

Lakeland Agricultural Research Association

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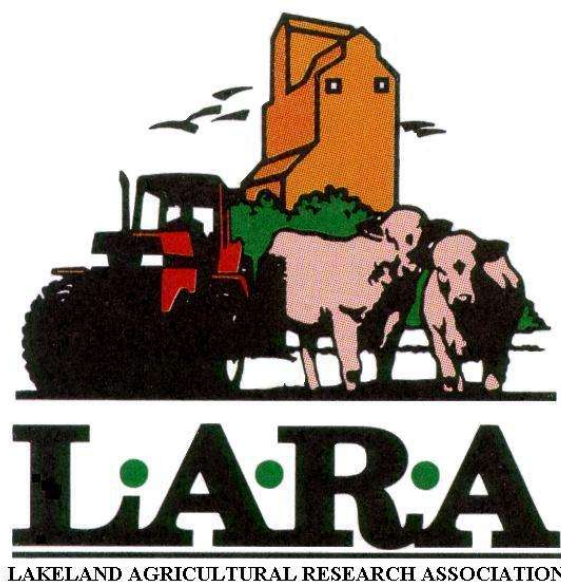
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Vision Statement:

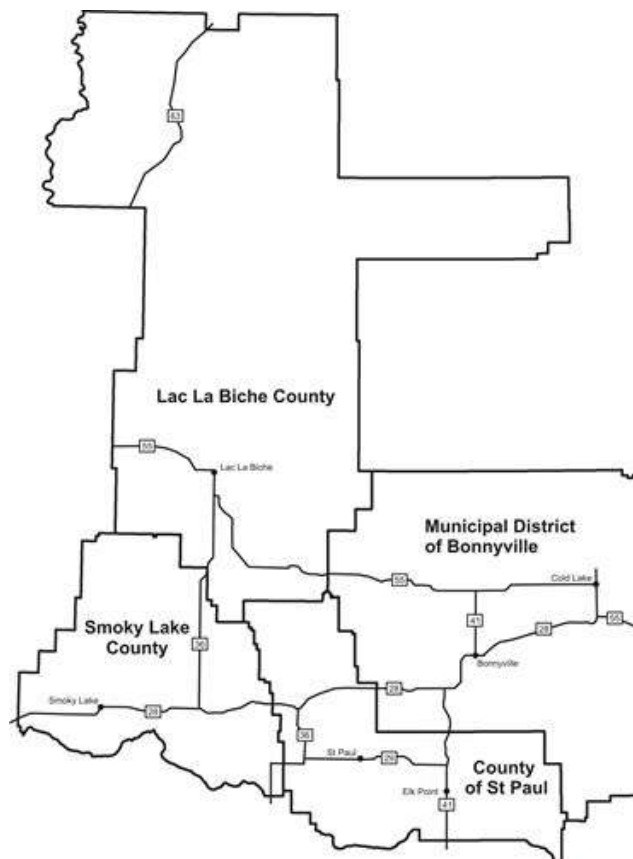
To be a leader in applied research and extension in Alberta

Mission Statement:

Lakeland Agricultural Research Association conducts innovative, unbiased, applied research and extension, supporting sustainable agriculture

What is the Lakeland Agricultural Research Association?

Lakeland Agricultural Research Association (LARA) is a producer-run organization conducting leading edge applied agricultural research and extension in Northeastern Alberta. Our aspiration is to make Alberta's agricultural producers profitable and sustainable through applied research, demonstration and extension in the areas of forages, livestock, annual crops, specialty crops, environmental conservation and regenerative agriculture.



LARA is located ½ mile west of Fort Kent, Alberta on Township Road 615.

LARA is open Monday to Friday, 8:00 am to 4:30 pm

2023 Board of Directors

Chair:	Wanda Austin
St. Paul County Rep:	Kevin Wirsta Louis Dechaine (alternate)
Lac La Biche County Rep:	Sterling Johnson Colette Borgun (alternate)
MD of Bonnyville Rep:	Don Slipchuk Josh Crick (alternate)
Smoky Lake County Rep:	Danny Gawalko Linda Fenerty (alternate)
Producer Reps:	Murray Scott – MD of Bonnyville Nick Kunec – MD of Bonnyville Phil Amyotte – County of St. Paul Patrick Elsen – County of St. Paul Wanda Austin – Lac La Biche County Laurier Bourassa – Lac La Biche County Amanda Fischer – County of Smoky Lake Barb Shapka – County of Smoky Lake
Lakeland Forage Association Rep:	Jay Cory - Chairman, LFA

2023 Staff

Executive Director:	Alyssa Krawchuk
Cropping Agrologist:	Momna Farzand
Forage & Livestock Manager:	Megan Wanchuk
EFP & Research Technician:	Dustin Roth
Administration/Horticulture:	Charlene Rachynski
Full Time Staff:	Vic Sadlowski
Summer Staff	Brooke Drapaka Graham Broda
LFA Pasture Managers:	Dale Glover and Kendra Roberts

Acknowledgements

The success of LARA's programs is a testament to the support and partnerships we have with a number of organizations and individuals within our operational area. LARA would like to thank the following contributors and partners in making 2023 another successful year.

**Alberta Agriculture and Forestry (AF)
Canadian Agricultural Partnership (CAP)
Agriculture and Agri-Food Canada (AAFC)
Alberta Environment and Parks (AEP)**

Municipalities & Counties

MD of Bonnyville
County of St. Paul
Lac La Biche County
Smoky Lake County

Associations & Societies

Farming Smarter
SARDA Ag Research
West Central Forage Association
Peace County Beef and Forage Association
FarmRite
North Peace Applied Research Association
McKenzie Applied Research Association
Gateway Research Organization
Battle River Research Group
Foothills Forage and Grazing Association
Chinook Applied Research Association
Grey Wooded Forage Association
Craigend Agriculture Society
Alberta Lake Management Society
Moose Lake Watershed Society
Organic Alberta
Canadian Mental Health Association
Food Water Wellness Foundation
Do More Ag

Producers

Guy Brousseau
Sand Springs Ranch
Mary & Michael Carson
Luc Tellier

Industry and Producer Commissions

Results Driven Agriculture Research
Alberta Beef Producers
Alberta Pulse Growers Commission
Alberta Grains
Alberta Canola Producers Commission
Canola Council of Canada
Alberta Beekeepers Commission

Agri-Businesses & Collaborators

AFSC Insurance
St. Paul Municipal Seed Cleaning Plant
Canadian Seed Growers Association
Imperial Seed
Axiom Agronomy
Innotech Alberta
FP Genetics
Nutrien Ag Solutions
SeCan
Canterra Seeds
Alliance Seed
Cover Crops Canada
Bonnyville Municipal Seed Cleaning Plant
Association of AB Seed Cleaning Plants
Top Gro Agro Ltd.
A & L Canada Laboratories
Yaremcio Ag Consulting
Mastin Seeds
Proven Seeds
Solick Seeds Ltd
SeedNet Inc
Fabian Seed Farms
Riddell Seeds Co
Canadian Rockies Hemp Corporation
Lakeland College

And the many, many other suppliers and producers who gave us a great deal of assistance!

Message from the Chair

2023 was an interesting year! It started out very dry and although we did get a fair amount of rain during the summer, it came a little too late to give us the really good hay crops but the rains did help the cereal crops which was a good thing.

Calf prices this fall were at an all time high and it is nice to see that we are finally getting paid for our products. However, with that being said, the price of everything else has gone way up so not sure we are any further ahead.

When fall rolled around the weather was so warm and it was dry. Everyone was able to get their crops all harvested and off the fields. We had a brown Christmas and cattle were still out grazing in the fields and pasture when 2024 rolled around.

Then in January of 2024, Mother Nature reminded us who is truly in charge when we suffered through record breaking cold temperatures!

On behalf of the LARA board of directors we want to thank our LARA staff for all their hard work and for always being ready, willing and able to help producers.

Thank you to the County of St. Paul, the County of Smoky Lake, the MD of Bonnyville and Lac La Biche County for your continued support of LARA.

And last but certainly not least a huge Thank you to RDAR.

I have been on the LARA board for the past ten years and I feel it is time for me to step aside and let another producer rep come forward to serve on the board.

So, with that, I want to say a heartfelt thank you to all the board members I have served with over the past ten years.

Thank you,

Wanda Austin



County of St. Paul Agricultural Service Board 2023

The County of St. Paul Agricultural Service Board would like to recognize LARA and how important they are for all of our local area producers and acreage owners. From Regional Variety Trials to horticulture to drone spraying LARA is a great reference to any of our residents. With their long history helping producers build their farms more environmentally friendly they are also making the Lakeland area better for future generations.

The 2023 season started off dry with most water sources at low to historic low levels. Drought seemed to be a forgone conclusion but then the rain started in June and we ended up with some of the best crops in the province. The fall was dry but by this time we had average to above average yields locked in. The weather was perfect for harvest and most producers got their crops off in timely fashion. The harvest also yielded adequate feed for our cattle and other farm animals. We do have lots to be thankful for in our County.

Smoke plagued us this summer but it was much worse in other areas of the province. Other years this smoke has created problems in delaying the growth of our plants but this year the effects were minimal. Let's hope and pray for more rain and snow for 2024 for all of Alberta.

This year marked the first year the County hired a contractor to mow our roadways. The contractor worked out so well that we are going to tender the mowing out for another two years. There was some time saved which gave us the ability to concentrate more on other projects. The ASB was also merged with the Waste Department and we became known as the Waste and Ag Department. This seemed like a good fit as we were often sharing our resources before this move.

The County is also considering tendering out our roadside spraying for 2024. We are currently seeking bids for about 500 miles of roadway and if the numbers come in we may switch to a contractor for this as well.

The County of St. Paul again checked every canola field for clubroot in 2023. We found 2 positive fields this year on land that had both had positive tests before. The number of positive fields continues to drop which is encouraging and gives us some proof our checking is working.

Our ASB also went through a restructuring in 2023. Up until last year we had all Council sit as ASB members. Thinking we might lose our AG focus we switched to an ASB made up of 3 councillors and 2 local producer reps.

A big thank you to LARA and our local area producers for feeding us all again in 2023!

Keith Kornelsen
Agricultural Fieldman
County of St. Paul



Smoky Lake County Agricultural Service Board 2023 Overview

Agricultural Service Board Act

- Smoky Lake County changed its Agricultural Service Board structure from an all-Council member Board to a mixed Board comprised of Council members and Producers-at-Large.
- Smoky Lake County hosted the 2023 Northeast Regional Agricultural Service Board Conference held at Metis Crossing on October 20, 2023.

Agricultural Pest Act

- 2 Agricultural Pest Inspectors appointed
- 87 fields inspected for Clubroot
- 4 fields surveyed for Blackleg in Canola
- 3 Bertha armyworms locations monitored throughout the County for Alberta Agriculture & Irrigation
- 18 townships surveyed for Grasshoppers on behalf of Alberta Agriculture & Irrigation
- 2 fields sampled for Fusarium Head Blight in wheat
- 3 new pond levelers installed
- 3 repaired/upgraded flow devises
- 9 1080 pills distributed
- 3 Wild Boar call investigated

Weed Control Act

- 2 Seasonal Weed Inspectors Appointed
- 657 weed inspections completed on private land with awareness letters sent to landowners
- 50% of municipal right-of-way's received a herbicide application for brush & noxious weeds
- 2 locations received a combination of herbicide application and hand picking for Prohibited Noxious Hoary Alyssum

- Leafy Spurge biocontrol location was monitored after beetle release in 2022 and successful establishment occurred.
- Weed awareness “WANTED” posted hung at all County truck fills and bulletin boards in the towns, villages, and hamlets.
- Lake lot weed hand picking and weed awareness campaign with AISC factsheets prior to the July long weekend
- All County roads received one ‘shoulder’ mowing pass early in the season and a second mowing pass to the ‘property line’ in the Fall. 3036 total mowing miles in 2023.
- Sat on the Weed Regulatory Advisory Committee with the Province and other stakeholders to complete risk assessments for current regulated weeds.

Soil Conservation Act

- 2 Soil Conservation Inspectors Appointed
- Monitoring for different types of Soil erosion occurs throughout growing season



AGRICULTURAL SERVICE BOARD 2023 REPORT

Prepared by Brennan Scott, Acting Agricultural Fieldman

In 2023, Agriculture Services, a division of the County's Environmental Services Department, delivered quality services to the County's residents and the provincial government. Some of the programs and services offered include gopher control, pest surveys, no spray signage, sale of tree seedlings, agricultural chemical sales, and the Community Garden. Other services offered were roadside vegetation inspection, roadside spraying and roadside mowing.

Agriculture Services is staffed with an Agricultural Fieldman and an Agricultural Equipment Operator on a permanent basis. In the spring and summer seasons, four Pest/Weed Inspectors were hired (previous years had 3 Inspectors), in addition to four Mower Operators (previous years had 3 Mowers) and four Agricultural Labourers.

The Agricultural Service Board, made up of two Councillor members and three Members-at-Large, guide the programs and services offered by the department. The Agricultural Service Board held ten regular meetings in 2023. Members of the board participated in the Regional ASB Conference held at Metis Crossing, St. Paul County.

In 2023, the Agricultural Fieldman worked with the four Pest Inspectors to control pests on County properties and municipal roadsides. 280 inspections were completed throughout the year.

The Ag Equipment Operator worked with the four Mower Operators and four Ag Laborers to control growth of vegetation along municipal roadsides. 2145.49 kms of roadside was mowed in the 2023 season.

On June 27, 2023, the annual Agricultural Appreciation Dinner was hosted at the Bold Centre. The event was attended by approximately 250 people.

Between January 1 and November 28, 2023, agricultural chemicals valued at \$18,340 were used in-house to spray 389.3 km of municipal roads, landfills and transfer stations, gravel pits, the airport field and 108 spot spray sites. Some of the chemicals were used to control gophers at the local airport and the William J. Cadzow Healthcare Centre. 69 jugs of agricultural pesticides were sold to residents for \$18494.

The department distributed 779 tree seedlings for \$4292.89 to residents for planting, compared to the 649 distributed to residents in 2022. Multiple canola fields were surveyed in 2023 for clubroot and blackleg disease. The County participated in the Alberta Agriculture & Forestry (old name) grasshopper surveys. Multiple fields were surveyed for grasshoppers and the data has been submitted to the province.

In 2023, the ASB equipment rental fleet was expanded to include a gas-powered post pounder, rock rake, four squirrel traps and a brush cutter. As of November 30, 2023, 78 residents have rented the ASB equipment for a combined total of 342 days. This has dropped since 2022's rental data (92 residents used the ASB equipment for 342 days). Skunk traps were rented out the most, for a combined total of 109 days in 2023, followed by post pounders (41 days).

The Community Garden, located at Alexander Hamilton Park, received significant improvements in 2023. Groundwork improvements were completed to mitigate flooding issues, the raised beds were all relocated

to the new gravel pad. All 35 ground plots were rented, and only 2 raised beds were not utilized. 2 new water tanks were also purchased and installed to alleviate the demand for water.

The Agricultural Service Board awarded two \$1000 bursaries each to local post-secondary students (Sierra Coy and Andrew Thomas) pursuing environmental programs. Julian and Charmayne Lemay of Plamondon received the 2023 Rural Beautification Award. Councillor Pare and Councillor Borgun, who are both ASB members, presented them with the award. The ASB also sponsored the 2023 Rural Women's Conference and the Lac La Biche District 4H Club Achievement Day. The department continued to support the Lakeland Agricultural Research Association (LARA) financially and in-kind to deliver quality research and extension programs in the County and the region.



Rural Beautification Award Presentation



The construction of the new Agricultural Service Board Chemical Storage Facility has been completed.



M.D. of Bonnyville Year in Review

“It’s supposed to be hard, if it wasn’t hard, everyone would do it”, now doesn’t this summarize our Agriculture industry. Each year has its ups and downs and 2023 was no different. The dry conditions early in the year had producers struggling to source quality and affordable feed for livestock and many wondered if harvest was going to bring low-yielding crops. The weather turned around and it was a smooth harvest with crops yielding above average. Livestock producers in the M.D. of Bonnyville received relief through the 2023 Alberta Drought Livestock Assistant program administered through AFSC. The program provided compensation to breeding producers who altered their usual grazing practices due to drought conditions.

The Shelterbelt program continues to be one of our most successful programs. Residents can purchase a variety of shelterbelt and ornamental tree seedlings at a discounted price. This year’s sale is March 12, 2024 @ 10 am, set a reminder so you don’t miss out.

Oxeye daisy, scentless chamomile, and white cockle continue to be our most prolific weeds. They can cause yield losses in cereal, pulse, forage, and oilseed crops and are hard to control once populations have established. A new noxious weed on our radar is common burdock. Common burdock is a biennial known for its large clinging burs that attach to animals, humans, and vehicles to spread its seed. Our weed inspectors are actively scouting and educating the public to reduce its spread and the establishment of new populations.

Clubroot continues to decrease in the M.D. of Bonnyville. Ten fields were randomly selected for survey, and no positive fields were identified. Grasshoppers and Bertha armyworm survey numbers were low this year. A decrease in reports of crop disease can be attributed to the drier conditions we have experienced in the past couple of years. If the right conditions develop, stay vigilant and scout your fields.

Did you hear the buzz? Producing your own honey is in, and with the recent changes to the M.D. of Bonnyville Land Use Bylaw to include backyard beekeeping the Ag Services department hosted the ABC’s of Bees. Dustin Bajer from Edmonton, AB educated our residents on bee life cycles, beekeeper basics, hive, and pest management.

The coyote and wolf reduction program continued in 2023 and with recent reports of sizable wolf populations and predation, the M.D. increased the bounty on wolves. We continue to conduct rat inspections on behalf of the province and are pleased to report that we are still rat-free. The M.D. has seen a reduction in beavers affecting our roads and infrastructure which can be credited to drier conditions. The Beaver Reduction Program continues to enlist local trappers to assist residents with problem beavers.

Residents can contact the Ag Services department for any questions regarding noxious weeds and pests.

We want to wish all producers a successful upcoming growing season.

Matt and Janice

LARA Research Program Report

2023 was my first year as a full-time employee at LARA! Despite facing some challenges due to my joining in the middle of season, the year was marked by numerous successes. I am grateful to LARA staff who made a particular effort to familiarize me with ongoing research projects. This year plots were grown in the MD of Bonnyville, County of St. Paul, County of Lac La Biche, and Smoky Lake County.

The regional variety and silage trials were key projects for our Cropping and Forage & Livestock Programs this past year. These trials did extremely well and produced stable data to be used by producers. We look forward to growing these trials again in 2024.

I would like to say a huge thank you to everyone who participated in our summer field days, extension events and webinars at LARA. I would like to extend the deepest appreciation to our board of directors and producers for their valuable support and help throughout the year. To our exceptional staff here at LARA; along with the summer students, your hard work and dedication are greatly acknowledged. It's a pleasure working with you all.

I am looking forward to another successful year in 2024!

Momna Farzand

Cropping Agrologist

Lakeland Agricultural Research Association Projects and Activities – 2023

Research and Demonstration Projects

Cropping Program

Regional Variety Trials – Cereals

- Wheat
- Oats
- Triticale
- Barley

Regional Variety Trials – Pulses

- Green Field Peas
- Yellow Field Peas
- Faba Beans

Use of ESN in Spring Cereals

- Wheat and Barley

Forage and Livestock Program

Regional Silage Trials

- Barley
- Triticale
- Wheat
- Oats

Intercropping of Cereal/Pulse/Oilseed Crops

Northern Range Enhancement Project

- Heifer Project

Environmental Program

Riparian Health Assessments

Cover Crops and Soil Health Project

Extension Activities

Workshops, Seminars and Webinars

Living Lab & Soil Health Coffee Shop

On Farm Climate Action

Fund (OFCAF)

Winter Grazing & Soil Health

Forage Species and Selection Webinar

Grabe Brown

Nutrient Management in

Regenerative Agriculture

LARA Research Update and AGM

Winter Grazing for Profit

LandView Drones

Genomic Tools for

Replacement Heifer Selection

No-Till Gardening

Grazing School

St. Paul Summer Field Day

Fort Kent Summer Field Day

Smoky Lake Summer Field Day

Lac La Biche Summer Field Day

Water Well Management

Strategic Weed Management Webinar

Young Farmer Social

Succession Planning

Funding Opportunities

Demonstrations

Solar Watering System

Rancher Researcher Project

A Short Explanation of Various Statistical Terms Used in this Report

Least Significant Difference (LSD):

- Once the data from a test plot has been collected it can be used to calculate the Least Significant Difference (LSD). The LSD tells if one variety (or bushel weight, etc.) is significantly different than the other varieties in a test plot (same environment and soil conditions).
- Example: The LSD for a test plot has been calculated to be 2 bu/acre. If a test variety Ava differs from the other varieties by more than 2 bu/acre then there is a significant yield difference. We can say one variety yields higher than another. If the varieties are within 2 bu/acre then we cannot say the varieties yield differently.

Yield Grouping:

- Once the LSD is determined, each variety is assigned a yield grouping letter (A, B, C, etc.). By using yield grouping letters, we can easily determine which varieties are significantly different. Varieties that share a letter will **NOT** be significantly different, but varieties that **DO NOT** share a letter **WILL** be considered significantly different.
- Example: In this example Bob, and Cora are **not** considered to be significantly different from Ava because they share the Yield Grouping letter A...but David, Evan, Frank and Gary **are** considered to be significantly different from Ava, because they do not have Yield Grouping letter A and therefore, it could be said that Ava has a higher yield than David, Evan, Frank and Gary.

Variety	Yield Grouping
Ava	A
Bob	AB
Cora	AB
David	BC
Evan	CD
Frank	CD
Gary	D

Coefficient of Variability (CV):

- The coefficient of variability (CV) is a measure of the consistency of the data from a plot. A lower CV value means that the data collected from the plot was consistent, which implies that the data collected is reliable and that accurate conclusions/recommendations can be made from these findings. A CV value of less than 20 is considered to be acceptable. The data from any plots that have a CV value of greater than 20 will be discarded to ensure the statistical accuracy of the tests. Discarding plot data that has a CV value of greater than 20 will prevent any skewing of the test results due to inconsistencies in soil quality or unexpected events like droughts or floods.

Bushel Calculation

- All bushels were calculated using 35.2L for volume, and test weight (0.5L) as measured

Cropping Program



Regional Variety Trials

Partners: Alberta Agriculture and Irrigation
Alberta Grains
St. Paul Municipal Seed Cleaning Plant
Agriculture and Agri-Food Canada
Nutrien Ag Solutions
Alberta Seed Processors
Alberta British Columbia Seed Growers
Alberta Oat Growers Association
Results Driven Agriculture Research

Objectives:

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

Background:

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

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

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

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

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

Methodology:

The trials were seeded as a randomized complete block design (RCBD) with four replicates to reduce error at Fort Kent (54° 18' N, 110° 37' W), St Paul (54° 5' N, 111° 15' W) and Smoky Lake (54° 6' N, 112° 38' W). Prior to seeding, soil samples were taken to a depth of 0-6" and 6-12" to determine the nutrient level and pH at A & L Canada Laboratories Inc. London, Ontario. LARA Fabro five row seeder was used for seeding with 9" row spacing. Plots were seeded to a depth of 1-1.5 inches depending on soil conditions and available moisture. The recommended rates of fertilizers were side banded during seeding. The plots measured 1.15 m by 6 m in area.

The trials were sprayed with a 3-point hitch sprayer once during the growing season. Prior to harvesting, the length of each plot was recorded to calculate the harvested area. Harvesting was done using Wintersteiger combine. Each plot was harvested individually, and other yield parameters were recorded accordingly.

Cereal Regional Variety Trials (RVT) contracted to LARA in 2023

Prepared by Sheri Strydhorst, PhD, PAg – ARVAC Regional Variety Trial Coordinator

LARA ran the following RVT trials for the Alberta Regional Variety Advisory Committee (ARVAC) in 2023:

Trial	Location	Data used in Tables
CPSR, SP, SWS	Fort Kent	Yes
CPSR, SP, SWS	St Paul	Yes
CWRS	St Paul	Yes
Barley	St Paul	Yes
Oats	Fort Kent	Yes
Oats	Smoky Lake	Yes
Triticale	St Paul	Yes

ARVAC grants permission to LARA to publish useable data, from single site years, but cautions that single site year data can be misleading and it is highly recommended to refer to compiled RVT data in the Alberta Seed Guide at seed.ab.ca.

Acknowledgement is given to the 2023 RVT funders: Results Driven Agricultural Research (RDAR), Alberta Grains, Alberta Seed Processors, Alberta British Columbia Seed Growers, Alberta Oat Growers Association, and Seed Companies who pay annual entry fees as program entrants.

Results:

RVT Oats, Fort Kent 2023

The yield, height, test weight and thousand kernel weight of RVT oats grown at Fort Kent are presented in table 1.1. These parameters differed significantly among all varieties. We had 12 oats varieties in the trial this year. A total of 7 varieties; CDC Byer (OT3115), CDC Anson, AC Morgan, AAC Anthony (OT7104), AAC Wesley, Kyron and Kalio yielded 10, 8, 6, 4, 2, 2 and 1% higher than the check variety (CS Camden), respectively. Varieties such as., CDC Arborg, Ore Level 48, AAC Neville and Ore BOOST (OT6037) yielded 2, 2, 10, and 11% lower than the check variety. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.1. RVT Oats, Fort Kent 2023.

Variety	Yield (% of CS Camden)		Height		TWT		TKW	
CDC Byer (OT3115)	110%	a	102.0	gh	42.4	ab	45.1	e
CDC ANSON	108%	ab	91.0	j	43.2	a	46.8	cde
AC MORGAN	106%	abc	110.0	c	42.3	ab	50.0	bc
AAC Anthony (OT7104)	104%	abcd	119.0	a	40.6	cd	51.7	abc
AAC WESLEY	102%	abcd	99.7	h	41.2	bc	44.8	e
KYRON	102%	abcd	102.3	fg	41.9	abc	44.1	e
KALIO	101%	abcd	107.3	d	42.4	ab	44.6	e
CS CAMDEN	100%	abcd	106.5	de	42.0	abc	49.7	bcd
CDC ARBORG	98%	bcd	116.3	b	41.9	abc	47.0	cde
ORE LEVEL 48	98%	bcd	104.7	ef	41.5	abc	48.5	bcd
AAC NEVILLE	90%	d	97.0	i	42.9	a	46.4	de
Ore BOOST (OT6037)	89%	d	111.0	c	39.1	d	54.1	a
Average	4173	g/plot	106.0	cm	41.7	lbs/bu	47.7	g/1000 seeds
ANOVA p-value	0.0271*		<.0001		0.0042		<.0001	
CV%	6.37%		1.34%		2.25%		4.16%	

Single site years of data are often an unreliable indicator of variety performance.

For publication in the Alberta Seed Guide, at least six site years over two growing seasons are required prior to reporting yield data.

Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

RVT Oats, Smoky Lake 2023

The yield, height, test weight and thousand kernel weight of RVT oats grown at Smoky Lake are presented in table 1.2. These parameters showed significant variations among all oat varieties grown at this location. All varieties yielded higher than the check cultivar, CS Camden. The highest

yield was obtained for CDC Byer (OT3115) which yielded 14% higher than the check variety. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.2. RVT Oats, Smoky Lake 2023.

Variety	Yield (% of CS Camden)		Height		TWT		TKW	
CDC Byer (OT3115)	114%	a	105.3	de	43.4	ab	43.3	e
AC MORGAN	113%	a	113.7	b	43.7	a	50.7	bc
KALIO	110%	ab	105.3	de	43.0	abc	45.7	de
KYRON	109%	abc	103.7	de	42.5	bc	47.2	cd
CDC ANSON	108%	abc	91.0	f	43.8	a	46.8	de
AAC Anthony (OT7104)	107%	bcd	122.7	a	40.6	d	55.7	a
AAC NEVILLE	106%	bcd	104.0	de	43.8	a	45.7	de
CDC ARBORG	104%	cde	111.0	bc	43.7	a	46.7	de
ORE LEVEL 48	104%	cde	107.0	cd	43.3	ab	46.5	de
OReBoost (OT6037)	103%	de	114.3	b	39.9	d	52.9	ab
AAC WESLEY	102%	de	101.7	e	41.8	c	45.8	de
CS CAMDEN	100%	e	105.7	de	41.8	c	47.1	cd
Average	4695	g/plot	107.1	cm	42.6	lbs/bu	47.8	g/1000 seeds
ANOVA p-value	0.0004		<.0001		<.0001		<.0001	
CV%	3.10%		2.63%		1.64%		4.44%	

Single site years of data are often an unreliable indicator of variety performance.

For publication in the Alberta Seed Guide, at least six site years over two growing seasons are required prior to reporting yield data.

Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

Barley RVT, St Paul 2023

We had 20 barley varieties in the trial this year. The yield, height, test weight and thousand kernel weight of barley RVT grown at Smoky Lake are presented in table 1.3. These parameters varied significantly among 20 barley varieties. A total of 10 varieties; AB Maximizer, CDC Durango, CDC Churchill, AAC Lariat, Ferguson (TR19758), AB Prime, AAC Stockington (TR20270), AB Brewnet, RGT Planet and RGT Asteroid, yielded 15, 8, 7, 7, 7, 6, 3, 2, 2 and 2% higher than the check variety (AAC Synergy), respectively. Varieties such as, CDC Austenson, CDC Copeland, AB Dram, AAC Prairie, Richer, AS Lafleur (CLO10-018,138), AC Metcalfe and AS Manon (CLO11-011,032) yielded 5, 6, 7,8, 10, 11, 13 and 14% lower than the check variety, respectively. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.3. Barley RVT, St. Paul 2023.

Variety	Yield (% of AAC Synergy)		Height		TWT	TKW		
AB MAXIMIZER	115%	a	76.3	cd	52.87	abcde	51.4	ijkl
CDC DURANGO	108%	abcd	74.7	def	53.47	abcd	52.7	fghijk
CDC CHURCHILL	107%	abcd	70.0	ghi	52.63	abcdefg	50.9	jkl
AAC LARIAT	107%	abcd	73.0	defg	52.90	abcde	56.0	abc
Ferguson (TR19758)	107%	abcd	66.7	i	52.60	bcdefg	50.1	l
AB PRIME	106%	bcd	81.0	b	51.47	g	51.9	hijkl
AAC Stockington (TR20270)	103%	cde	75.7	cde	52.93	abcde	55.1	bcde
AB BREWNET	102%	cdef	81.7	b	51.50	g	52.8	fghijk
RGT PLANET	102%	cdef	69.7	ghi	52.13	efg	56.5	ab
RGT ASTEROID	102%	cdef	67.3	i	52.97	abcde	53.5	defghi
AB STANDSWELL	100%	defg	68.3	hi	49.40	h	41.6	m
AAC SYNERGY	100%	defg	76.3	cd	51.93	efg	53.9	cdefgh
CDC AUSTENSON	95%	efghi	73.0	defg	53.77	ab	52.8	fghijk
CDC COPELAND	94%	fghij	74.3	def	52.00	efg	51.9	hijkl
AB DRAM	93%	ghij	79.0	bc	52.77	abcdef	51.9	hijkl
AAC PRAIRIE	92%	ghij	72.3	efg	51.60	fg	51.6	ijkl
RICHER	90%	hij	95.0	a	48.40	h	50.7	kl
AS Lafleur (CLO10-018,138)	89%	hij	71.7	fgh	53.87	a	53.0	efghij
AC METCALFE	87%	ij	75.7	cde	52.23	defg	51.5	ijkl
AS Manon (CLO11-011,032)	86%	j	82.3	b	53.70	abc	58.1	a
Average	3759	g/plot	73.8	cm	52.3	lbs/bu	52.7	g/1000 seeds
ANOVA p-value	<0.0001		<0.0001		<0.0001		<0.0001	
CV%	5.10%		2.97%		1.45%		2.48%	

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Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

CWRS RVT, St Paul 2023

We had 13 CWRS wheat varieties in the trial this year. The yield, height, test weight and thousand kernel weight of CWRS RVT grown at St. Paul are presented in table 1.4. These parameters showed significant variations among 13 CWRS wheat varieties. All varieties grown in this trial yielded lower than the check variety, AAC Brandon. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.4. CWRs RVT, St. Paul 2023.

Variety	Yield (% of AAC Brandon)		Height		TWT		TKW	
AAC BRANDON	100%	a	87.3	abc	67.1	a	45.2	bcde
AAC Walker VB (BW1116)	99%	ab	85.0	c	66.7	ab	43.7	efg
AAC Spike (PT4002)	99%	ab	75.3	d	66.6	ab	40.4	hi
AAC WHITEHEAD VB	96%	abc	87.3	abc	64.6	g	46.1	abcd
AAC DUTTON VB	95%	abcd	86.3	abc	66.1	bcde	40.0	i
AAC VIEWFIELD	94%	bcd	79.0	d	66.7	ab	40.3	hi
DONALDA	92%	dce	89.7	abc	66.1	bcde	41.8	fghi
AAC HOCKLEY	91%	dcef	86.3	abc	66.5	abc	41.7	ghi
AAC HASSLER	90%	def	90.7	a	65.2	fg	42.5	fgh
CDC Envy (PT5003)	89%	def	85.0	c	65.3	efg	46.3	abc
AAC TOMKINS	88%	ef	89.3	abc	65.1	fg	44.0	def
AAC DARBY VB	87%	ef	90.3	ab	65.6	def	40.7	hi
AAC Westking (BW5090)	87%	ef	85.3	bc	66.2	bcd	47.3	ab
Average	3682	g/plot	85.9	cm	66.0	lbs/bu	43.3	g/1000 seeds
ANOVA p-value	<0.0001		<0.0001		<0.0001		<0.0001	
CV%	3.98%		3.60%		0.71%		0.31%	

Single site years of data are often an unreliable indicator of variety performance.

For publication in the Alberta Seed Guide, at least six site years over two growing seasons are required prior to reporting yield data.

Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

Triticale RVT, St Paul 2023

The yield, height, test weight and thousand kernel weight of RVT Triticale grown at St. Paul are presented in table 1.5. We had only two triticale varieties in the trial this year. The yield and test weight differed significantly between varieties. The maximum yield was obtained for Brevis, which yielded 31% more than AB Stampeder. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.5. Triticale RVT, St Paul 2023.

Variety	Yield (% of Brevis)		Height		TWT		TKW	
BREVIS	131%	A	96	A	58.6	A	49.7	A
AB STAMPEDER	100%	B	103	A	55.6	B	51.1	A
Average	2470	g/plot	100	cm	57.1	lbs/bu	50.4	g/1000 seeds
ANOVA p-value	0.0205	**	0.0572	NS	0.0098	***	0.3176	NS
CV%	4.76%		2.05%		0.64%		2.60%	

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Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

CPSR/SWS/SP RVT - Fort Kent 2023

We had 10 CPSR/SWS/SP wheat varieties in the trial this year. The yield, height, test weight and thousand kernel weight for CPSR/SWS/SP RVT grown at Fort Kent are presented in table 1.5. These parameters differed significantly among 10 CPSR/SWS/SP wheat varieties grown in this trial. A total of 8 varieties; Alotta (GP250), AAC Rimbey VB, Pasteur, AAC Perform, AAC Westlock, AC Andrew, AAC Penhold and AAC Goodwin yielded 28, 15, 10, 10 8, 7, 2 and 1% higher than the check variety (AAC Brandon), respectively. The only variety which yielded lower than the check variety was UA Forefront. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.5. CPSR/SWS/SP RVT - Fort Kent 2023.

Class	Variety	Yield (% of AAC Brandon)		Height		TWT		TKW g/1000 seeds	
SP	ALOTTA (GP250)	128%	a	79.3	de	61.4	bc	46.2	a
CPSR	AAC RIMBEY VB	115%	bc	81.0	cde	62.1	ab	41.5	bc
SP	PASTEUR	110%	bcd	82.3	bcd	60.3	cd	35.0	e
CPSR	AAC PERFORM	110%	bcd	85.0	ab	60.4	cd	36.8	de
CPSR	AAC WESTLOCK	108%	bcd	86.0	a	62.5	ab	42.9	ab
SWS	AC ANDREW	107%	cd	78.7	e	59.5	de	38.7	cd
CPSR	AAC PENHOLD	102%	d	69.3	g	62.6	a	42.8	ab
CPSR	AAC GOODWIN	101%	de	77.7	e	63.3	a	37.7	de
CWRS	AAC BRANDON	100%	de	82.3	bcd	63.3	a	39.0	cd
CPSR	UA FOREFRONT	89%	e	77.7	e	60.7	c	43.4	ab
	Average	3603	g/plot	79.5	cm	61.5	lbs/bu	39.6	g/1000 seeds
	ANOVA p- value	0.0002		<0.0001		<0.0001		<0.0001	
	CV%	6.56%		2.71%		1.12%		5.46%	

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Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

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Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

CPSR/SWS/SP RVT – St. Paul 2023

The yield, height, test weight and thousand kernel weight of CPSR/SWS/SP RVT grown at St. Paul are presented in table 1.6. These parameters showed significant variations among 10 CPSR/SWS/SP wheat varieties grown in this trial. A total of 6 varieties; AAC Rimbey VB, Pasteur, AAC Perform, AC Andrew, Alotta (GP250) and AAC Goodwin yielded 16, 9, 8, 6, 4 and 3% higher than the check variety (AAC Brandon), respectively. Varieties such as, AAC Penhold, UA Forefront and AAC Westlock yielded 4, 4 and 9% lower than the check variety. More information is available on <https://www.seed.ab.ca/variety-data/cereals/>.

Table 1.6. CPSR/SWS/SP RVT – St. Paul 2023.

Class	Variety	Yield (% of AAC Brandon)		Height		TWT		TKW	
CPSR	AAC RIMBEY VB	116%	b	85.3	bcd	66.5	ab	51.8	ab
SP	PASTEUR	109%	bcd	88.7	ab	65.2	c	44.0	ef
CPSR	AAC PERFORM	108%	bcd	86.0	bcd	66.1	abc	47.8	cd
SWS	AC ANDREW	106%	bcde	87.3	abc	63.9	d	44.6	def
SP	ALOTTA (GP250)	104%	cde	86.3	bcd	63.6	d	55.4	a
CPSR	AAC GOODWIN	103%	cde	84.0	cde	66.8	a	45.1	de
CWRS	AAC BRANDON	100%	def	86.3	bcd	66.8	a	46.3	cde
CPSR	AAC PENHOLD	96%	ef	79.0	f	66.0	abc	52.5	ab
CPSR	UA FOREFRONT	96%	ef	80.3	ef	65.2	c	49.2	bc
CPSR	AAC WESTLOCK	91%	f	86.0	bcd	65.3	c	51.7	ab
	Average	3860	g/plot	84.8	cm	65.5	lbs/bu	47.9	g/1000 seeds
	ANOVA p- value	<.0001		0.0002		<0.0001		<0.0001	
	CV%	5.98%		3.15%		0.97%		4.62%	

Single site years of data are often an unreliable indicator of variety performance.

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Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

Impact of Varying Rates of Environmentally Smart Nitrogen (ESN) on the Performance of Spring Wheat and Spring Barley in Northeastern Alberta

Partners: Kotowich Evergreen Farms
Top Gro Agro Ltd.
County of St. Paul
Municipal District of Bonnyville
Canadian Agricultural Partnership
St. Paul Municipal Seed Cleaning Plant
Results Driven Agriculture Research

Objectives:

1. To determine the impact of utilizing varying rates of Environmentally Smart Nitrogen (ESN) on spring wheat production in Northeastern Alberta.
2. To determine the impact of utilizing varying rates of Environmentally Smart Nitrogen (ESN) on spring barley production in Northeastern Alberta.
3. To determine the economic feasibility of utilizing Environmentally Smart Nitrogen (ESN) in spring wheat production in Northeastern Alberta.
4. To determine the economic feasibility of utilizing Environmentally Smart Nitrogen (ESN) in spring barley production Northeastern Alberta.

Background:

Growth in grain crop yields has been declining in recent years while it is estimated that annual grain crop production will need to increase to around 3 billion tonnes by 2050 to feed a fast-growing human population (FAO 2009). According to the Food and Agriculture Organization (2009), this increase in crop yield will not come from land expansion in developed countries, but ninety percent will be from higher yields and increased cropping intensity.

A large portion of today's current food production numbers is due to the use of commercial fertilizers which consists of Nitrogen (N), Phosphorous (P) and Potassium (K) and Sulphur (S). However, actual N uptake from fertilizer applied to a grain crop is estimated at only around 50%, with the rest lost through environmental events such as volatilization and denitrification. It can be determined that the use of commercial fertilizers will increase in order to meet production demands. The development of effective nutrient (N, P, K and S) management strategies will be key in maintaining and enhancing current grain crop production in Alberta.

The use of enhanced efficiency fertilizers, such as environmentally smart nitrogen or ESN, is one method of reducing N loss during grain crop production. Environmentally smart N is the most widely used slow-release N product on the market for agricultural crops (Walsh & Christiaens, 2014). It is produced through the use of a flexible polymer coating or membrane that protects against loss mechanisms such as volatilization, denitrification or leaching. This coating allows water to imbibe into the granule to create a liquid solution that can then move out of the membrane

based on crop N demands and soil temperature. The ability to match fertilizer use to crop requirements could translate into increased yield and overall cost savings to Alberta producers.

Method:

The trials were conducted in the County of St. Paul, County of Smoky Lake and the MD of Bonnyville in 2020-2022 growing seasons, using a randomized complete block design (RCBD) with four replications to reduce error. Prior to seeding, a soil sample was collected to determine fertility recommendations and a blend fertilizer was side-banded during seeding.

The wheat variety used was AAC Brandon and the barley variety used was CDC Austenson. Five different inclusion rates of ESN as a percent of the total nitrogen in the fertilizer were used: 30%, 50%, 70% and 90%. Additionally, a check plot with no ESN was included for comparison. Prior to harvesting, the length of each plot was recorded to calculate the harvested area. Harvesting was done using Wintersteiger combine. Each plot was harvested individually, and other yield parameters were recorded accordingly.

Results:

The results for the ESN barley and wheat are shown in the tables below. In wheat, the treatment with 90% ESN produced the highest yield and TKW. On the other hand, the wheat that was treated with 70% ESN has the highest height and test weight. In barley, none of the ESN blends provided any yield advantage, though the treatment with 30% and 50% ESN produced the highest height and test weight, respectively. We have not observed any significant effect of different ESN blends applied on wheat and barley in this study. Our results are in agreement with Nelson et al. (2009) and Gao et al. (2015) who did not notice any consistent and exceptional yield advantages of ESN when compared to urea and other conventional N fertilizers. Khakbazan et al. (2013) conducted a multi-year study in western Canada to evaluate the effect of ESN for barley, wheat and canola trials and concluded that occasional yield advantage derived by ESN was not sufficient to offset the cost of fertilizer. In contrast, numerous studies have documented the beneficial impacts of ESN such as., increase in crop yield and decrease in nitrous oxide (N₂O) emission (Sahota, 2020; Halvorson et al., 2013).

Although we did not notice significant effect of different ESN blends in our trials but environment has significant effect on all observed parameters in wheat and barley. The significant effect of environment can be attributed to the variation in soil conditions. We have received less precipitation in St Paul 2022 growing season as compared to Smoky Lake 2021 growing season. But the highest grain yield both in wheat and barley was recorded in St Paul 2022 growing season and the lowest grain yield was observed in Smoky Lake 2021 growing season. Another report has also indicated that less rainfall provided greater yield benefits in ESN trials conducted on winter wheat in North Carolina (Rajkovich et al., 2017).

We conclude that due to the environmental conditions, the ESN blends may not have been fully utilized by the plants, and this may be the reason for the results that were achieved. This information is still valuable to producers and industry stakeholders as it shows how environmental

factors can affect ESN. Also, with the data and information collected over the past three years, producers can compare results and make decisions that are best suited to their operation. This trial was conducted to allow producers to be able to see how varying rates of blended ESN can have an impact on both spring wheat and barley production in Northeastern Alberta.

Table 1.7. Results of analysis of variance (ANOVA) of Treatment (T) and Environment (E) effects and their interaction (T*E) for wheat grain yield, height, TKW and TWT.

Parameter	Treatment	Environment	Treatment*Environment
Yield	NS	***	NS
Height	NS	***	NS
TKW	NS	***	NS
TWT	NS	***	NS

Note: NS: non-significant; Significance codes: 0 '***'

Table 1.8. Effect of different ESN blends on spring wheat grain yield (bu/ac) at St. Paul, Smoky Lake, and Fort Kent, in 2020-2022 growing season.

Treatment	SP-20	SL-21	SP-22	FK-22	Mean	Group
ESN 90%	50.6	37.1	88.7	76.7	63.3	a
Check	46.4	38.2	89.6	78.3	63.1	a
ESN 50%	49.2	33.0	89.4	78.2	62.5	a
ESN 30%	50.6	35.0	90.2	73.8	62.4	a
ESN 70%	49.9	33.3	88.6	77.2	62.3	a
Pr > F	0.92	0.97	0.98	0.85	0.99	
CV = 13.4						

Note: SP-20: St. Paul 2020; SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; FK-22: Fort Kent 2022; Means followed by the same letters are not significantly different from each other.

Table 1.9. Effect of different ESN blends on spring wheat height (cm) at St. Paul, Smoky Lake, and Fort Kent, in 2020-2022 growing season.

Treatment	SP20	SL21	SP22	FK22	Mean	Group
ESN 70%	82.7	57.3	86.0	80.1	76.5	a
ESN 30%	83.3	57.4	84.2	78.7	75.9	a
Check	79.8	60.6	83.1	79.0	75.6	a
ESN 50%	82.7	57.9	84.2	76.8	75.4	a
ESN 90%	77.9	59.3	83.0	81.2	75.3	a
Pr > F	0.27	0.99	0.72	0.56	0.99	
CV = 16.1						

Note: SP-20: St. Paul 2020; SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; FK-22: Fort Kent 2022; Means followed by the same letters are not significantly different from each other.

Table 1.10. Effect of different ESN blends on spring wheat test weight (g/0.5L) at St. Paul, Smoky Lake, and Fort Kent, in 2020-2022 growing season.

Treatment	SP20	SL21	SP22	FK22	Mean	Group
ESN 70%	382.5	398.3	408.0	403.6	398.1	a
ESN 50%	380.2	400.7	409.2	401.9	398.0	a
Check	382.7	397.0	408.7	402.5	397.7	a
ESN 30%	379.3	398.5	406.8	405.2	397.4	a
ESN 90%	378.7	400.4	408.0	402.5	397.4	a
Pr > F	0.60	0.29	0.63	0.12	1	
CV = 2.79						

Note: SP-20: St. Paul 2020; SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; FK-22: Fort Kent 2022; Means followed by the same letters are not significantly different from each other.

Table 1.11. Effect of different ESN blends on spring wheat TKW (g) at St. Paul, Smoky Lake, and Fort Kent, in 2020-2022 growing season.

Treatment	SP20	SL21	SP22	FK22	Mean	Group
ESN 90%	43.7	38.4	40.4	38.8	40.3	a
ESN 50%	43.4	38.1	40.6	38.9	40.3	a
ESN 70%	42.0	38.6	40.0	39.5	40.0	a
ESN 30%	41.7	38.0	40.0	39.6	39.8	a
Check	41.2	37.9	40.4	39.1	39.7	a
Pr > F	0.18	0.96	0.92	0.70	0.87	
CV = 5.17						

Note: SP-20: St. Paul 2020; SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; FK-22: Fort Kent 2022; Means followed by the same letters are not significantly different from each other.

Table 1.12. Mean comparisons of spring wheat grain yield, height, TKW and TWT at St. Paul, Smoky Lake, and Fort Kent, in 2020–2022 growing seasons.

Environment	Yield (bu/ac)		Height (cm)		TKW (g)		TWT (g/0.5L)	
SP-20	49.4	c	81.3	ab	42.4	a	380.7	d
SL-21	35.3	d	58.5	c	38.2	d	399.0	c
SL-22	89.3	a	84.1	a	40.3	b	408.1	a
FK-22	76.8	b	79.1	b	39.2	c	403.1	b

Note: SP-20: St. Paul 2020; SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; FK-22: Fort Kent 2022; Means followed by the same letters are not significantly different from each other.

Table 1.13. Results of analysis of variance (ANOVA) of Treatment (T) and Environment (E) effects and their interaction (T*E) for barley grain yield, height, TKW and TWT.

Parameter	Treatment	Environment	Treatment*Environment
Yield	NS	***	NS
Height	NS	***	NS
TKW	NS	***	NS
TWT	NS	***	*

Note: NS: non-significant; Significance codes: 0 '***'

Table 1.14. Effect of different ESN blends on barley grain yield (bu/ac) at Smoky Lake and St. Paul in 2021-2022 growing season.

Treatment	SL-21	SP-22	Mean	Group
Check	83.8	116.7	100.2	a
ESN 50%	82.0	115.2	98.6	a
ESN 90%	79.2	116.9	98.0	a
ESN 30%	78.8	114.3	96.5	a
ESN 70%	80.8	110.1	95.5	a
Pr > F	0.99	0.69	0.99	
CV = 21.4				

Note: SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; Means followed by the same letters are not significantly different from each other.

Table 1.15. Effect of different ESN blends on barley height (cm) at Smoky Lake and St. Paul in 2021-2022 growing season.

Treatment	SL21	SP22	Mean	Group
ESN 30%	60.6	82.4	71.5	a
ESN 70%	60.2	82.8	71.5	a
Check	59.4	82.3	70.9	a
ESN 90%	60.8	79.9	70.4	a
ESN 50%	52.4	81.3	66.8	a
Pr > F	0.62	0.92	0.96	
CV = 20.0				

Note: SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; Means followed by the same letters are not significantly different from each other.

Table 1.16. Effect of different ESN blends on barley test weight (g/0.5L) at Smoky Lake and St. Paul, in 2021 and 2022 growing seasons.

Treatment	SL21	SP22	Mean	Group
ESN 50%	316.7	333.6	325.2	a
Check	316.3	331.7	324.0	a
ESN 30%	314.3	333.5	323.9	a
ESN 70%	309.1	336.4	322.7	a
ESN 90%	310.3	329.9	320.1	a
Pr > F	0.06	0.06	0.92	
CV = 3.5				

Note: SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; Means followed by the same letters are not significantly different from each other.

Table 1.17. Effect of different ESN blends on barley TKW (g) at Smoky Lake and St. Paul, in 2021 and 2022 growing seasons.

Treatment	SL21	SP22	Mean	Group
Check	51.7	50.9	51.3	a
ESN 30%	51.1	50.6	50.8	a
ESN 90%	51.0	50.3	50.6	a
ESN 70%	49.4	51.9	50.6	a
ESN 50%	49.7	50.7	50.2	a
Pr > F	0.17	0.83	0.82	
CV = 3.5				

Note: SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; Means followed by the same letters are not significantly different from each other.

Table 1.18. Mean comparisons of barley grain yield, height, TKW and TWT at Smoky Lake and St. Paul, in 2021 and 2022 growing seasons.

Environment	Yield (bu/ac)		Height (cm)		TKW (g)		TWT (g/0.5L)	
SL-21	80.9	b	58.7	b	50.6	a	313.3	b
SP-22	114.6	a	81.7	a	50.9	a	333.0	a

Note: SL-21: Smoky Lake 2021; SP-22: St. Paul 2022; Means followed by the same letters are not significantly different from each other.

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Forage and Livestock Program



The producer's resource for forage production, feeding and grazing

The single most variable cost in livestock production is feed! From grazing in summer on tame and native pastures to feeding in the winter through conventional or extended grazing systems to animal marketing, cost effective production begins and ends with forage/feed. This program aims to aid producers in decreasing their cost of production while increasing their value of production.

The goals of this program are to:

- Demonstrate effective winter-feeding systems in Northeastern Alberta
 - Reduce costs associated with winter feeding systems
- Improve crop production efficiency through feed testing, ration-balancing, pasture/grazing management etc.
- Determine the highest yielding and quality annual crops for whole-plant forage production
 - Aid producers in annual and perennial forage selection
- Provide producers with current marketing options and risk management strategies

Lakeland Forage Association

The Lakeland Forage Association (LFA) was formed in 1972 to promote the management and use of forage crops, and to identify and pursue the forage crop research needs of Northeastern Alberta. The LFA provides forage demonstrations, extension activities and coordination of forage research. The governing board of directors currently has 13 members who are elected for staggered three-year terms at the LFA annual general meeting. They are responsible for the management of the Olympic Lake Grazing Lease.

The Olympic Lake Lease was obtained by LFA in 1985, has grown to 2000 acres and has been used for two main projects: the Northern Range Enhancement Project (NREP) and the Olympic Lake Heifer Project.

Under the NREP, this lease was used as a demonstration for turning boreal forest land into an enhanced, sustainable rangeland. Range improvements have included clearing and breaking the land, windrowing, and spraying and burning. This pasture has been rotationally grazed for 20 years (currently there are 12 paddocks) and so fencing was also involved in the range improvements. Grazing capacity has almost doubled in the past 20 years. Now that the pasture has been developed the focus has changed from development to increasing pasture longevity and rejuvenating older pastures. Projects with this goal have included yearly rotation of fertilizer application, spraying weeds (trials have included Grazon, Remedy, and Restore) and introducing legumes into the pastures.

The Heifer Project has been tracing the effect of body weight and body condition on heifer fertility for over ten years. The heifers are weighed at the beginning and the end of the grazing season. These measurements are then compared to the fall pregnancy test results. From 2010 to 2013, the heifers were weighed two additional times, when they are switched from tame pasture to native brush pastures around the end of July and then when they switch from these native pastures back to the tame pastures around mid-September.

LFA would like to thank Dale Glover and Kendra Robers who took over management of the pasture this past year and did a fantastic job!

In addition to managing the Olympic Lake Lease the LFA acts as the forage and livestock advisory board for Lakeland Agricultural Research Association (LARA).

Northern Range Enhancement Project

Partners: Lakeland Forage Association
Lac La Biche County
Dale Glover and Kendra Roberts

Objectives:

1. To monitor the weight of heifers entering and exiting the pasture.
2. To evaluate methods of pasture rejuvenation.
3. To develop a complimentary grazing system, allowing for maximum utilization of tame and native species.

Background:

The Lakeland Forage Association (LFA) obtained Grazing Lease N. 840055 from the provincial government in 1985. The lease is located in Lac La Biche County near Olympic Lake (NE17-64-14) and was originally 1500 acres. A second lease was obtained by LFA to increase the pasture to 2000 acres. At the time the lease was obtained, the pasture had not been grazed for 15 years and no formal range improvement had taken place.

The LFA has used the Olympic Lake Grazing Lease as a demonstration for turning boreal forest land into an enhanced sustainable rangeland. Four different treatments have been used to increase carrying capacity: 1) clear and break, 2) spray and burn, 3) windrowing and 4) fertilizing. Rotational grazing has been practiced for the past 20 years and management improvements, such as cross-fencing, fertilizing and spraying, have been utilized to increase carrying capacity. The pasture has gone from carrying 998 Animal Unit Months (AUMs) in 1990 to 1607 in 2006. In 2010 1130 AUM's were grazed on the pasture, allowing some recovery from the drought in 2009. The cattle are rotated through the paddocks in a high intensity, low frequency grazing system.

Now that the pasture has been developed the focus has changed to increasing pasture longevity and pasture rejuvenation. Similar to other pastures in Northeastern Alberta, aspen encroachment and old pastures are a problem.

Every year approximately 11 patrons are given allotments for up to 30 heifers and one bull. The grazing season typically runs from mid-June to early-mid October.

In 2023, there was one project at the Olympic Lake Grazing Lease.

1. Heifer project

Heifer Project

Methods:

The heifers were weighed when they entered the pasture on June 7th, 2023. The Bulls were pulled on August 30th, 2023, allowing for a 60-day breeding period. At this time the heifers were weighed for a second time. The heifers were removed from the pasture on October 1st, 2023 allowing for adequate grass carryover for the 2024 grazing season. The heifers were weighed for a third and

final time during the heifer take-out day in October. Similar to previous years the heifers were not pregnancy checked. The Pasture received a total of 15 inches of rain over the grazing season.

Results:

There was a total of 116 days in the grazing season at Olympic Lake Grazing Lease (Table 1). The average daily gain (ADG) over the grazing season was 1.04lbs/day.

Table 1. Grazing rotation for the 2023 grazing season at Olympic Lake Grazing Lease.

Paddock Name	First Graze					Second/Third Graze				
	Date In	Date Out	# of days	# of head		Date In	Date Out	# of days	# of head	
				heifers	bulls				heifers	bulls
Headquarters	07-Jun-23	08-Jun-23	1	362	12	10-Aug-23	11-Aug-23	1	362	12
Headquarters						30-Sep-23	01-Oct-23	1	362	0
W3	16-Jun-23	20-Jun-23	4	362	12	21-Jul-23	26-Jul-23	5	362	12
W3						07-Sep-23	12-Sep-23	5	362	0
W5	20-Jun-23	26-Jun-23	6	362	12	26-Jul-23	31-Jul-23	5	362	12
W5						02-Sep-23	07-Sep-23	5	362	0
W1						28-Aug-23	30-Aug-23	2	362	0
W1	12-Jun-23	13-Jun-23	1	362	12	05-Aug-23	08-Aug-23	3	362	12
W2	13-Jun-23	16-Jun-23	3	362	12	02-Aug-23	05-Aug-23	3	362	12
W2						30-Aug-23	01-Sep-23	2	362	0
W4	11-Jun-23	12-Jun-23	1	362	12	31-Jul-23	02-Aug-23	2	362	12
W4						01-Sep-23	02-Sep-23	1	362	0
PIPELINE	08-Jun-23	11-Jun-23	3	362	12					
C3	05-Jul-23	11-Jul-23	6	362	12	11-Aug-23	14-Aug-23	3	362	0
						12-Sep-23	16-Sep-23	4	362	0
C1	01-Jul-23	05-Jul-23	4	362	12	08-Aug-23	10-Aug-23	2	362	0
C2	26-Jun-23	01-Jul-23	6	362	12	23-Sep-23	30-Sep-23	7	362	0
C4	19-Jul-23	21-Jul-23	2	362	12	22-Sep-23	23-Sep-23	1	362	0
S1	11-Jul-23	19-Jul-23	8	362	12	16-Sep-23	22-Sep-23	6	362	0
E1	14-Aug-23	28-Aug-23	14	362	0					
		Total:	58				Total:	58		



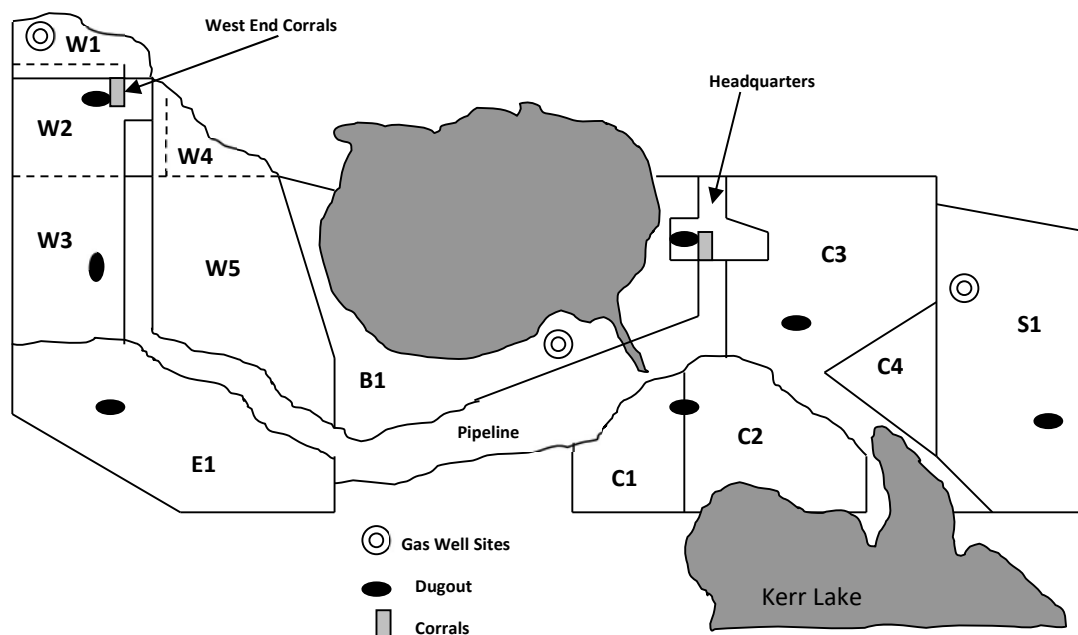


Figure 1. Map of the Northern Range Enhancement Project (NREP) pasture system.

Discussion:

There was a total of 11 patrons grazing cattle at Olympic Lake in 2023 with herd size ranging from 30 heifers and 1 bull to 60 heifers and 2 bulls in partnerships. All red or black angus heifer bulls were used for breeding between June 7th, 2023 and August 10th, 2023.

The average herd entry weight at 816 lbs in 2023, 17 pounds more than the 799 lb entry weight in 2022. The average daily gain (ADG) throughout the season was 1.04 lbs/day. The stocking rate at the Olympic Lake Lease has slowly declined since 2009, which has allowed for significant recovery and improvement of the pasture.

The pasture received a total of 15 inches of rain in 2023, allowed for excellent pasture growth and carry-over for the 2024 grazing season.

Regional Annual Silage Trials

Partners: Alberta Agriculture and Irrigation
Battle River Research Group
Chinook Applied Research Association
Gateway Research Organization
North Peace Applied Research Association
McKenzie Applied Research Association
West-Central Forage Association
SECAN
Association of Albert Co-op Seed Cleaning Plants
Alberta Brand, Canadian Seed Growers Association
A & L Canada Laboratories
Imperial Seeds

The Annual Forage Trial (AFTs) began at LARA in 2008 with the purpose of comparing annual forage crops for whole-plant production when considering both yield and quality. Funding was obtained from the Alberta Beef Producers and the Ag and Food Council. The trial was seeded in four blocks of plots (barley, oats, triticale and alternatives) in three locations (Fort Kent, St. Paul and Lac La Biche).

The trial was expanded in 2009 to form the Regional Silage Trials, a provincial partnership between six applied research and forage associations with 11 plot sites across the province. The Alberta Beef Producers provided funding for this initiative and Alberta Agriculture helped coordinate seed. While many of the associations involved have been growing silage trials for a number of years, this is the first coordinated effort to standardize the protocol, variety selection and data reporting. Provincial protocol was established for five blocks of plots: barley, oats, triticale, pulse and late-seeded.

In 2023, the LARA Regional Annual Silage Trial included three blocks: barley (15 varieties), oats (7 varieties), and triticale/wheat (5 varieties).

In partnership with the Association of Alberta Co-op Seed Cleaning Plants and the Alberta Seed Growers Association, the Regional Annual Silage Trial information is annually printed in the Alberta's Seed Guide (seed.ab.ca). The Regional Silage Trial data for 2022 and 2023 have been printed in the most recent seed guide.

Regional Annual Silage Trial

Cereals

Partners: Sustainable Canadian Agriculture Partnership
Alberta Agriculture and Irrigation
Battle River Research Group
Chinook Applied Research Association
Gateway Research Organization
West-Central Forage Association
Peace Country Beef and Forage Association
Guy Brousseau

Objectives:

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

Background:

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

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

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

Method:

The silage trials were grown in three blocks of plots: barley, oats and triticale/wheat, in St. Paul. The trial blocks were seeded as a randomized complete block design (RCBD) with four replicates to reduce error. The plots measured 1.15 m by 6 m in area.

Agronomic information on the trials can be found in Table 2.1. The trials were seeded using the LARA five-row zero-till small plot drill and blend fertilizer was side-banded at the time of seeding. The trials were sprayed with a 3-point hitch sprayer once during the growing season.

Crop height and stage of maturity was recorded prior to harvest with the LARA alfalfa-Omega self-propelled forage harvester. The total plot weight was recorded and samples were taken to assess dry matter content. Additional composite samples were taken from each variety, frozen and sent to A & L Canada Laboratories for wet chemistry analysis.

The following varieties were grown in the Regional Annual Silage Trials in 2023:

Barley

- *CDC Austenson* – 2-row barley variety with semi-smooth awns, short and strong straw and high feed yield.
- *AB Standswell* – 6-row barley variety with high grain and forage yield.
- *AAC LARIAT* – 2-row hulled barley with excellent yield potential and good standability.
- *AB Maximizer* – 2-row hulled barley with good potential for forage production.
- *CANTU* – 2-row barley variety with excellent yield potential and good standability.
- *Bighorn* – 2-row feed barley variety with excellent yield potential.
- *CDC Durango* – 2-row barley variety with excellent grain yield and good agronomic performance.
- *AB Hauge* – 2-row hulled general purpose barley with potential for forage production, high protein, low NDF and ADF.
- *CDC Churchill* – high yielding 2-row malt barley variety with lower grain protein than AC Metcalfe and an overall excellent agronomic package.
- *AB Prime* – barley variety developed in Alberta.
- *Esma* – 2-row barley variety with strong yields and agronomic package.
- *Stockford* – hooded, 2-row barley variety suitable for grain production, hay, and forage.
- *CDC Renegade* – 2-row smooth awn, mid-height barley with excellent forage yield and great grain yield.
- *CDC Fraser* – 2-row malt variety that is multi-use with high grain and good forage yields.
- *KWS Kellie* – very short, strong strawed 2-row European barley with excellent grain yield.

Oats

- *CDC Baler* – very leafy, forage oat variety.
- *CS Camden* – milling oat, excellent yield potential, great lodging resistance, short height, and big leaf biomass
- *CDC Arborg* – is a milling oat with good yield potential, early maturing, lodge resistant.
- *Ore BOOST (OT6037)* – light yellow hulled oat variety with excellent yield potential.
- *AAC WESLEY* – white hulled oat variety with good yield potential, early maturity and reduced height.
- *CDC Endure* – oat variety with excellent yield and standability.

- *AAC Douglas* - is a high β -glucan white hulled milling oat with high grain yield potential and excellent groat percentage.

Triticale and Wheat

- *AAC Paramount* – soft white spring wheat, midge tolerant, high grain protein, good fit for silage production
- *AB Stampeder* – new spring forage triticale variety with reduced awns, shorter stature and increased digestibility.
- *Alotta* – high yielding special purpose spring wheat with rust tolerance.
- *AC Sadash* – semi-dwarf soft white spring wheat variety with high yields, high quality and short, strong straw.
- *KWS Alderon* – high yielding special purpose red spring wheat, short stature, strong straw, late maturing, no awns, does well in cooler growing seasons.

Table 2.1. Agronomic Information 2023.

		# of	Seeding	Seeding	Fertility	Weed	Harvest	Accumulated
Trial	Site	Varieties	Date	Rate	(lbs/ac)	Control	Date	Precipitation
Barley	St. Paul	15	30-May-22	28 plants/ sq ft	92-34-69	Buctril M	16-Aug-23	173 mm
Oats	St. Paul	7	30-May-22	28 plants/sq ft	88-28--61	Buctril M	08-Aug-23	156 mm
Wheat/Triticale	St. Paul	5	30-May-22	33-35 plants/ sq ft	117-68-118	Buctril M	28-Aug-23	223 mm

Results:

Barley

The barley trials are aimed to be harvested at the soft dough stage. This year, we only had one barley site, which was in St. Paul County. We had a total of 15 barley varieties grown in the trails at this location. There were 6 new barley varieties (6- row; AB Standswell and 2-row; AAC Lariat, AB Maximizer, Cantu, Bighorn and CDC Durango) added to the trial this year. The trial was harvested at 76 days after seeding. We found significant differences among varieties when considering forage dry matter yield as % of check, Austenson (Table 2.2). A total of 9 varieties; CDC Durango, CDC Churchill, CDC Renegade, Bighorn, AB Hague, Cantu, KWS Kellie, AB Prime and AB Maximizer yielded 21, 19, 16, 15, 13, 8, 7, 7 and 5% higher than the check variety, respectively. Varieties such as., Stockford, AAC Lariat, Esma, CDC Fraser and AB Standswell yielded 1, 1, 8, 10 and 21% lower than the check variety, respectively.

For crude protein (CP), the general rule of thumb is 7-9-11 % for mid gestation, late gestation and after calving. Most of the varieties had CP content between 7-9%, adequate to meet the nutrient requirements from mid gestation to late gestation. Total digestible nutrients (TDN), which is the easiest method to estimate the amount of energy in the feed, was adequate to meet the nutritional requirements until late gestation, following the rules of 55-60-65. More information is available on <https://www.seed.ab.ca/variety-data/silage/>.



Table. 2.2. Barley RST, 2023.

Variety:	2023 Quality Results											
	DM Yield (% of Austenson)	CP (% DM)	ADF (% DM)	NDF (% DM)	TDN (% DM)	Starch (% DM)	WSCs (% DM)	IVTD-30hrs (% DM)	Ca (% DM)	P (% DM)	K (% DM)	Mg (% DM)
CDC DURANGO	121% a	7.7 de	35.6 a	47.7 a	60.6 a	21.6 a	7.8 a	65.4 a	0.51 abcd	0.26 a	2.97 a	0.31 a
CDC CHURCHILL	119% ab	7.6 de	35.1 a	47.8 a	61.1 a	21.2 a	7.6 a	66.6 a	0.50 bcde	0.26 a	2.80 a	0.29 a
CDC RENEGADE	116% ab	8.7 ab	33.8 a	47.3 a	62.5 a	18.4 a	11.2 a	69.6 a	0.54 ab	0.26 a	2.46 a	0.30 a
BIGHORN	115% abc	7.6 de	34.2 a	45.5 a	62.1 a	24.4 a	7.4 a	68.6 a	0.45 f	0.27 a	2.96 a	0.30 a
AB HAGUE	113% bcd	8.6 ab	34.1 a	48.8 a	62.2 a	21.0 a	8.0 a	67.9 a	0.50 bcdef	0.26 a	2.40 a	0.26 a
CANTU	108% cde	7.9 cde	34.0 a	43.4 a	62.3 a	25.3 a	7.5 a	70.0 a	0.46 ef	0.27 a	3.22 a	0.31 a
KWS KELLIE	107% cdef	8.5 abc	33.9 a	44.2 a	62.4 a	22.8 a	9.0 a	69.4 a	0.53 ab	0.26 a	2.80 a	0.30 a
AB PRIME	107% def	8.1 bcde	36.2 a	51.6 a	59.9 a	18.6 a	7.1 a	65.2 a	0.51 abcd	0.26 a	2.77 a	0.26 a
AB MAXIMIZER	105% efg	8.2 bcde	34.5 a	48.1 a	61.8 a	21.6 a	7.7 a	68.6 a	0.47 def	0.27 a	2.74 a	0.28 a
CDC AUSTENSON	100% fg	8.2 bcde	35.9 a	48.7 a	60.3 a	20.3 a	5.9 a	64.1 a	0.50 bcdef	0.27 a	3.21 a	0.31 a
STOCKFORD	99% g	8.9 a	34.4 a	47.5 a	61.9 a	19.2 a	8.8 a	69.2 a	0.55 a	0.27 a	2.96 a	0.30 a
AAC LARIAT	99% g	7.7 de	34.9 a	46.4 a	61.4 a	21.8 a	7.8 a	66.8 a	0.52 abc	0.26 a	2.86 a	0.29 a
ESMA	92% h	8.3 abcd	34.2 a	45.3 a	62.1 a	23.4 a	7.8 a	68.0 a	0.51 abcd	0.26 a	2.70 a	0.29 a
CDC FRASER	90% h	8.0 bcde	36.3 a	51.2 a	59.9 a	19.4 a	6.7 a	64.2 a	0.51 abcde	0.27 a	2.81 a	0.30 a
AB STANDSWELL	79% i	7.6 e	34.3 a	44.3 a	62.0 a	26.0 a	6.3 a	67.3 a	0.49 cdef	0.26 a	2.94 a	0.29 a
Average	13538	8.1	34.8	47.2	61.5	21.7	7.8	67.4	0.50	0.26	2.84	0.29
ANOVA	<.0001	0.0044	0.4496	0.3414	0.4497	0.0655 NS	0.0746	0.2771	0.0046	0.1641	0.5497	0.3254
p-value	***	***	NS	NS	NS	NS	NS	NS	***	NS	NS	NS
CV%	4.25%	5.03%	4.21%	8.15%	2.54%	13.45%	20.39%	4.43%	5.23%	3.18%	14.35%	8.78%

For publication in the Alberta Seed Guide, at least six site years over two growing seasons are required prior to reporting yield data.

Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

Oats

The oats trials are aimed to be harvested at the milk stage. We had a total of 7 oats varieties grown in the trial this year in St Paul. There were 2 new varieties, ORe BOOST (OT6037) and AAC Wesley, added to the trials this year. The trial was harvested 68 days after seeding.

We found significant differences among varieties when considering forage dry matter yield as % of check, CDC Baler (Table 2.3). All varieties in this trial yielded lower than the check variety. The average CP and TDN contents in the 2023 oat variety trials were 9.8 and 60.0%, respectively. Majority of the varieties grown had CP and TDN contents sufficient to meet requirements until late gestation. More information is available on <https://www.seed.ab.ca/variety-data/silage/>.



Table. 2.3. Oats RST, 2023.

Variety:	2023 Quality Results											
	DM Yield (% of CDC Baler)	CP (% DM)	ADF (% DM)	NDF (% DM)	TDN (%)	Starch (% DM)	WSCs (% DM)	IVTD-30hrs (% DM)	Ca (% DM)	P (% DM)	K (% DM)	Mg (% DM)
CDC BALER	100% a	9.6 a	37.84 a	65.1 a	58.2 d	6.8 e	13.6 a	65.3 bc	0.44 c	0.20 a	1.10 a	0.18 b
CDC ENDURE	91% b	10.4 a	36.71 ab	63.9 a	59.4 cd	10.1 cd	7.3 c	64.8 bc	0.49 ab	0.22 a	1.10 a	0.20 ab
AAC WESLEY	78% c	9.4 a	34.08 d	56.0 b	62.2 a	14.6 a	9.7 bc	70.1 a	0.50 a	0.23 a	1.38 a	0.23 a
CDC ARBORG	77% c	9.6 a	37.04 ab	60.6 ab	59.1 cd	12.3 b	8.7 bc	64.6 bc	0.51 a	0.22 a	1.47 a	0.21 a
ORe BOOST (OT6037)	73% c	10.0 a	37.30 ab	63.9 a	58.8 cd	9.4 d	7.1 c	63.3 c	0.50 a	0.21 a	1.12 a	0.20 ab
AAC DOUGLAS	61% d	9.4 a	34.52 cd	58.4 b	61.8 ab	12.0 bc	13.2 a	70.0 a	0.45 bc	0.22 a	1.02 a	0.22 a
CS CAMDEN	53% e	10.0 a	35.87 bc	60.3 ab	60.3 bc	10.7 bcd	11.2 ab	67.3 ab	0.51 a	0.22 a	1.00 a	0.22 a
Average	12549	9.8 a	36.2	61.2	60.0	10.8	10.1	66.5	0.49	0.22	1.17	0.21
ANOVA	<.0001	0.5568	0.0037	0.0213	0.0037	0.0001	0.0036	0.0037	0.0309	0.4122	0.5969	0.0442
p-value	***	NS	**	*	**	*	**	**	*	NS	NS	*
CV%	5.06%	7.08%	2.75%	4.76%	1.77%	10.99%	18.18%	2.86%	5.69%	6.52%	30.08%	7.06%

Single site years of data are often an unreliable indicator of variety performance.

For publication in the Alberta Seed Guide, at least six site years over two growing seasons are required prior to reporting yield data.

Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

Triticale and Wheat

The triticale and wheat trials are targeted to be harvested at the late milk stage. This year, the triticale and wheat silage variety trials were in St. Paul County. There were 4 wheat varieties and 1 triticale variety in the trial. Alotta was a new variety that was included in the silage trail this year. The results can be found in Table. 2.4. Harvest occurred 88 days after seeding. We found significant differences among varieties when considering forage dry matter yield as % of check, AC Sadash (Table 2.4). All varieties in this trial yielded higher than the check variety.

The average CP and TDN in the 2023 trials were 8.0 and 60.6%, respectively. Most of the varieties grown in the trials had CP and TDN contents adequate to meet nutritional requirement for mid gestation to late gestation but not for post calving. More information is available on <https://www.seed.ab.ca/variety-data/silage/>.



Table. 2.4. RST Wheat and Triticale, 2023.

2023 Quality Results												
Variety:	DM Yield (% Sadash)	CP (% DM)	ADF (% DM)	NDF (% DM)	TDN (% DM)	Starch (% DM)	WSCs (% DM)	IVTD-30 hrs (% DM)	Ca (% DM)	P (% DM)	K (% DM)	Mg (% DM)
ALOTTA	131% a	9.2 a	34.7 b	47.7 bc	61.5 a	19.5 bc	10.0 a	65.8 a	0.52 a	0.26 b	2.32 a	0.26 a
KWS ALDERON	131% a	9.1 a	34.5 b	48.3 bc	61.8 a	21.5 b	7.2 a	64.7 ab	0.51 ab	0.28 a	2.77 a	0.27 a
AAC PARAMOUNT	122% b	7.4 b	36.7 a	53.4 ab	59.5 b	20.8 b	5.8 a	60.6 c	0.43 d	0.27 ab	2.39 a	0.24 a
AB STAMPEDER	115% b	7.6 b	37.9 a	56.3 a	58.1 b	16.7 c	8.2 a	59.2 c	0.48 abc	0.24 c	2.25 a	0.24 a
AC SADASH	100% c	7.3 b	33.4 b	43.3 c	63.0 a	26.3 a	7.9 a	66.6 a	0.46 bcd	0.27 b	2.16 a	0.28 a
Average	18990	8.0	35.6	50.0	60.6	21.1	7.7	63.1	0.47	0.26	2.39	0.26
ANOVA	<.0001	0.0010	0.0004	0.0187	0.0004	0.0078	0.0861	0.0043	0.0106	0.0003	0.2100	0.0945
p-value	***	***	***	*	***	**	NS	**	*	**	NS	NS
CV%	3.63%	6.46%	2.28%	7.40%	1.43%	10.46%	18.59%	3.07%	5.81%	2.50%	11.65%	7.14%

Single site years of data are often an unreliable indicator of variety performance.

For publication in the Alberta Seed Guide, at least six site years over two growing seasons are required prior to reporting yield data.

Please reference the January 2024 - Alberta Seed Guide for multi-site year data.

Values followed by different letters (i.e., a,b,c) are statistically different.

Values followed by the same letter are NOT statistically different (i.e., a = ab, or abc = bc).

ANOVA p-value indicates statistical significance. If the p-value is less than 0.05, then there are significant differences in the described trait.

i.e., ANOVA p-value of <0.0001 for yield means that at least one variety has a statistically different yield.

i.e., ANOVA p-value of > 0.05 means there are no statistical differences in the trait between any of the varieties.

Intercropping of Cereal/Pulse/Oilseed Crops for Forage Production

Partners: Craigend Agriculture and Recreation Society
 Lac La Biche County

Objectives:

1. To evaluate the performance of different intercrop arrangements with cereal/pulse/oilseed crops for forage yield.
2. To evaluate the performance of different intercrop arrangements with cereal/pulse/oilseed crops for forage nutritional quality.

Background:

Intercropping is a popular farming practice to introduce diversity into cropping systems. Species mixtures with some degree of genotypic heterogeneity among plants could provide several advantages over monocropping systems. Some observed advantages include; higher yield, weed suppression, disease reduction, greater utilization of resources, and soil protection (Homulle et al., 2021). The production of high-yielding and high-quality forage has been a big challenge for Alberta livestock producers. Energy and protein are the topmost factors to enhance the reproductive efficiency of cattle (Bindari et al., 2013). In forage production, growing species mixtures may be a viable option to improve the overall fibre and crude protein (CP) content of a blend. Currently, there is an emerging trend to incorporate leguminous crops into the intercropping system because leguminous crops can naturally introduce nitrogen (N) to the system by forming symbiotic relationships with arbuscular mycorrhizal fungi and N-fixing bacteria and reduce the input of synthetic N fertilizers. Furthermore, including leguminous species into a forage mixture could also increase the crude protein (CP) content of a blend. Thus, the purpose of this trial was to determine the most beneficial crop combinations in terms of forage yield and nutritional quality.

The following combinations were used in this trial.

1. Barley-Red Lentil
2. Wheat-Lentil-Canola
3. Wheat-Faba bean
4. Oats-Pea
5. Flax-Oats-Buckwheat
6. Barley-Pea
7. Canola-Pea
8. Flax-Green Lentil
9. Canola-Lentil

Method:

The trial was seeded at our Lac La Biche site on June 06, 2023, in a randomized complete block design (RCBD) with three replicates to reduce error. The plots were seeded using the LARA five row Fabro zero-till drill to a depth of 1-1.25 inches. Soil tests were taken in the spring and a blend fertilizer (80-30-30-10) was side banded during seeding.

Prior to harvesting, the length of each plot was recorded to calculate the harvested area. On September 11, 2023, harvesting was done using LARA alfalfa-Omega self-propelled forage harvester and the total plot weight was recorded immediately. For each treatment plot, a 0.5m long strip from the three inner rows will be hand cut and chopped into 1" long pieces. The wet samples were frozen immediately and sent to A & L Canada Laboratories Inc. for quality analysis. Statistical analysis of the data was conducted using R statistical software.

Results:

The yield and quality results from the trial are summarized in Table 2.5. The highest yielding combination was Barley-Red Lentil at 4.2 tons/ac and lowest yielding combination was Pea-Canola at 2.1 tons/ac. The other combinations such as., Wheat-Lentil-Canola, Wheat-Faba bean, Oats-Pea, Flax-Oats-Buckwheat, Barley-Pea, Canola-Pea, and Flax-Green Lentil yielded 3.9, 3.6, 3.5, 3.1, 2.8 and 2.6 ton/ac, respectively. The highest CP and TDN were recorded for Wheat-Faba bean at 11 and 66.6%, respectively. These CP and TDN contents were adequate to meet the nutritional requirements for mid gestation to post calving. Another study indicated that faba bean intercropped with wheat resulted into high forage quality (CP and NDF concentrations) when compared to wheat in monocrop (Ghanbari & Lee, 2003).

We can conclude that Wheat-Faba bean is a suitable forage mixture from a nutritional quality perspective. On the other hand, Barley-Red Lentil combination could give high forage yield but has a low nutritional profile.

References:

- Bindari, Y. R., Shrestha, S., Shrestha, N., & Gaire, T. N. (2013). Effects of nutrition on reproduction-A review. *Advances in Applied Science Research*, 4(1), 421-429.
- Ghanbari-Bonjar, A., & Lee, H. C. (2003). Intercropped wheat (*Triticum aestivum* L.) and bean (*Vicia faba* L.) as a whole-crop forage: effect of harvest time on forage yield and quality. *Grass and forage science*, 58(1), 28-36.
- Homulle, Z., George, T. S., & Karley, A. J. (2021). Root traits with team benefits: understanding belowground interactions in intercropping systems. *Plant and Soil*, 1-26.

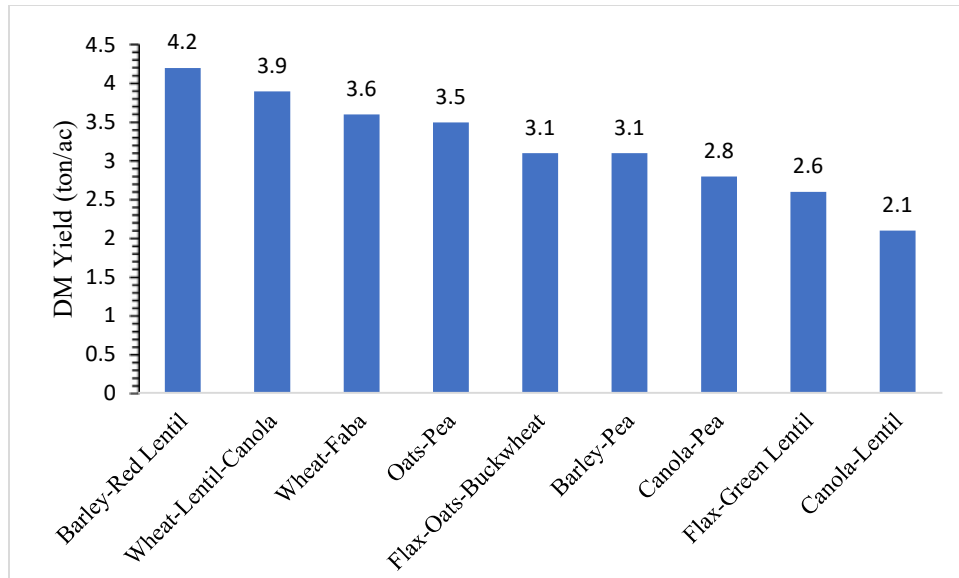


Figure 2.1. Intercrops forage dry matter yield, 2023 (ton/ac, 1 ton = 2000 lbs).

Table. 2.5. Intercrops forage dry matter yield (ton/ac) and nutritional value.

Treatment	Quality Results									
	Yield		CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca	P	K	Mg
Barley-Red Lentil	4.2	a	6.8	38.6	51.9	58.8	0.4	0.2	1.2	0.1
Wheat-Lentil-Canola	3.9	ab	9.9	39.1	51.7	58.4	0.3	0.2	1.4	0.2
Wheat-Faba bean	3.6	ab	11.0	28.7	42.8	66.6	0.3	0.2	1.5	0.2
Oats-Pea	3.5	bc	6.8	39.1	59.4	58.4	0.7	0.1	1.9	0.2
Flax-Oats-Buckwheat	3.1	bcd	7.8	43.8	55.3	54.8	0.7	0.2	2.0	0.2
Barley-Pea	3.1	bcd	6.4	41.0	63.1	57.0	0.8	0.1	1.7	0.1
Canola-Pea	2.8	cd	8.3	36.4	51.2	60.5	1.2	0.2	1.7	0.2
Flax-Green Lentil	2.6	de	7.4	47.1	56.6	52.2	0.7	0.3	1.5	0.3
Canola-Lentil	2.1	e	8.0	38.1	56.7	59.3	1.6	0.3	1.6	0.3
CV = 14.8										

Forage Crop Guidelines and Forage Analysis Summary

The single largest variable cost in maintaining a cow herd is feed. Understanding cow nutrient requirements and ration balancing can help to reduce costs associated with over and under feeding (Tables 2.6 and 2.7). Previous studies estimate that feeding a balanced ration can save as much as \$0.25/hd/day. Consequently, feed tests are critical to ensuring that rations are based on the actual feed being fed.

Every year LARA sends in multiple feed samples for quality analysis on our trials and demonstrations. In addition, we also offer feed testing services for producers in our area for a fee.

Available to all producers is a forage probe that can be borrowed at any time. Contact LARA to see when it is available: 780.826.7260.

Table 2.6. Forage intake guidelines (as percent of body weight).

	Straw and Poor Quality Forage (%)	Medium Quality Forage (%)	Excellent Quality Forage (%)
Growing and Finishing Cattle	1.0	1.8 - 2.0	2.5 - 3.0
Dry Mature Cows and Bulls	1.4 - 1.6	1.8 - 2.0	2.3 - 2.6
Lactating Cows	1.6 - 1.8	2 - 2.4	2.5 - 3.0

* as taken from CowBytes

Table 2.7. Minimum Energy and Crude Protein Requirements for Beef Cattle.

Animal	CP (%)	ADF (%)	TDN (%)
Cows			
Mid-Pregnancy	8	59	50
Late Pregnancy	9	50	55
Lactation	10-12	31.5 - 45.7	56 - 63
Growing Cattle			
400 - 600 lbs - low ADG	11-12	24-39	60-65
400 - 600 lbs - high ADG	12-14	<31	68-75
600 - 800 lbs - low ADG	10-11	<31	60-65
600 - 800 lbs - high ADG	12-13	<31	68-75
>800 lbs	9-12	<31	68-75
Finishing Cattle			
900 - 1000 lbs	10-11	<31	68-75
>1000 lbs	9-10	<31	68-75
Wintering Bulls	9	37-53.5	53-60

Environment and Regenerative Agriculture



Environmental Farm Plans

The environment is becoming a more prominent issue. It is a large factor in marketing agriculture and food products in today's global markets. Consumers are demanding more transparency and are demanding high quality and safe products. Reputation of food safety is critical to retain and gain access to domestic and international markets.

Environmental Farm Plans (EFP) provide a tool for producers to assess their own operation and identify environmental risks, current standards, areas for improvement and also highlight what they are doing well.

Having a completed EFP allows producers to access different funding opportunities, such as the Growing Forward Stewardship Program. It is also useful in product branding that demonstrates specific environmental standards. There is a ten-year mandatory renewal period for all EFPs. If your EFP is older than 10 years old you will have to renew it to be eligible for funding opportunities.



The EFP Process

An EFP can be completed with one-on-one session(s). The EFP first identifies the soil and farm site characteristics. Following this, the producer completes only the relevant chapters that apply to their operation; such as wintering sites, fertilizer, pesticides, crop management etc.

Upon completion the EFP is submitted to a Technical Assistant for review. Once reviewed, the EFP will be returned along with a letter of completion.

The EFP is a living document and should be reviewed and updated periodically. As of April 1, 2018, there is a mandatory 10-year renewal period for an EFP.

If you wish to complete an EFP or have any questions regarding EFP please contact the LARA office at 780-826-7260. Currently, we have 11 EFP in progress.

Try Before you Buy!

Demonstration Solar Watering Systems

In 2022 LARA purchased a new portable solar watering system through funding from Alberta Environment and Parks. This system can be placed in any surface water source for the use of watering livestock.

LARA also has a portable solar winter watering system that can be placed in any surface water source for livestock watering.

Demonstration Razer Grazer Electric Fencer

LARA has a demonstration Razer Grazer electric fencer from Range Ward that is available for producers to borrow.

These items are available for a free trial and allows the producer a chance to see if an alternative watering system or electric fencing system will work for their situation. A \$500.00 damage deposit is required and will be returned upon inspection of the returned item.

Call the LARA office to book the system if you are interested.

Soil Health Benchmark Study Update

Dr. Yamily Zavala and Dianne Westerlund, CARA February 2024

The final report for the Soil Health Benchmark Study was submitted in 2023 to Alberta Agriculture and Irrigation's Natural Resource Management Branch. The project was designed to promote a better understanding of soil health and to develop a provincial database of physical, biological and chemical soil indicators, all of which contribute to an overall measure of soil health. A biological and physical baseline for provincial soils will provide a framework which can help define strategies for managing and improving the productive capacity, and sustainability, of our soils. Understanding and managing for a diverse micro-biological functional group underground may contribute to an overall healthier soil by improving soil aggregation, soil water infiltration and storage, as well as improved carbon sequestration. The improved aggregation stability will also contribute to enhanced carbon sequestration levels in the soil. Healthy soils produce healthy plants resulting in a higher quality food product. Knowing their soil health constraints will give Alberta producers a valuable tool for use in making strategic management decisions, and monitoring those practices, on their farms and ranches.

The database will also be used to develop regional scoring functions for assessing, interpreting and understanding soil health status and management responses. The overall soil health benchmark will contribute to target, monitor and adjust soil health constraints not only at the provincial level but also in each region represented by the 11 Alberta Applied Research and Forage Associations involved in this project.

During the course of the project, soil samples were collected from over 1800 sites across Alberta by partnering organizations. Soil health indicators for physical (soil compaction, water infiltration, texture and wet aggregate stability), biological (active carbon, soil microbial respiration, total fungal and bacteria biomass) were done under the guidance of Dr. Yamily Zavala at the CARASHLab using protocols adapted from Cornell University as well as the Canadian Soil Food Web Protocols. Total carbon, organic and nitrogen levels were analyzed in partnership with the University of Alberta and chemical characteristics (soil minerals and fertility) were evaluated at a commercial laboratory. The database and regional scoring curves are continually evolving as information from benchmark analysis from samples outside the project are added. Soil health reports were initially generated using the Cornell Comprehensive Assessment of Soil Health (CASH) framework.

Dr. Zavala has observed a few trends from samples. Compaction, Soil wet aggregate stability and poor water infiltration are common concerns at many sites and are often associated with lower biological components. She has found a great diversity of beneficial soil creatures and predatory species.

Some of the sites sampled in 2019 were re-visited in 2022 for collection of on-site compaction and infiltration measurements as well as a full analysis. Any changes observed in soil parameters will

be correlated to management practices at these sites during the past three years. Evaluation of the data from site re-visits will be a highlight of the project. The information is intended to be a working tool that helps managers better understand soil health, how various management practices impact it and those which might contribute to improving land resilience.

Funding for further monitoring was received from RDAR for a verification of management on soil health at specific sites during 2022 through 2024. The verification project is a collaboration of all groups who have been working with producers across Alberta. Most of the soil health reports have been shared with regional associations and their producers. Additional meetings are planned for discussion of individual site information.

Participating groups included soil health information in many events and activities during the year. Several methods of sharing information were utilized, including one-on-one consultations, seminars, workshops, field tours, webinars and more. Dr. Yamily Zavala has met with several producers to discuss their benchmark reports as well as strategies for remediation of identified constraints. An update on the Soil Health Benchmark project was made by project lead Dr. Zavala at the Western Canada Conference on Soil Health and Grazing held in December 2022 in Edmonton to over 500 conference attendees. The project received attention as the first submission for the Cattlemen magazine's new research update column early in 2023.

Dr. Yamily Zavala participated in RDAR's January 2023 Research Review with a poster presentation of the project.

Figure 1 shows an example of one of the soil health indicators' scoring functions for the 3 depths of soil samplings. The scoring functions were initially developed using the Cornell Comprehensive Assessment of Soil Health (CASH) framework because there was not adequate information from Alberta soils. The scoring functions are now based on the data collected during the Alberta Benchmark Study and will replace those generated earlier.

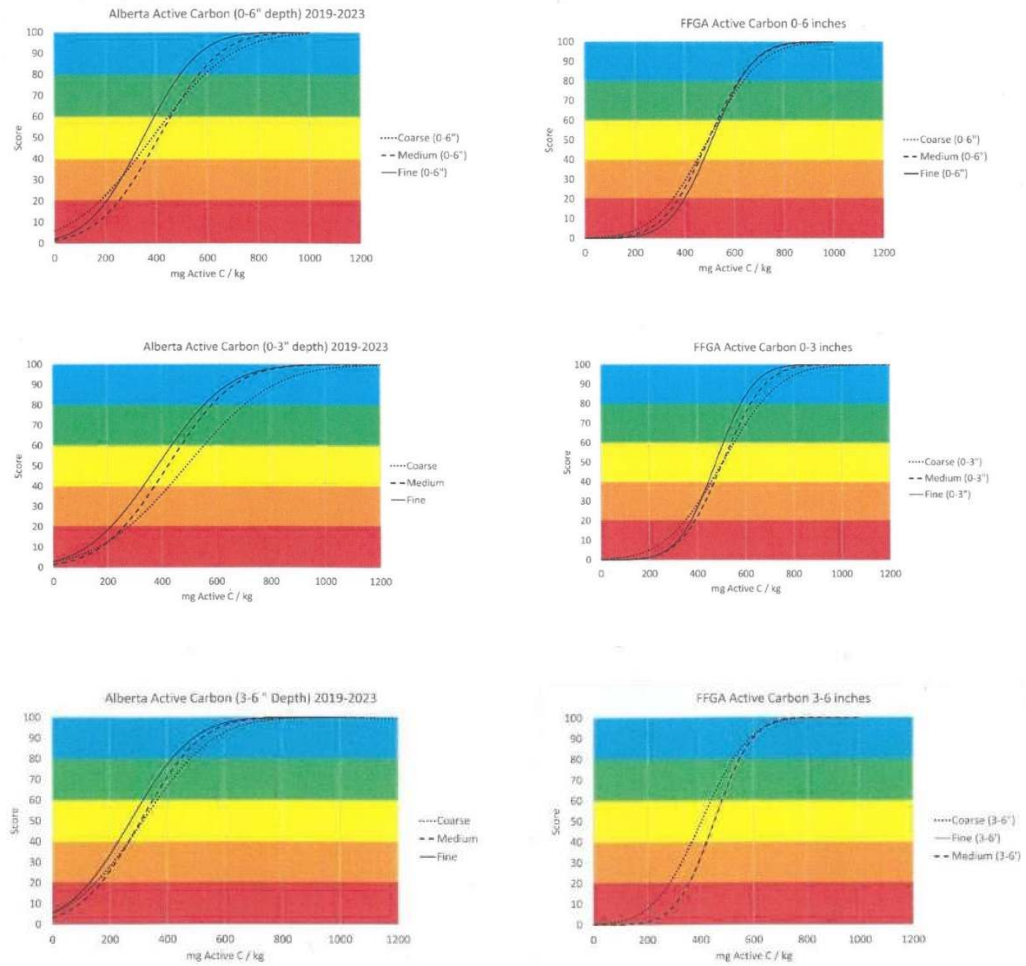
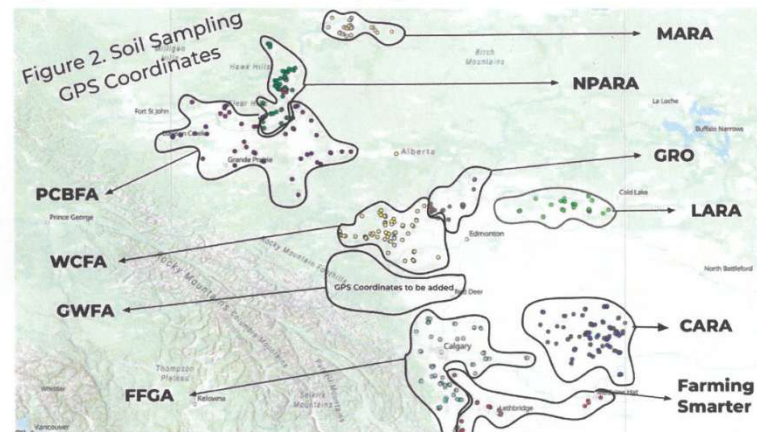


Figure 2 shows few of the GPS sampling areas for 10 of the association.



Extension



Lakeland Agricultural Research Association Extension Activities 2023

Living Lab & Soil Health Coffee Shop

Twenty producers participated in this workshop on February 14th in Mallaig. The workshop was designed specifically for agricultural producers who were passionate about soil health for an informal coffee shop chat with Dr. Kris Nichols.

On Farm Climate Action Fund (OFCAF)

LARA hosted a series of events featuring OFCAF on Feb 21st, Feb 22nd, Feb 28th and March 1st in St. Paul, Fort Kent, Smoky Lake, and Lac La Biche, respectively. Through these events, producers learned how they could access up to \$75,000 in grant funding for the adoption of cover crops, nitrogen management and rotational grazing.

Winter Grazing & Soil Health

On February 27th, LARA hosted a webinar on Winter Grazing and Soil Health with Dr. Allen Williams. This webinar was attended by 70 producers and is featured on the LARA YouTube channel.

Forage Species and Selection Webinar

On February 28th, LARA hosted a Forage Species and Selection Webinar. This webinar was attended by 72 producers and is featured on the LARA YouTube channel.

Grabe Brown

On March 2nd, LARA hosted a Grabe Brown webinar focused on nutrient density, adaptation of livestock and plants to local microbiomes and profit potential of regenerative agricultural products. This webinar was attended by 60 producers and is featured on the LARA YouTube channel.

Nutrient Management in Regenerative Agriculture

On March 7th, LARA hosted a Nutrient Management in Regenerative Agriculture webinar. This webinar was attended by 46 producers and is featured on the LARA YouTube channel.

LARA Research Update and AGM

The annual research update and AGM was held on March 14th in Spedden Hall. LARA staff presented information on the 2022 research and extension programs such as the variety trials, fertility trials, forage peas and forage variety trials. There were 40 people in attendance.

Winter Grazing for Profit

LARA hosted a two-part webinar series with Dallas Mount of Ranching for Profit on March 16th and 23rd. The webinars were attended by 52 and 40 producers on March 16th and 23rd, respectively. The webinars are available on the LARA YouTube channel.

LandView Drones

LARA hosted a workshop in partnership with LandView Drones in Ashmont on March 30th and 31st. This workshop was organized to provide flight training suitable for complete beginners and attended by 30 producers.

Genomic Tools for Replacement Heifer Selection

On April 19th, 11 producers attended an event hosted by LARA in partnership with Livestock Gentec in Ashmont. This event was designed to learn how genomics can be used to select cows and heifers for greater fertility and longevity, optimize hybrid vigour within your herd through bull selection, and managing efficiency, growth, and other economic traits including carcass.

No-Till Gardening

On April 26th, LARA hosted a No-Till gardening webinar with Bluesette Campbell. This webinar was attended by 78 people and is featured on the LARA YouTube channel.

Grazing School

LARA hosted a Grazing School workshop with Greg Judy on June 21st. This workshop was attended by 39 producers.

St. Paul Summer Field Day

On July 25th, LARA hosted its Summer Field Day in St. Paul. Thirteen producers attended the presentations and were taken on a tour of our regional variety and silage trials.



Fort Kent Summer Field Day

On July 27th, LARA hosted its Summer Field Day in Fort Kent. Thirty producers attended the presentations and live drone spraying demonstrations.



Smoky Lake Summer Field Day

On August 2nd, LARA hosted its Summer Field Day in Smoky Lake. Fifteen producers attended the presentations and were taken on a tour of our regional variety and silage trails.



Lac La Biche Summer Field Day

On August 9th, LARA hosted its Summer Field Day in Lac La Biche. Twenty producers showed up for presentations and cover crops demonstrations.

Water Well Management

On November 16th, 23 producers attended the virtual water well management workshop hosted by LARA. Here they learned about their wells, common water problems, rural water treatments, and proper well maintenance as well as increasing their understanding of groundwater and driller's reports, attendees also learned how to shock chlorinate their wells.

Strategic Weed Management Webinar

On November 28th, LARA hosted a strategic weed management webinar with GECO Engineering. There were 6 producers in attendance. Here the producers learned a new approach to use herbicides in a targeted way to avoid blanket applications while beating down the weedy hotspots and thus aligning both economic and environmental benefits for farms.

Young Farmer Social

Eleven young farmers attended our Young Farmer Social for a night of networking and special presentation from Elaine Froese on November 30th at the Eastbourne Hall.



Succession Planning

Seventy producers attended Finding Fairness in Farm Transitions with Elaine Froese on December 1st at the Smoky Lake Agriplex. This workshop was organized to help farms better prepare for succession planning.



Funding Opportunities

On December 15th, 20 producers joined us at Ashmont to discuss funding opportunities from the government through different programs such as., RALP and OFCAF.

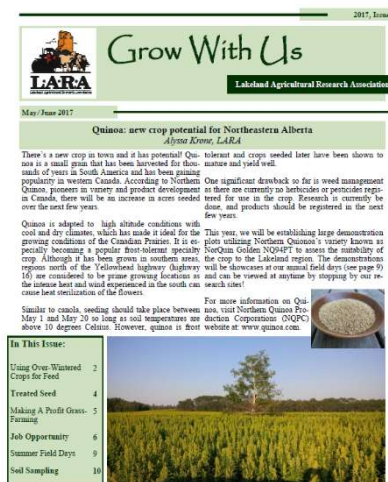
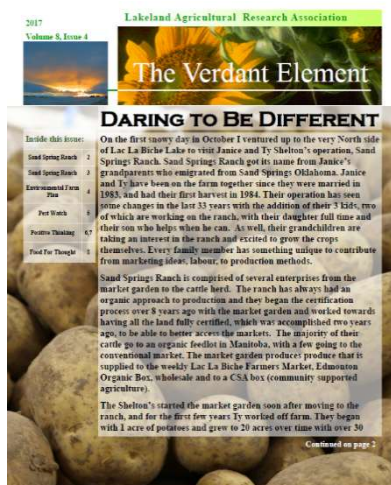


Social Media

LARA is very active on Facebook, Twitter, and Instagram. We also have a YouTube channel where many of our webinars can be found, as well as other recommended videos.

Newsletter

Along with articles in LARA's bimonthly *Grow With Us* newsletter, this year four editions of *The Verdant Element* were produced and distributed to 1600 farm mailboxes in the MD of Bonnyville, County of St. Paul, Smoky Lake County and Lac La Biche County.



Horticulture Program



Garden & Greenhouse 2023

This past year presented a challenge again as a lack of rainfall and warm temperatures worked against us. We try to rely on Mother Nature for moisture to provide a true picture of the season; however as mentioned she did not provide much in the way of rain. Due to the lack of rain, we did water a few times to prevent the crops from dying. All things being equal we had a fair crop. Root crops produced quite well. The potatoes, onions, beets, carrots and leeks produced an average yield. Corn also did surprisingly well. We direct seeded it the first week of June and watered the rows upon planting. We found that the beans (green and yellow), peas and lettuce produced but not as well as expected. This year we tried kidney beans for the first time. We chose Red Kidney and were very satisfied with the crop. They required very little care and produced well.



We planted Marketmore, Gateway and Patio Snacker cucumbers in both the greenhouse and the garden. Both produced well; however, the plants in the greenhouse produced earlier and had larger fruits.



The kidney beans were left on the garden until late September. Growing instructions were to leave the plants until the pods were mature and starting to turn brown. The plants were then pulled and hung in the greenhouse to finish drying. Once the pods were completely dry, we picked the pods and shelled them out.

Greenhouse 2023

Tomatoes

Cosmonaut Volkow

An heirloom tomato that is quite large and sweet.

Amish Paste

Roma tomato known for making excellent sauces and pastes.

Yellow Gooseberry

A heavy yielding sweet, yellow cherry tomato.

Watermelon Beefsteak

A large, pink heirloom – can exceed 1 pound.

Stupice

A very early tomato originating in the Czech Republic – vines can be as tall as 6 feet.

Get Stuffed

A stuffing tomato with red/gold-streaked skin. This one quickly became a favourite of ours.

Glamour

An early, heavy yielding variety with 6-8 oz fruits.



Peppers

Szegedi – a large, sweet paprika pepper.

Bulgarian Orange – a hot chile pepper.

Flat Cherry – an early pepper producing small, relatively hot peppers, often used for stuffing.

Hungarian Hot – heavy yields of large (5”) peppers.

Carolina Reaper – and extremely hot pepper (1.500,000 Scoville units) – handle with care.

Orange Habanero – fairly early small pepper – relatively hot – (400,000 Scoville units).



Orange Habanero



Carolina Reaper

Appendices



Definition of Common Feed Nutrient Terms

ADF	Acid Detergent Fibre – the least digestible portion of roughage. ADF content is used to determine digestibility and energies.
AIP	Available Insoluble Protein – the portion of the total available protein which is not soluble in the rumen fluid, but is still available to the cow.
AP	Available Protein – the portion of the total protein which is available to the animal if the animal could completely digest the feed.
BP	Bypass Protein – ingested protein that is not degraded in the rumen.
CP	Crude Protein – the total protein contained in feeds as determined by measuring nitrogen content.
DE	Digestible Energy – the amount of energy consumed minus the amount of energy lost in feces.
GE	Gross Energy – measure of total caloric energy of a feedstuff.
IP	Insoluble Protein – the portion of protein which digestive juices or similar solutions cannot dissolve.
ME	Metabolizable Energy – equal to DE minus energy lost in urine, feces and in methane for ruminants.
NDF	Neutral Detergent Fibre – measures cellulose, hemi-cellulose, lignin, silica, tannin and cutin; used as an indicator of feed intake.
NEG	Net Energy for Gain – amount of energy for gain above that which is required for maintenance; used for balancing rations for ruminants.
NEM	Net Energy for Maintenance – amount of energy required to maintain an animal with no change in body weight or composition.
RFV	Relative Feed Value – an index for assessing quality based on the ADF and NDF levels of a feed. As fibre values increase the RFV of forages decreases.
SP	Soluble Protein – the portion of protein which digestive juices of ruminant can dissolve.
TDN	Total Digestible Nutrients – a term which is estimated from the ADF content and is used to describe the digestible value of a feed.

Forages and Cattle Nutrient Requirements

Table 1. Composition of Some Common Feedstuffs.

Feedstuff	Percent of DM Basis								
	DM	CP	ADF	NDF	TDN	Ca	P	K	Mg
Alfalfa Hay	90.5	19.9	31.9	39.3	60	1.63	0.21	2.56	0.34
Early									
Alfalfa Hay	90.9	17	38.7	48.8	55	1.19	0.24	1.56	0.27
Late									
Alfalfa Silage	44.1	19.5	37.5	47.5	63	1.32	0.31	2.85	0.26
Barley Grain	88.1	13.2	5.77	18.1	88	0.05	0.35	0.57	0.12
Barley Straw	91.2	4.4	48.8	72.5	40	0.3	0.07	2.36	0.23
Barley Silage	37.2	11.9	33.9	56.8	60	0.52	0.29	2.57	0.19
Corn Silage	34.6	8.65	26.6	46	72	0.25	0.22	1.14	0.18
Mature									
Oat Grain	89.2	13.6	14	29.3	77	0.01	0.41	0.51	0.16
Oat Straw	92.2	4.4	47.9	74.4	50	0.23	0.06	2.53	0.17
Oat Silage	36.4	12.7	38.6	58.1	59	0.58	0.31	2.88	0.21
Oat Hay	90.7	9.5	38.4	63	53	0.32	0.25	1.49	0.29
Smooth Brome	26.1	21.3	31	47.9	74	0.55	0.45	3.16	0.32
Early Pasture									
Smooth Brome	87.6	14.4	36.8	57.7	56	0.29	0.28	1.99	0.1
Hay Mid-bloom									
Rye Grass	22.6	17.9	38	61	84	0.65	0.41	2	0.35
Pasture									
Orchard Grass	89.1	12.8	33.8	59.6	65	0.27	0.34	2.91	0.11
Hay Early Bloom									
Orchard Grass	27.4	10.1	35.6	57.6	57	0.23	0.17	2.09	0.33
Early Pasture									
Timothy Hay	89.1	10.8	35.2	61.4	59	0.51	0.29	2.41	0.13

Source: NRC 1996. Nutrient Requirements of Beef Cattle (7th Ed.) National Academy Press, Washington D.C.

Note: The values that are presented in the above table are intended for producers to determine if the results of their own feed tests are within normal ranges. The most accurate way to determine if feeds are meeting nutrient requirements of specific groups of cattle is to feed test.

Table 2. Tolerance Information for Some Perennial Legumes.

Legumes	Acidity	Alkalinity	Salt	Drought	Winter
	Tolerance	Tolerance	Tolerance	Tolerance	Hardiness
Alfalfa	Moderate	High	Moderate	Very High	Moderate-High
Cicer Milkvetch	Low	Moderate	Low-Moderate	Moderate-High	Very High
Alsike Clover	Moderate	Moderate	Low-Moderate	Low-Moderate	High
Red Clover	Low	Moderate	Low	Low-Moderate	Moderate-High
Sainfoin	Low	Low	Low-Moderate	Moderate	Moderate
Birdsfoot Trefoil	High	Moderate	High	Moderate	Low-Moderate
Sweetclover	Low	High	Moderate	Moderate-High	Moderate

Table 3. Tolerance Information for Some Perennial Grasses.

	Acidity	Alkalinity	Salt	Drought	Winter
Grasses	Tolerance	Tolerance	Tolerance	Tolerance	Hardiness
Meadow Bromegrass	Moderate	Moderate	Low-Moderate	Moderate-High	Moderate
Smooth Bromegrass	Moderate	Moderate	Low-Moderate	Moderate-High	Moderate-High
Reed Canarygrass	High	Moderate	Moderate-High	Moderate-High	Low-Moderate
Creeping Red Fescue	High	Moderate	Moderate-High	Moderate-High	High-Very High
Meadow Fescue			Moderate	Low	Moderate
Tall Fescue	High	Moderate	Moderate-High	Moderate	Moderate
Creeping Foxtail	High	Low	Low	Low-Moderate	High-Very High
Meadow Foxtail	Moderate		Low	Low	High
Orchardgrass	Moderate	Low	Low-Moderate	Moderate	Moderate
Italian Ryegrass	High	Low	Moderate	Low	Low
Perennial Ryegrass	High	Low	Moderate	Low	Low
Timothy	Very High	Low	Low	Low	Moderate
Crested Wheatgrass		Moderate	Moderate	Very High	Very High
Intermediate Wheatgrass	Low	Moderate	Moderate	Moderate	Moderate
Northern Wheatgrass	Moderate	High	Moderate	Very High	Moderate
Slender Wheatgrass		High	Moderate-High	Moderate	High
Tall Wheatgrass		Very High	Very High	High	Moderate
Western Wheatgrass	Moderate	Moderate	Very High	Moderate - High	Moderate
Russian Wildrye	Low	Moderate	High	Very High	High
Altia Wildrye			High	Very High	High
Dahurian Wildrye			High	Moderate-High	Moderate-High

Table 4. Nutrient Requirements for Beef Cattle.

	Daily	Dry Matter	Crud Protein	TDN				
	Gain	Intake	% of		% of	Ca	P	
	(lbs)	(lbs)	lbs/day	DM	lbs/day	DM	(%)	(%)
600 lb Calves	1.5	1308	1.32	9.5	9.4	68.5	0.32	0.21
950 lb Bred Heifers	0.9	19	1.5	8	10.3	54.1	0.27	0.02
1200 lb Cows								
Mid Pregnancy	-	20.8	1.4	6.9	10.1	48.8	0.19	0.19
1200 lb Cows								
Late Pregnancy	0.9	22.3	1.7	7.8	11.8	52.9	0.26	0.21
1000 lb 2 yr. Heifer								
With Calf	0.5	20.8	2.1	10.2	12.9	61.9	0.31	0.23
1200 lb Cow Nursing	-	23	2.1	9.3	12.1	55.5	0.27	0.22
Calf (1st 3-4 months)								

Source: NRC 1984. Nutrition Requirements of Beef Cattle (6th Ed.) National Academy Press, Washington, D.C.