPHY	**14.9**	101
ORE 3542 M	**13.1**	89
CDC Baler Consider as a Check		

Triticale Varieties Used in the Trial

- **Taza –** Awnletted (reduced awn expression) standard height spring triticale line intended for use as a feed grain conserved forage, swath grazing crop and potentially for industrial use. Adapted to the Canadian Prairie Provinces. This line has good lodging resistance, good test weight, and high kernel weight

- **Bunker –** early maturing, reduced awn forage variety with great digestibility, high-fat content and high silage yields.
- **Sunray –** Adapted to the Canadian prairies and represents an improvement in ergot resistance for Canadian triticale. Early maturing, spring triticale variety with short-statured for increased resistance to lodging. It is resistant to the prevalent races of leaf rust, stem rust, common bunt, root rot and is moderately resistant to grain sprouting.
- **T256 –** spring triticale, forage-type line, is more digestible because it has reduced awns, is shorter, and has lower lignin content. It is also favorable for swath grazing.
- **Tyndal –** A reduced awn spring triticale designed for conserved forage production (silage/greenfeed). Good leaf and stem rust resistance. An earlier maturing variety with good lodging resistance and high forage yields.

Table 3: Wheat/Triticale Silage Yield

	Yield (tonne/ac) at 65% H2O	Yield as % of check
2-AAC AWESOME	14.1	77
3-AAC DELIGHT	17.3	94
4-AC ANDREW	15.1	82
5-AC SADASH	15.2	83
1-TAZA	18.3	100
6-BUNKER	17.8	97
7-SUNRAY	17.4	95
8-T256	17.5	95

TAZA Consider as a Check

NOTE: Silage trial results are sent to Alberta seed guide every year. We rely on municipal funding to continue these trials so if producers feel the data is relevant and important please talk to your municipal councillor to support GRO.

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Table 4: Barley Silage quality results from 2019

	Crude Protein	Acid Detergent Fibre	Total Digestible Nutrients (Weiss)	Relative Feed Value	NE Lactation	NE Gain	Calcium	Phosphorus	Potassium	Magnesium
	%	%	%		MCal/Kg		%	%	%	%
CDC AUSTENSON	9.29	34.63	64.43	100.92	1.36	0.75	0.32	0.14	1.29	0.10
AD ADVANTAGE	9.76	29.93	67.14	118.71	1.42	0.84	0.34	0.13	1.50	0.11
AB CATTLELAC	9.54	31.45	67.05	124.55	1.39	0.80	0.38	0.14	1.50	0.10
ALTORADO	10.25	29.18	72.04	150.94	1.44	0.86	0.29	0.17	1.25	0.11
AMISK	10.87	32.88	67.24	117.82	1.38	0.78	0.46	0.16	1.49	0.13
CANMORE	9.88	33.39	65.48	109.39	1.34	0.75	0.41	0.15	1.44	0.12
CDC BOW	9.33	34.10	65.99	103.68	1.34	0.74	0.33	0.13	1.24	0.09
CDC COALITION	9.54	34.77	68.49	132.10	1.34	0.74	0.26	0.17	1.23	0.10
CDC COWBOY	10.27	36.27	64.56	102.04	1.31	0.70	0.29	0.14	1.82	0.10
CDC MAVERICK	9.42	33.93	65.48	107.36	1.34	0.75	0.32	0.19	1.35	0.11
CLAYMORE	9.68	36.02	63.40	101.44	1.30	0.70	0.34	0.14	1.39	0.09
SR17515	10.27	34.45	67.41	131.56	1.33	0.73	0.31	0.20	1.53	0.13
SR17519	9.56	41.63	58.68	88.22	1.19	0.57	0.39	0.12	2.18	0.11
SUNDRE	9.36	36.18	63.01	103.63	1.29	0.69	0.44	0.14	1.80	0.12
TR17639	9.80	32.46	67.91	124.55	1.37	0.78	0.35	0.15	1.44	0.11

STAGE of Barley at silage – soft dough

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Table: 5 Oat Silage quality results from 2019

	Crude Protein %	Acid Detergent Fibre %	Total Digestible Nutrients (Weiss) %	Relative Feed Value	NE Lactation MCal/Kg	NE Gain MCal/Kg	Calcium %	Phosphorus %	Potassium %	Magnesium %
CDC BALER	9.63	37.17	57.50	85.21	1.27	0.66	0.18	0.15	1.83	0.09
AC MORGAN	9.90	35.37	59.76	91.70	1.31	0.72	0.22	0.21	1.91	0.10
AC JUNIPER	9.64	30.68	68.13	143.25	1.42	0.84	0.24	0.21	1.13	0.15
CDC HAYMAKER	8.43	33.83	62.35	99.83	1.33	0.73	0.20	0.18	1.54	0.10
CDC NASSER	8.78	37.01	62.30	98.49	1.29	0.69	0.21	0.16	1.70	0.10
CDC SEABISCUIT	9.22	33.50	64.24	114.55	1.34	0.75	0.18	0.16	1.51	0.09
CDC SO-1	8.79	34.20	64.51	120.37	1.31	0.72	0.15	0.13	1.29	0.10
MURPHY	10.04	40.64	56.66	81.00	1.22	0.60	0.21	0.15	1.81	0.09
ORE 3542 M	9.72	35.79	63.23	104.04	1.32	0.72	0.16	0.17	1.90	0.08

STAGE of Oats at silage - Milk

Table 6: Triticale and soft white wheat silage quality results from 2019

Wheat Silage	Crude Protein %	Acid Detergent Fibre %	Total Digestible Nutrients (Weiss) %	Relative Feed Value	NE Lactation MCal/Kg	NE Gain MCal/Kg	Calcium %	Phosphorus %	Potassium %	Magnesium %
AAC AWESOME	9.8	28.5	68.7	118	1.45	0.87	0.16	0.20	1.59	0.09
AAC DELIGHT	10.2	26.8	70.0	124	1.47	0.91	0.16	0.22	1.02	0.09
AC ANDREW	10.5	28.5	69.2	122	1.46	0.88	0.17	0.18	2.10	0.10
AC SADASH	10.0	27.2	69.4	124	1.48	0.91	0.19	0.24	1.84	0.12

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Triticale Silage	Crude Protein	Acid Detergent Fibre	Total Digestible Nutrients (Weiss)	Relative Feed Value	NE Lactation	NE Gain	Calcium	Phosphorus	Potassium	Magnesium
TAZA	9.7	28.6	68.9	119	1.46	0.88	0.18	0.24	1.15	0.09
BUNKER	9.9	27.9	70.2	119	1.46	0.89	0.19	0.22	1.14	0.09
SUNRAY	9.8	24.6	72.4	143	1.52	0.95	0.17	0.24	1.12	0.09
T-256	9.5	30.5	66.7	108	1.40	0.82	0.30	0.17	1.32	0.10

STAGE of Soft Wheat/Triticale at silage – Late Milk

Grazing Corn

Co-operators: Ole farms – SW-23-65-23-4

Years 2019

Objectives

- To provide unbiased, current and comprehensive data regarding the establishment, yield and nutritional quality characteristics of different Corn varieties available to our region.

Background: The trial was seeded as small plot research trial at Westlock as well as a field scale strip style at the cooperating producer's field (Ole Farms) near Colinton. The eight different corn varieties seeded for side by side comparison in this project. The small plot corn trial near Westlock flooded out and didn't establish as expected so no data was collected. The producer seeded corn demo did very well.

Corn Variety	Yield (tonne/acre) at 65% H2O	Corn Heat Unit	Relative Maturity (Days)
P7005AM	**17.9**	2000	70
P6909R	**13.8**	1950	73
P7211HR	**16.7**	2050	74
DKC 23-21	**10.7**	2075	73
P7332R	**16.9**	2050	73
PS EXLEAFY RR	**12.3**	2550	85
LR9473RR	**13.1**	2150	73
PS2210VT2P	**11.9**	2100	78

	Crude Protein	Acid Detergent Fibre	Total Digestible Nutrients (Weiss)	Relative Feed Value	NE Lactation	NE Gain	Calcium	Phosphorus	Potassium	Magnesium
	%	%	%		MCal/Kg		%	%	%	%
P7005AM	4.89	21.5	43.7	109	0.93	0.53	0.14	0.24	0.82	0.08
P6909R	7.50	25.2	55.7	116	1.17	0.69	0.27	0.25	1.23	0.11
P7211HR	6.43	23.2	51.7	119	1.10	0.65	0.08	0.36	1.00	0.11
DKC 23-21	8.75	25.6	61.6	126	1.29	0.78	0.35	0.50	1.96	0.22
P7332R	6.80	28.9	60.1	112	1.27	0.73	0.22	0.26	1.00	0.11
PS EXLEAFY RR	7.08	21.6	49.7	119	1.05	0.62	0.27	0.18	1.45	0.13
LR9473RR	5.05	16.4	39.3	125	0.82	0.49	0.15	0.20	0.91	0.09
PS2210VT2P	6.78	25.4	50.6	108	1.05	0.60	0.27	0.27	1.24	0.17

Perennial Wheat and Perennial Rye

GRO planned to seed perennial cereals alone or with clover to see the establishment and regrowth along with survivability in our area after grazing too. The trial site was selected and staked for seeding on July 21, 2019. The continuous rain events that began in June prevented us from seeding the trial. GRO looks forward to 2020 to establish this interesting long term trial.

The perennial cereals needed to be seeded once every three to four years, which would mean a substantial savings for producers. In addition, perennial cereals can provide low cost feed, good persistence, and solid performance against weeds. Another advantage of perennial cereals is that year round living root system staying active throughout winter that improve soil health, prevent soil/water erosion.

Canada's first **perennial rye** cultivar **ACE-1** is originally developed in Germany by crossing rye and Secale montananum (grass), it was further selected to survive western Canadian winters.

Kernza® is **perennial wheat** developed by Land institute by selecting improved populations of intermediate wheatgrass. Ultimate goal for developing the Krenza is to utilize it as a dual purpose forage and grain crop in diverse farming operations.

More research on these crops is needed to determine how widely it will be adapted and how it will be utilized by different types of animal systems.

Gateway Research Organization

What's up for 2020

1). Impact of Soil pH >7.2 on Crop Yield (wheat, yellow peas & canola) and Clubroot Disease (trial 2020-2022).

Objectives of the research is to:

- Determine the annual impact on yield on plots treated with lime to a soil pH ≥7.2 vs none limed plots for a typical Alberta crop rotation of Canola, HR Wheat, and Yellow peas over a three-year period
- Evaluate the effectiveness of increased soil pH (≥7.2) on clubroot disease spore and disease occurrence on the roots (GRO site only).
- Assessment of soil health at start of trial year 1 and at the end of trial year 3.

The number of fields infected with clubroot disease in Alberta, are still growing. Clubroot has been diagnosed in fields as far north as the Northern Sunrise County and as far south as Newell County and continues to spread. It has been found over all the Prairie Provinces.

Canola is Canada's most important agricultural sources of revenue generating about 25% of all farm cash receipts. Clubroot disease in canola was first found in Clubroot disease in canola can be considered the largest economic threat. Research done by Nicole Fox M.Sc. (The Evaluation of Lime Products as a Clubroot (Plasmodiophora brassicae) Management Tool) indicates that a soil pH >7.2 may be a viable tool for disease management. "Different lime products, and hydrated lime in particular, may represent an effective tool to manage P. brassicae in highly infested patches in a field, at field entrances and in acidic soils, by reducing clubroot severity on susceptible and resistant hosts. As such, the application of lime may help to supplement the use of genetic resistance, by reducing disease pressure and the potential for pathotype shifts."

In field trials where hydrated lime was used on a clubroot infected field (2018 - Edberg location, Keith Gabert) are showing some promising initial results.

No information is available on crop yield when soil pH is increased to >7.2. It is unclear what the impact is, if any, of raising the soil pH to >7.2 level on the productivity of other crops. For most crops it seems that the higher pH is just outside their optimum. Application of chemical fertilizer and sprays continues to have an acidifying effect on the top soils with in 2019 about 50% of Alberta soils having a pH of 6.0 and lower (with 15-20% being <5.5pH). In 1970 this was estimated to be 21% of Alberta soils or 2.1 million acres, with 4% having a pH of 5.5 and lower. (source: Doug Penney, Lacombe June 26 2019).

This project is supported by the Canadian Agriculture Partnership (CAP) "Adapting Innovative Solutions in Agriculture"

Gateway Research Organization

Alberta Soil Health Benchmark Monitoring Project

This project is supported by the Canadian Agriculture Partnership (CAP) Environmental Stewardship Program. It involves evaluation of soil samples from points across Alberta collected by 11 producer associations during the next four years. Results from analysis of the samples will be summarized into a data base. Management practices at each of the sites will be monitored. Site sampled in 2019 will be re-sampled in 2021 to determine the impact of management during the 2019-2022 period.

Benchmark Methodology:

- Soil samples will be collected by each participating group in each of 2019 through 2022; the project will allow for farmers to include additional samples in the benchmark inventory if they wish at their own expense
- No specific land use criteria will be used for **site selection other than a willing and interested landowner who has good records of management history for the site**; it is anticipated the samples will be a cross-section of crop, forage and native pasture under various management regimes
- CARA's Soil Health Sampling Protocol will be utilized in the collection of all samples
- Parameters that will be analyzed:
    - Physical (on-site or at CARA Lab):
        - wet aggregation stability (Cornell University protocol)
        - compaction (penetrometer on site)
        - bulk density (by weight/volume measurement)
        - texture (Bouyoucos hydrometer method)
    - Biological (CARA Lab Food Soil Web protocol except as noted)
        - active carbon (Cornell University protocol)
        - C:N ratio (will be done in collaboration with U of A)
        - soil microbial respiration (Cornell University protocol)
        - active & total bacteria
        - active & total fungi
        - nematode functional groups
        - protozoa functional groups
    - Chemical (commercial labs)
        - organic matter, pH, EC, etc.
        - N, P, K and Micro nutrients
- All information will be entered into a data base
- Information related to specific sites will be shared with the cooperating producers by association staff.

Gateway Research Organization

Pest Monitoring & Disease Survey

Partner: Producers from Counties of **Westlock**, **Barrhead,** and **Woodlands.**

Special thanks to Shelley Barkley, Alberta Agriculture

The Gateway Research Organization (GRO) participated in the Prairie Pest Monitoring Program in 2019. The objective of the Prairie Pest Monitoring Program is to develop an early warning system for crop pests, with emphasis on insects and disease. Being forewarned means that scouting, information workshops, and control operations can be carried out in the affected areas before crop losses occur. Last year, GRO surveyed for diamondback moth, bertha armyworm, Cabbage Seedpod weevil, and Wheat Midge.

BARRHEAD 2019 Summary

Of the six bertha armyworm sites in Barrhead County none were above the first warning level of 300 moths. Trapping will continue to be very important to watch for a possible build-up in the population although we are not anticipating major risks for your area in 2020 the trap catches could be interpreted as a build-up in the population.

There was 1 diamondback moth trap in your area which had low level of moths caught during the trapping period.

Pea leaf weevil numbers were up in 2019. I would be recommending producers to use seed treatment, especially if they have seen a similar trend on their operation. It will depend on the individual producer and their approach to risk management.

Wheat midge numbers remain very low in your area with the exception of 4 midge at one location. This will result in a warning for your area near that field. If wet conditions persist next year wheat midge could become a more serious issue.

No cabbage seedpod weevil were found in your area. The population in central Alberta seems to have reduced.

We did survey 2 fields in your county for the new canola flower midge. We did not find any midge or any signs of damage from the midge.

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WESTLOCK 2019 Summary

Of the eight bertha armyworm sites in Westlock none were above the first warning level of 300 moths. Trapping will continue to be very important to track what looks like a build-up in the population.

There was one diamondback moth trap site in your area which had very few moths caught during the trapping period.

Pea leaf weevil damage was higher again this year in your county in the survey we conducted in late May – early June. This would indicate that producers should use insecticide seed treatments for managing this insect. In general if producers had experienced high levels in the past I would recommend staying with seed treatment. It will depend on the individual producer and their approach to risk management.

Wheat midge numbers also increased this year in your area. This population could increase to damaging levels if wet conditions and or late seeding occur. **It would be a good idea for producers and agronomists to monitor fields closely in 2020 as the wheat heads out.**

No cabbage seedpod weevil were found in Westlock County. The population in central Alberta seems to have reduced to very low levels.

We did three fields in our survey for the new midge in canola. We did find signs of damage from the midge in 2017 but none this year. This insect does pose any threat to canola production at this point.

WOODLANDS 2019 Summary

There was one bertha armyworm site in Woodlands and it was very low and well below the first warning level of 300 moths. Trapping will continue to be very important to watch for a possible build-up in the population.

Wheat midge numbers remain low in your area as we found no larvae in the two fields we surveyed. Certainly no risk for 2020.

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No cabbage seedpod weevil were found in your area. The population in central Alberta seems to have reduced to very low numbers.

We looked at two canola fields in your area looking for the new canola blossom midge. No larvae or damaged flowers were found.

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FEAP and On-Farm Solar Outreach

Amber Kenyon: January 31, 2019/January31, 2020

Summary

Until March Amber spent the majority of her time working on extension of the Farm Energy and Agri-Processing Program (FEAP), as well as the On Farm Solar PV Program. When the provincial election was called on March 19, 2019, the program, which was funded by carbon tax under the Climate Leadership Plan, was suspended as the new government ran a financial review. Between January 31 and March 19, 2019, Amber attended and/or presented at 12 different events. There was a good uptake on the program and a good number of new applications were submitted as the Outreach Team spent time at conferences, events and trade shows. After the financial review was completed no new funds for FEAP or the On Farm Solar PV Program (previously funded by the Climate Leadership Plan, which was eliminated in the spring) were identified and therefore the program was cancelled at the end of October.

Throughout the summer, Amber was taking phone calls primarily on the FEAP program. While doing this, she also spent the season managing the GRO Heifer Pasture and planning extension events. During the fall, she spent a good amount of time collecting soil samples for the CARA soil carbon project and traveled to the Peace region to collect soil samples for a project with the University of Alberta in collaboration with the government of Alberta.

In October, the Outreach Team officially started training on, and then promoting the Canadian Agricultural Partnership (CAP), with a focus on the Environmental Stewardship and Climate Change Producer program. Since this time, Amber's event schedule has started to pick back up again and we are looking forward to a busy 2020. Overall, there were 8 speaking opportunities and 2 trade shows attended from May 15, 2019 to January 31, 2020. There were 14 events attended with the goal of speaking one on one with

producers while networking. The downtime throughout the summer hindered extension opportunities.

Speaking Opportunities

Below is a chart outlining all of the speaking opportunities throughout the year. For a complete report on how the events went and the types of questions received, see GRO's stakeholder engagement table in SharePoint.

Overall, the speaking events were well received with an average of 30 people being reached at each one. Some of the most successful events were achieved through collaboration with other organizations trying to reach the same audience, and events that involved the expertise of all of the Outreach Officers. Having more speakers seems to be the most successful way of reaching producers, as it offers different perspectives and allows for a longer, more comprehensive event.

Event	Location	Date	# of people
Ranching the Impossible Way	Ft Assiniboine	Feb 1	20
Ranching the Impossible Way	Thorhild	Feb 8	11
Solar Info Session	Drayton Valley	Feb 16	22
GRO AGM	Westlock	Feb 22	40
Farm to Market to Table	Nisku	Feb 28	40
Bison Conference	Camrose	Mar 15	300
A-Maize-ing Grazing	Athabasca	Nov 7	15
People, Pasture, Profit	St Albert	Nov 20	15
Embracing Swath Grazing	Thorhild	Nov 29	15
Total Events:	**9**	**People Reached**	**478**

Tradeshows

The chart below outlines the 2 tradeshows attended in the last year.

Event	Location	Date	# of Attendees
Peace Country Agri-Classic	Grande Prairie	Mar 7	300
Soil and Grazing Conference	Edmonton	Dec 10	550
Total Tradeshows:	**2**		

Phone calls, emails, and publications

Apart from speaking engagements and tradeshows, the majority of efforts were spent working one on one with producers, answering their questions through phone calls and emails. The phone calls and emails increased throughout the spring as word spread about the funding opportunities available. These slowed down throughout the summer with the suspension of the programs, we do however expect them to pick back up now as we promote the Canadian Agricultural Partnership funding opportunities.

Conclusion: What's been going well, and what hasn't?

Overall, the FEAP and On Farm Solar PV programs were well received with the number of applications to these programs increasing as the Outreach Officers spent time promoting them. The change of pace to promoting the CAP program temporarily hindered extension opportunities, but the Outreach Team looks forward to the challenge of promoting a program with good environmental benefits and the ability to help producers to access funds available to further achieve their environmental goals.