GATEWAY RESEARCH ORGANIZATION

ANNUAL REPORT

24

Gateway Research Organization

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MESSAGE
FROM THE CHAIR

The past year has been yet another year of change, transition, and growth for Gateway Research Organization. 2024 saw the welcoming in of our new manager Andria, who is proving to be an excellent fit with the GRO staff and board. Adding to the change and transition, we bid farewell to Jay Byer who started in 2020 as our Soil Conservation Agronomist, and ended off as interim manager. Jay will be missed and we are thankful for his leadership, experience, and guidance. In addition to our comings and goings, the office got a major overhaul, adding more office and meeting space as well as a much more welcoming feel.

Much of our planning for the year ahead is in the works, and the staff are excited to dig into another season of crop, livestock, and forage research and extension. Please make sure and keep an eye out for the many events, field days, and tours that will be upcoming this year as we have something of interest to nearly everyone in the ag industry.

This upcoming year will also see a major milestone achievement as our organization celebrates its 50th anniversary! We look forward to seeing past and current members this summer as we celebrate 5 decades of research and extension!

As always, on behalf of the board of directors. I would like to thank our members and contributors for their continued support, and wish you a successful season ahead!

MIKE HITTINGER
Board Chair

2024 BOARD OF DIRECTORS & COMMITTEES

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Byron Long
Randy Pidsadowski
Kurtis Properzi
Adam MacMillan
Justin Nanninga
Uwe Quedenbaum

MESSAGE
FROM THE MANAGER

I started at GRO in November of 2024 and had the great benefit of overlapping with Jay prior to his retirement in February of 2025. Congratulations to Jay and an immense thank you for everything you have done for GRO. We wish him all the best. I would like to thank the board of directors and Jay for providing me with the time and support to enjoy most of 2024 with my young kids and family before starting this role.

I have a background in mixed-beef family farm, and canola research, but I was still astonished in those initial few months by the vast range of research and demonstrations that GRO invests in. Furthermore, the quality of that research is excellent. I am very excited and proud to be part of this excellent organization and programming and to continue to build upon this strong foundation.

This good reputation allows me to have easy introductions as I meet the producers, cooperators, partners and collaborators of GRO. I have attended many conferences, and meetings to build these connections and networks between GRO and the other ARA's, industry, colleges and universities and municipalities. I am appreciative for all of their continued support and collaboration that provides GRO with the resources, funding and expertise to execute high quality research for our producers.

I am grateful for GRO's staff; Rick Tarasiuk, Kabal Singh, and Stacy Murray for the wonderful work they did in 2024, and I look forward to continuing GRO's successful work with them for 2025.

ANDRIA CARLYON
Manager

2024 STAFF

CONTRACT PASTURE MANAGER:
Murray Buxton

SUMMER STAFF:
Anika Bausch
Jelena Bausch
Leigh Murray
Keaton Wagner
Stella Ma (temporary)

FULL TIME STAFF:
Jay Byer - Manager
Andria Carlyon - Incoming Manager
Kabal Singh Bhullar - Crop Research Coordinator
Stacy Murray - Extension Coordinator
Rick Tarasiuk - Plot Coordinator

MESSAGE FROM **THE PAST MANAGER**

JAY BYER

Overall, 2024 was a very successful year for Gateway Research Organization. Through an extensive amount of hard work, support, and cooperation, most annual crop trials and plots were completed. The provincial Regional Variety Trials made it to yield except for those that were damaged by the environment, such as hail or poor overwintering conditions. Those trials that made it to yield were successful, with very little unexplainable variation or yield differences. Again, except for those damaged by hail, private contract research plots were also very positive, and the information garnered from them was well received. These private trials, while producing information that is often not for public distribution, both helps pay the bills here at GRO, but also gives us an indication of the leading edge of agricultural research for future consideration.

On the forage/livestock side of GRO's activities, several new initiatives along with continuing research and demonstration has been conducted. A new twist was attempted at the heifer pasture. While we already had 16 paddocks there, they were subdivided into three sub paddocks each, to facilitate daily moves, to encourage more even grazing, While the activity was successful this year, the weather again worked against us determining whether this was a favorable practice. The daily moves may have increased labour costs somewhat but was offset by the new solar pump providing a continuous water supply rather than having to supervise a gas pump two or three times a week. In addition, a trial was started to determine if genetic testing of heifer calves can become a predicter of long-term herd success. This ongoing trial will show, in practical terms, the potential of genomics in commercial herds.

Our extension program continues to be robust, with courses, webinars, tours and activities that meet the needs of local producers. Our on-line, ongoing flagship event, Wednesday Night Networking, with Steve Kenyon as the host provides ongoing, semi-weekly opportunity for producers from near and far who are interested in regenerative agriculture to discuss a wide variety of topics. Our corn tour exceeded our expectations from an information perspective with our plots, innovative local producers trying cutting edge concepts, and variety trials that even showed how well corn can overcome hail damage.

GRO soil work continues to create interesting observations, and now with the acquisition of a self-contained, hydraulic probe in its own vehicle, more, improved and replicated sampling can occur. As it stands, results from the heifer pasture appear to show differing microbial populations under different grazing systems; a field that has been converted from an annual crop to perennial forages seems to be changing in its soil health perspective; and benchmarking and carbon sequestration trials continue. This keeps GRO on the cutting edge of soil health in the province.

On the administrative side, GRO's first full audit, now a requirement for RDAR funding, was successful, with very few issues, and a positive response from the auditors. They were pleasantly surprised with the state of our books, and they look forward to fulfilling the yearly need for this process. A review of our operations went well, with very few changes recommended by the reviewer.

Financially, GRO continues to be successful, with yet another surplus occurring in 2024, thanks to extensive public and contract trials, RDAR base funding, generous contributions from municipalities, project funding from the Westlock Community Fund, and contributions of land, knowledge, and other aspects from producers across GRO's area of influence.

The equipment fleet at GRO continues to expand, with the purchase of several new pieces to meet the changing needs of research in 2024. This was the first year of operation for our corn planter, and it went very well. We discovered both its versatility and its limitations as we put it to work in the field. We were most gratified to have a woodchipper donated by Ray Galvas for us to properly process our corn silage samples. Our new-to-us hydraulic soil sampling truck will help with the quality and quantity of the samples we take, and our plot-sized swather has improved our harvest control, particularly with canola. With the generous support of the Government of Alberta's Forage and Applied Research Association Capital Grant Program, office renovations have been completed, and more needed equipment will be purchased. I am very pleased to have been able to make the initial connection with Alberta Government Surplus to hopefully obtain, free of charge, additional needed vehicles, furniture and equipment, potentially saving all provincial ARAs up to hundreds of thousands of hard-earned dollars.

In closing, as this will be my last contribution as Manager for the Annual report, I am glad I am leaving the Organization in good hands, from the new manager through all the rest of the staff and I wish GRO well going forward. Please read on through our articles here to get more information on all the work we have done in 2024.

ALL THE BEST IN YOUR RETIREMENT, JAY!

MESSAGE FROM **THE CROP RESEARCH COORINDINATOR**

KABAL SINGH BHULLAR, P.Ag.

The 2024 growing season posed significant challenges, primarily due to unpredictable weather patterns that impacted planting, crop growth, and overall yield performance. Early in the season, excessive moisture in the soil delayed planting by approximately three to four days. This initial setback was compounded by below-average rainfall throughout the season, with precipitation levels recorded at only 75% to 85% of normal. As a result, crops struggled to access the necessary moisture at critical growth stages, ultimately affecting overall productivity. Despite these adversities, harvest yields were reasonable, albeit slightly lower than the long-term average.

As part of our livestock research, we launched a pasture rejuvenation project during the summer. A designated paddock was selected to test and assess different rejuvenation techniques, addressing the adverse effects of prolonged dry spells in recent years which have significantly reduced pasture health and biomass production. Additionally, we partnered with Livestock Gentec to support and promote their genome testing program. These advanced tools offer a straightforward and efficient approach to selecting high-quality replacement heifers and sires, ultimately contributing to the development of superior feeders and improving overall herd performance.

The year also marked a period of transition for GRO. We were pleased to welcome Andria Carlyon as our new Manager, bringing fresh leadership and expertise to our organization. At the same time, we prepared to bid farewell to Jay Byer, a highly respected and valued member of our team, who officially retired in February 2025. Jay's dedication and contributions have played a crucial role in the success of our research initiatives, and we extend our sincere gratitude for his years of service. We wish him all the best in his well-earned retirement.

The progress and achievements of our research efforts in 2024 were made possible through the collective contributions of several key groups:

- GRO Team – The dedication and expertise of our staff are fundamental in executing research projects and ensuring meaningful outcomes. The input and support of our Board members are crucial to our ongoing success.
- Funders – Financial support from our funding partners plays a vital role in enabling research activities, allowing us to explore innovative agricultural solutions.
- Farmers – We are especially grateful to the farmers who generously provide land for research trials. Their involvement ensures that our studies remain practical, applicable, and beneficial to real-world farming operations.

As an applied research association, GRO remains committed to bridging the gap between scientific advancements and on-farm applications. Throughout 2024, we successfully conducted approximately 35 research projects focused on crops, forages, and livestock, generating valuable insights that contribute to the continuous improvement of agricultural practices.

As we step into 2025, working together and staying adaptable will be key to keeping up with the changes in farming. We wish all farmers and ranchers a successful and prosperous year ahead. Your hard work and dedication are the backbone of our industry, and we look forward to continued growth and innovation together.

MESSAGE FROM
THE PASTURE MANAGER

MURRAY BUXTON

2024: A new year and another trial.

This year we chose to modify the way in which we grazed the pasture. We created smaller cell sizes to promote pasture recovery and rejuvenation, as in general the pasture has been established for several decades. The goal is to increase pasture yield without artificial stimulants, other than animal impact.

The new cell format consists of 39, 3-acre paddocks with a common alley at the front of the cell. This concept is to efficiently utilize the pasture while not intentionally over grazing each cell, allowing sufficient rest for each paddock to help promote grass growth and rejuvenation.

This change required portable electric fencing to be utilized in each cell for the division of each paddock and the movement of animals every day. With the help of summer student, the heifers were rotated successfully over the entire pasture three times throughout the summer, allowingn us to have 121 days of pasture for 96 heifers on 140 acres.

Note, we maintain a permanent continuous grazing pasture that five heifers stay in all summer, as a control or comparison to the rotational grazing model, and to see the differences between grass growth and pasture improvements/damage.

Also implemented this year was a solar water system to compliment the artesian well that is at the property, eliminating the need to pump water every day for the heifers. This is a game changer as far as efficiency while at the pasture every day. It does also allow for occasional days away from the pasture on extended weekends or when staffing needs dictate.

Rate of daily gain was lower than expected this summer. I believe this is directly related to lack of moisture and very slow grass growth throughout the grazing period, although we did maintain the grazing days while utilizing less acres as we did some rejuvenation demo trials on 10 acres within the pasture.

MESSAGE FROM **THE EXTENSION COORINDINATOR**

STACY MURRAY

It's been another exciting year for the GRO team! We saw a number of events in 2024 including our annual field days - Pasture Picnic, Cut the Crop, Forage BBQ, and Pulse/Canola Tour, and a new tour focused on corn. We hosted a couple of Living Lab workshops, an agriculture drone workshop, continued to support and participate in Wednesday Night Networking, hosted several evening Crop Talks, high school class tours, and a University of Alberta class tour. We continued our participation in Open Farm Days by collaborating with Barrhead Seed Cleaning plant for their tours and look forward to working with another site or two this year. For the first time in a number of years our staff were involved in the Classroom Agriculture Program, making three presentations to local classes. This December GRO, along with 8 other forage and applied research associations, organized and hosted the biennial Western Canada Conference on Soil Health & Grazing. With over 500 producers in attendance it was a fantastic three day event. We also did our share of learning by attending numerous workshops, conferences, showcases, and producer meetings. These are great opportunities to hear about emerging issues, collaborate with researchers, funders, and producers, and share updates about the work GRO is doing.

2024 also saw some shared work with the other forage and applied research associations in the province as we've collaborated on ways to engage with producers, learned more social media, and worked on improving our websites. While this is an ongoing work in progress, I hope you are finding the information we share wherever you are, and in easy to access and understand formats.

2025 should be an exciting year as we plan to continue sharing our work through our field days and tours; host workshops on ag drones (with Landview Drones), water usage, silvopasture, CowBytes, and mental health; provide networking opportunities through Wednesday Night Networking, other webinars, and a new opportunity for 'Women of Agriculture - GROing Together'; participate in some new county events; and to celebrate our 50th Anniversary. 50 Years! Watch for some special details at many of our regular functions, but we are also planning a wonderful gala evening for June 6, 2025.

We are always open to suggestions for new events and ways to share our information. Please reach out any time if you have questions or ideas.

WESTERN CANADA Conference on Soil Health

Western Canadian Grazing Conference


Gateway Research Organization
Crops
Livestock
Environment


RDAR

ACKNOWLEDGEMENTS

The Board of Directors and Staff wish to extend their sincere appreciation for the active support we receive for our research and extension programs. Without the contributions of these groups and individuals it would be impossible to achieve all we do.

BASE & PROJECT FUNDING

RDAR
Results Driven Agriculture Research

SUPPORTING COUNTIES

Athabasca County
County of Barrhead
Lac Ste. Anne County
Parkland County
Woodlands County

PROJECT AND EXTENSION SPONSORS

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Alberta Grains
Alberta Pulse Growers
Alberta Seed Processors
Calcium Products
Canterra Seeds
CFGA
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FP Genetics
Food Water Wellness Foundation
Humaterra Grow Wiser.
Oat Advantage
Olds College of Agriculture & Technology
Performance Seed
POGA Prairie Oat Growers Association
SeCan Canada's Seed Partner
University of Alberta
VantageAg
Westlock Community Foundation
WinField United

RESEARCH AND EXTENSION PARTNERS

These partners provide us with goods, land, equipment, product, services, discounts, grants, etc.

- 20/20 Seed Labs
- Agriculture & Agri-Food Canada
- A&L Labs
- AltRoot
- Anderson Seed Growers
- Brett Young Seeds
- Canada Employment
- CropMaxx
- Colby Hansen
- Covers & Co.
- Dean Weigand
- Galloway Seeds Ltd
- G3
- Greener Pastures Ranching
- Jubilee Feedlot
- Justin Nanninga
- Lakeland College
- The Land Institute
- Lefsrud Seeds
- Lupin Platform
- McEwan's Fuels & Fertilizers
- Meinczinger Seed Farms
- Neerlandia Co-op
- Nutrien Ag Solutions
- Ole Farms
- Paradigm Productions
- Portage College
- Randy Pidsadowski
- Rick's Pedigreed Seeds
- Routier Farms
- Steve Kenyon
- Tom McMillan
- Tower Farms
- True Seeds
- Westlock Seed Cleaning Plant
- Westlock Veterinary Centre

A special thank you for special capital grant funding: Alberta

We'd also like to offer many thanks to all of the guest speakers, too numerous to name, for our many extension events. Many offer their experience and opinions for steeply discounted rates or no charge. Our field days and workshops, Wednesday Night Networking and Thursday Night Crop Talk would not be possible without them.

Finally, a HUGE thank you to ARECA staff and all of our sister ARAs and FAs who support us all year.

STAY CONNECTED

Become a member to receive our e-newsletter and reminders about upcoming events.

The Gateway Connection
the latest local ag research news

We also have a number of ways to find information from us on-line:

Website: www.gatewayresearch.org
Facebook: Gateway Research Organization
Twitter: @GatewayResearch
Instagram:@gatewayresearchorganization

Subscribe to our **YouTube** channel: @gatewayresearchorganization

Listen to a **podcast on Podbean**:

Wednesday Night Networking (Sustainable Agriculture):
https://gatewayresearchorganization.podbean.com/
Thursday Night Crop Talk:
https://gro-croptalks.podbean.com/

CORN SILAGE VARIETY TRIAL

Corn production in Alberta has been steadily growing as producers explore its potential for silage, grain, and feedstock purposes. However, Alberta's unique climatic conditions, including its shorter growing season, variable weather patterns, and diverse soil types present distinct challenges that make hybrid selection critical for success.

In the past, GRO has struggled to accurately place seed corn in trials, since the only method available was to hand seed it, extremely limiting the plots available for research or demonstration. As a result, GRO was restricted to planting only one small contract corn plot. In the fall of 2023, GRO was fortunate to acquire a used 2-row precision planter equipped with variable row spacing and discs capable of precisely planting seeds of all sizes, from corn to canola.

In 2024, GRO conducted two small-plot corn trials. One of these trials was sponsored by an industry partner, and as such, the data remains confidential. The second trial was executed in collaboration with seed distributors who provided the seed to compare hybrid performance. This trial was designed to evaluate the performance of commercially available corn hybrids in a side-by-side comparison. Approximately 90% of the hybrids featured in GRO's Corn Silage Variety Trial are commercially available.

Agronomics:

Seeding Date: May 31, 2024
Target Plant Population: 32,000 plants/acre
Row Spacing: 30"
Fertilizer:
  Spring Deep Banded: 28.5-4.75-11.4-4.75-1 Mg @ 526 lbs/ac
    149.6 lbs/ac actual N; 25 lbs/ac actual P; 60 lbs/ac actual K; 25 lbs/ac actual S; 5.4 lbs/ac actual Mg
Pesticides:
  Glyphosate + Heat @ 270 g ae/ac +10.5 g/ac on May 29
  Glyphosate @ 270 g ae/ac on June 18
  Glyphosate @ 180 g ae/ac on July 04
Rainfall recorded from June 1 to October 15, 2024: 222.3 mm
Harvest Date: October 18, 2024

Important Acronyms Used in the Table:

- **CP (Crude Protein):** The percentage of protein present in the corn, important for assessing the feed quality for livestock. Higher CP content indicates better nutritional value for animals.
- **ADF (Acid Detergent Fiber):** A measure of the fiber content that affects the digestibility of the corn. Lower ADF values typically suggest better digestibility and higher feed quality.
- **NDF (Neutral Detergent Fiber):** Represents the total fiber content, including lignin, cellulose, and hemicellulose, which influences the digestibility and feed intake by livestock. Lower NDF values are generally preferred for better forage quality.
- **TDN (Total Digestible Nutrients):** Indicates the overall digestibility of the corn as feed. A higher TDN value reflects more energy available for livestock.
- **Mineral Content (Calcium, Phosphorus, Potassium, Magnesium):** Essential minerals that contribute to the nutritional value of the corn, impacting livestock health and productivity.
- **RFV (Relative Forage Value):** A composite score that evaluates the overall quality of the corn for use as animal feed, considering digestibility, nutrient content, and fiber levels. Higher RFV values are indicative of better forage quality.

Unfortunately, the trial site experienced hail damage on July 24, which may have resulted in yield and quality losses. Therefore, the data presented may not fully reflect the potential performance of each hybrid under ideal conditions. ***It is important to note that hybrid performance can vary significantly depending on your specific farm conditions, and we recommend conducting thorough diligence before making decisions based solely on this data.***

Acknowledgements:
We would like to express our sincere gratitude to BrettYoung, Pioneer, and Bayer for their generous support in providing seeds for testing. Their contributions have been invaluable in making this trial possible.

Corn Variety Trial - 2024

Trt #	Trt Name	Height (cm)	Yield (tons/ac) @ 65% moisture	CP	ADF	NDF	TDN	Calcium	Phosphorus	Potassium	Magnesium	RFV
				% Dry Matter								
1	P7958	228	10.2	6.1	22.2	35.2	67.0	0.21	0.16	0.45	0.14	177
2	P6909	237	11.1	5.8	20.3	34.0	68.7	0.21	0.16	0.54	0.14	188
3	P6910	229	9.2	5.4	31.7	48.6	60.5	0.20	0.17	0.93	0.15	116
4	P7202	232	11.2	6.2	14.9	27.0	72.5	0.21	0.15	0.40	0.13	250
5	P7211	237	11.0	6.4	21.7	33.7	67.8	0.21	0.15	0.49	0.14	187
6	DKC24-05 RR2	231	10.1	5.2	27.4	43.2	63.4	0.20	0.16	0.78	0.15	136
7	DKC21-36 RIB	239	7.6	5.9	22.8	41.2	66.9	0.22	0.17	0.70	0.14	151
8	DKC20-23 RIB	225	9.7	6.7	16.3	29.0	71.7	0.20	0.15	0.49	0.14	230
9	DKC072-12 RIB	227	11.1	6.5	21.0	33.4	68.6	0.22	0.16	0.42	0.14	191
10	BY Brava RR2	242	9.6	5.3	22.8	39.4	67.2	0.23	0.17	0.76	0.14	159
11	BY Belmont RR2	232	8.7	6.3	20.3	36.6	68.8	0.22	0.17	0.60	0.14	175
12	BY Guernsey VT2P RIB	248	9.6	5.7	22.9	38.5	66.7	0.22	0.16	0.67	0.14	161
13	BYM 2432001BV	227	7.8	5.9	25.8	40.7	64.9	0.22	0.16	0.50	0.15	148
14	BYM 2428002TV	244	10.4	5.8	19.6	34.1	69.4	0.22	0.16	0.57	0.14	189

MORE CORN

Introduction:

Corn as a crop for silage, grazing, or grain, has been increasing in popularity throughout the current millennium in north central Alberta. In the past, GRO has struggled to accurately place seed corn in trials, since the only method available was to hand seed it, severely limiting the plots available for research or demonstration. As a result, GRO was restricted to planting only one small contract corn plot. In the fall of 2023, GRO was fortunate to find and obtain a used 2-row precision planter, with variable row spacing and discs that could place all sizes of seed from corn down to canola with precision.

The spring of 2024 was to be an experimental year for our use of the planter. Not only were we then able to plant our regular contract plot with much greater ease, but we also put in a variety demonstration. In addition, demand was such that GRO was asked to contract plant a plot for another ARA, which was an indication of the need for such a planter for a number of research groups in future years. This work gave us an understanding of the issues associated with such a practice.

Trial 1: RDAR PREP work:

The Results Driven Agricultural Research (RDAR) organization has a program that supports producer-led on-farm research or demonstrations, known as PREP (Producer Research and Evaluation Program). In 2024, GRO agreed to assist Colby Hansen in gathering a set of PREP information that was to be obtained from this proposal. One of those sets of samples taken may indicate that when planted with a cover crop, a lower corn population may lead to a much higher total volume and possibly higher quality.

There were several other trials discussed in Colby's application, and it is likely that GRO will help Colby coordinate more of this work in 2025. GRO gratefully acknowledges the support for the Hansen's trials from the RDAR PREP program.

Corn Demonstration Project 2:

As was previously mentioned, many area producers are interested in corn production. Some are also thinking that cover crops in association with their corn is a method of maximizing their net return per acre. Another GRO producer and Board member, Byron Long, has attempted to conduct some corn row spacing/cover crop work, and the technical staff of GRO were happy to try and get some data from this demonstration.

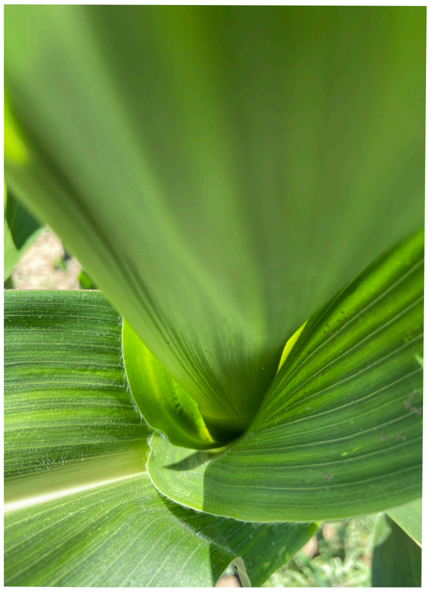
Byron planted corn in rows spaced 90, 54 and 42 inches apart. While the results were not fully replicated to definitely indicate a significant difference, it appears as if there is no yield penalty to going to wider row spacing, up to 90 inches. The same seems to apply when cover crops are interseeded with the corn. Of course, further replicated research is required to determine if there might be actual benefits to interseeding and wider row spacing, but with the corn planter, GRO should be able to more easily work with Byron to create replicated trials in the future.

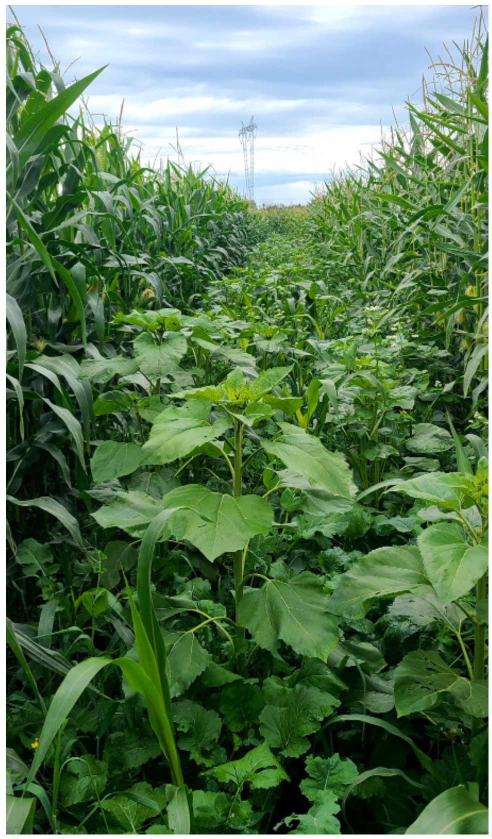
Corn Tour

In addition to these trials and demonstrations, GRO was able to work with Farming Forward to conduct a corn tour, where a number of agronomic activities were demonstrated, including the row spacing and intercropping work mentioned above. The tour also visited a local producer to discuss plastic mulch application to enhance growth and maturity of the crop, and corn for seed production. As more replicated corn work is conducted by GRO, it is likely similar tours will occur in the future with more increased replicated data for the crop as silage, intercropping and grain.

Conclusion

While 2024 may not have been an ideal year for GRO and its statistically valid corn work, it is obvious that the purchase of this precision, variable row spacing corn seed drill is going to prove to be a valuable addition to the equipment fleet, and there will be an increase in statistically valid results available for producers in north central Alberta in the future.





CANOLA HYBRID COMPARISON TRIAL

Co-Operator: Justin Nanninga (NW 5-62-2-W5)

While this site hosted several industrial canola trials, including seed treatment efficacy assessments for flea beetle control, a foliar phosphorus application, and evaluations of various biological products aimed at promoting canola growth, in this report, we are only sharing the results from the GRO canola hybrids comparison trial. Given the highly competitive nature of the canola industry—where each seed company promotes its hybrids as the best— a canola hybrids comparison trial offered a unique opportunity to conduct side-by-side performance comparisons of various hybrids. The trial was self-funded, with support from seed companies that provided their hybrids for testing.

Rainfall at the site was about 80% of the typical yearly rainfall for the Neerlandia area. Soil test results revealed a magnesium deficiency at the trial site. To address this issue and ensure optimal plant health, we incorporated magnesium into the fertilizer blend, aiming to replenish the soil and support the plants' nutritional needs throughout the growing season. Magnesium (Mg) is a vital nutrient for canola, as it plays a crucial role in photosynthesis and supports the overall health of the plant. As the central element in chlorophyll, magnesium is essential for capturing light energy and converting it into chemical energy during the photosynthesis process.

Canola Hybrids Comparison Trial - 2024

Seeded: May 29, 2024
Seed depth: 3/4th inch
Soil temperature: 14 Degree Celsius
Rainfall recorded: May 25 to September 30, 2024: 237.4 mm
Fertilizer:
  Deep banded: 28.5-4.75-11.4-4.75-1Mg @426 lbs/ac
    121 lbs/ac Actual N; 20 lbs/ac Actual P; 49 lbs/ac Actual K; 20 lbs/ac Actual S; 4 lbs/ac Actual Mg
  Side banded: 28.5-4.75-11.4-4.75- 1 Mg @ 100 lbs/ac
    29 lbs/ac Actual N; 5 lbs/ac Actual P; 11 lbs/ac Actual K; 5 lbs/ac Actual S; 1 lbs/ac Actual Mg
Pre-Burn: Glyphosate + Heat @ 270g ae/ac + 10.5 g/ac on May 28, 2024
1st Herbicide Application:
  Clearfield (CL) - Solo @ 325 ml/ac on June 18, 2024
  Roundup Ready (RR)/True Flex (TF) - Glyphosate @ 270g ae/ac on June 18, 2024
  Liberty Link (LL) - Liberty @ 1.6ml/ac on June 18, 2024
2nd Herbicide Application:
  CL - Solo @ 325 ml/ac on July 4, 2024
  RR/TF - Glyphosate @180g ae/ac on July 4, 2024
  LL - Liberty + Poast Ultra @ 1.1 L/ac + 100 ml/ac on July 4, 2024
Swathed on: September 13, 2024
Harvested on: October 08, 2024

Results and Discussion:
It is important to remember that each canola hybrid has its own strengths and potential. A hybrid's performance can vary depending on many factors, such as environmental conditions, soil types, management practices, disease pathotype tolerance, and other variables that affect crop growth. As a result, it is not ideal to make a decision on which hybrid to choose based solely on this data. This trial represents just one year's worth of information, and we advise approaching the results with care, as they may not fully reflect how a hybrid will perform at your farm under different conditions.

Canola Hybrids Performance Trial - 2024

Trt No.	Treatment Name	Herbicide-Tolerant Trait	Height cm		Yield kg/ha		Yield bu/ac		Bushel Weight lbs/bu		Test Weight kg/HL		1000, KWT g		Oil %	
					Values are adjusted at 10% Moisture Content											
1	UA CountyGold – non-GMO	Clearfield	112	e	1189	i	**21**	i	55.3	b-e	68.3	b-e	4.60	ef	43.3	c-g
2	P514CL		134	c	3751	bcd	**67**	bcd	55.3	b-e	68.3	b-e	3.94	i	44.3	bc
3	CP21T3P	Roundup Ready	120	d	2422	h	**43**	h	56.5	ab	70.0	a	4.92	cd	42.6	g
4	CP22T1C (HSFA)	True Flex	133	c	3396	fg	**61**	fg	55.5	a-e	68.8	a-e	5.79	a	42.8	fg
5	BY6216TF	Optimum®GLY	137	bc	3529	def	**63**	def	55.8	a-d	68.8	a-e	4.96	cd	43.1	d-g
6	BY6219TF		139	b	3223	g	**58**	g	54.5	e	67.5	e	5.03	cd	41.2	h
7	CS3000TF		130	c	3399	fg	**61**	efg	56.0	a-d	69.5	ab	4.36	fgh	43.6	b-f
8	CS3200TF		145	a	3863	ab	**69**	b	54.8	de	67.8	de	5.24	bc	43.5	c-g
9	CS3300TF		132	c	3582	c-f	**64**	c-f	56.8	a	69.8	ab	5.03	cd	44.1	bc
10	CS2600 CR-T		131	c	3655	b-e	**65**	b-e	56.5	ab	70.0	a	5.41	b	43.1	d-g
11	DK901TF		132	c	3775	bcd	**68**	bc	56.0	a-d	69.0	a-d	4.74	de	44.0	bcd
12	DK902TF		131	c	4023	a	**72**	a	56.3	abc	70.3	a	4.44	fg	43.9	bcd
13	CP21L3C	Liberty Link	133	c	3344	fg	**60**	fg	55.0	cde	68.0	cde	4.14	hi	43.7	b-e
14	CP24L3C		134	c	3713	bcd	**66**	bcd	56.0	a-d	69.0	a-d	4.49	efg	44.5	b
15	BY7204LL		130	c	3810	bc	**68**	bc	56.0	a-d	69.3	abc	4.99	cd	45.3	a
16	P516L		131	c	3466	ef	**62**	efg	56.8	a	69.8	ab	4.26	gh	42.9	efg
LSD P=.05			4		168.08		3.02		0.81		0.91		0.2185		0.597	
Standard Deviation			2.81		118.02		2.12		0.57		0.64		0.1534		0.42	
CV			2.13		3.49		3.51		1.02		0.93		3.22		0.96	

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

PRECISION PLACEMENT OF CANOLA

Introduction:

Canola seed prices keep increasing over time, and it has become a major input into a canola crop. If producers are able to regulate the amount of seed they need to produce a crop without impacting their yield, their bottom line will be improved. Canola, being such a plastic species, is well-known for being able to expand the size of the individual plant with additional branching and only a slight increase of its maturity. Precisely placing seed, rather than it being randomly interspersed with traditional seeding methods, should make the best use of each individual seed put in the ground.

Precision placement of canola seed appears to be one way of ensuring plants are well spaced and it maximizes the chance of a top-notch canola crop. GRO was fortunate enough to purchase a versatile two row planter that can precision place seeds of all sizes, from canola to corn, and we wanted to determine if ideal seed spacing would save on seed costs while still ensuring an appropriate brassica crop.

Method:

A three-rep randomized block small plot trial was set up and seeded on June 11 with 137.3N-10.5P-87.3K-29.5S actual fertility applied. A preburn of Glyphosate + Heat was conducted on June 7th. GRO's new MaterMacc precision corn seeder was used to place 3.3, 4.7 and 8 lbs/acre of seed in the randomized 1.4 x 7 meter plots. 5.3 inches of rainfall were recorded for the growing season, until the plot had to be abandoned due to hail.

Results:

After the June seeding of the plots, emergence appeared to be rapid and even. Plant or leaf counts were not taken, but all treatments appeared to fully cover the ground. On July 24th, a hailstorm occurred at this research site, which had a major detrimental effect on the trial. As a result of the hail damage, the plot was eventually abandoned. Even though there was significant regrowth, it was determined the storm had such a negative effect that the results could not be considered reliable. The conclusion drawn from these plots is that from the growth seen up until the flowering stage of the crop it is possible that precision placement of seed can reduce input costs in a sufficient manner to cover the costs of the equipment required to conduct this type of operation, particularly if it could also be used for other crops such as corn. More research is required for the local confirmation of this conjecture, which will be easily done with the equipment currently available at GRO.

AGRONOMICS OF LUPIN PRODUCTION

Project: Investigating the agronomics of lupin production a new high protein pulse crop for Alberta.

Principal Investigator: Robyne Bowness Davidson

Background: There is a great deal of interest in developing a new protein crop for Aphanomyces affected fields in Central Alberta. Lupins is one such crop and is an important crop for livestock and human consumption. As the market develops for this emerging crop, GRO is partnering with other organizations to determine the best lupin variety for our growing conditions. This adaptive trial reviews the production of the latest germplasm of both white (Lupinus alba) and blue (Lupinus angustifolius) lupins compared to current pea and faba bean varieties. New emerging germplasm is introduced into the trial each year. GRO has had a replicate of this plot since 2022, and usually has some measure of success in this trial. In 2024, however, our plots were hit with hail, and there were no replicated results from the trial, save emergence and plant stand. Consequently, results from some of the other sites for this trial were included in the annual report so that interested producers could see how the newer lupin germplasm performed in 2024, with the understanding that GRO will continue with this trial in 2025.

Research design and methodology:

In 2024 changes were made for both blue and white varieties in response to industry request and newly acquired germplasm (Fig.2). Coyote, Lawler, AGTP0013 and AGTP0054 blue lupin were added from Australian Grain Technologies (Australia). Bonus, Periwinkle, Snowbird and L2043N white lupin were added from Soy UK (Great Britian). Three faba bean varieties (Fabelle, Malik and Snowbird) were also added in 2024 to provide additional data for comparison to a later maturing pulse crop. The field pea varieties remained the same through all years of testing.

For flowering, all blue and white lupin varieties reached 10% flower at approximately the same time with a few exceptions. Flowering in 2024 at the Lacombe and Namao location averaged 54 days after planting. In 2024, both lupin types flowered at the same time as the faba bean, 5-7 days earlier than the field pea varieties at both locations.

For plant height, both lupin types were significantly shorter than the field pea varieties at both locations. In 2024 there were significant differences between the lupin varieties and field pea and between the lupin and faba bean as expected (Table 3). Plant height for the lupin varieties ranged from 25.0 cm (Coyote) to 38.0 cm (Bonus) at Lacombe. However, there was no significant difference between the faba bean and field pea, or between the two lupin types. This was not expected and is contradictory to the data from the three previous research years. Similar results were seen at Namao where differences were not as expected and contradictory to previous results. This is likely due to the climate conditions in 2024. By harvest time, the field pea varieties had lodged, at a rating of 3-4 out of 7 (where 7 is completely flat) whereas the lupin crops were still standing very well with minimal lodging (1 out of 7). The faba bean plots did not lodge.

At Namao, the earliest blue lupin variety matured 15 days after field pea 4-6 days in 2024. At Lacombe, maturity was variable. The blue lupins matured 6 days after field pea in 2024. The exceptions were Coyote and P0054 in 2024 which matured 19 days later, more consistent with faba bean. White lupin maturity was considerably late and problematic. At Namao in 2024 under very dry conditions, the white lupins matured at the same time as the field pea due to significant moisture stress. At Lacombe the white lupin varieties did not reach physiological maturity before the onset of winter required desiccation.

Yield differences in 2024 were similar to previous years. At Lacombe, there were significant differences between the lupin varieties (Fig.2), and lupin yield was significantly lower than both field pea and faba bean. The highest yielding lupin at this location was a variety called Snowbird (not to be confused with the faba bean variety of the

LUPIN TRIAL CONTINUED

same name) at 1639.8 kg/ha with the lowest yielding lupin variety being Coyote at 970.7 kg/ha. At Namao, there were significant differences between the blue and white lupin varieties and between the lupins and faba bean but results were poor due to stressed growing conditions. Yields were quite low in 2024, especially at Namao, due to hot, dry conditions with field pea only yielding an average of 4683.2 kg/ha compared to the previous year and faba bean yielding considerably less than normal at an average of 3411.7 kg/ ha.

The key messages from trial results indicate that numerous lupin cultivars are well suited to Central Alberta. The blue lupin types that seem best suited for adaptation would be Boregine, Lunabor and Probor with other varieties from Australia showing potential but needing more testing under higher moisture conditions. Some varieties tested, such as AGTP0054 will be removed due to very poor adaptability. Late maturity and resulting low yield of white varieties suggests this type may not be as well suited to these growing areas. High temperatures combined with very dry conditions in 2024 showed that, similar to faba bean, heat and drought extremes are not conducive for lupin success and that this crop is indeed a cool season crop requiring adequate moisture and cool temperatures. The crop stood very well and was easy to harvest. This is due to the solid, thick woody stem which is characteristic of both lupin types. With a higher protein level, resistance to Aphanomyces and established markets recently developed, the prospect for lupin remains high.

This plot was replicated as well at the GRO Anderson site in 2024 (see Anderson site agronomic summary for background information). It was seeded on May 9 at a depth of one inch, into good moisture and a soil temperature of 18C, following the rest of the recommended protocol as listed above. Fertilizer applied was 1.37-6.5-27.08-14.7-7.2 Mg @276.96 lbs/ac, side banded, and 11-52-0 @ 23 lbs/ac, seed placed. The plots were growing and thriving until July 24, when a hailstorm hit the site. The blue lupins and peas were already in the pod stage. They were badly damaged and did not recover. The fababeans, which were in the early pod stage, were particularly badly hit and lost all of their pods. The white lupins were just in the flowering stage,and were left to see whether there would be any regrowth. They did rebloom and if the remainder of the season was more favorable, they might have been harvestable, but the results still would not be useable, so they were not combined.

GRO had a similar project to these in 2023 with a few different varieties. While there were some issues with the plots over the season, they were harvested, and some data was taken. Those results are included in the table below. There are some similarities in the results, but more work needs to be conducted to determine the relative suitability of lupins locally, and the net yield, protein, and total return per acre.

The economics of lupin production, compared to other pulses, is somewhat difficult to determine as the market for lupin seed is not well developed. Seed fractionation and product development will eventually determine the value of this disease tolerant, robust, crop with good standability. Continued observation of the development of lupin products is warranted.

Conclusion

While 2024 was not a successful year due to circumstances beyond our control, lupin varieties, particularly blue lupin lines, continue to hold great promise for north central Alberta. Interest in lupins, their yield, disease resistance and growth pattern in comparison to other pulse crops remains high. It is likely GRO will continue to conduct this trial in 2025, and testing them side-by-side against other pulse crops is beneficial to determine their relative net yield and return.

Table 1. Average plant height, maturity and yield data for blue lupin, white lupin, field pea and faba bean varieties at Lacombe and Namao in 2024, and GRO in 2023.

Type	Variety	Lacombe Height (cm)		Lacombe Maturity (# days)		Lacombe Yield (kg/ha)		Namao Height (cm)		Namao Maturity (# days)		Namao Yield (kg/ha		GRO, 2023 Height (cm)		GRO, 2023 Yield (kg/ha)	
Blue lupin	Boregine	35	bc	90.3	a	1340.6	def	52.2	bcd	93	a	1371.1	b	45	b	1293	b
	Lunabor	31.8	bc	93.8	ab	1244.5	def	41.1	d	--		1256.6	b	55	ab	983	b
	Probor	27.6	bc	94	ab	1020.2	f	41.8	d	93	a	849.8	b	45	b	964	b
	Coyote	25	c	96.4	abc	970.7	f	--		--		--		--		--	
	Lawler	25.7	bc	95.5	ab	1133.9	ef	--		--		--		--		--	
	AGTP0013	25.7	bc	95.5	ab	1131.4	ef	--		--		--		--		--	
	AGTP0054	28.6	bc	106.5	bc	1115.1	ef	--		--		--		--		--	
White lupin	Dieta	33.5	bc	--		1478.5	de	54.8	bcd	109	c	2837	a	75	ab	590	c
	Volos	36.8	bc	--		1555.8	de	47.9	d	105.5	c	2889.2	a	75	ab	369	cd
	Bonus	38.5	b	--		1604	d	46.6	d	106.8	c	3140.3	a	--		--	
	Periwinkle	36	bc	--		1564.4	de	50.8	cd	107.8	c	3120.1	a	--		--	
	Snowbird	35.4	bc	--		1639.8	d	--		--		--		--		--	
Field pea	CDC Amarillo	63	a	91	a	4572.9	a	77	a	108	c	134.8	c	103	a	5526	a
	AC Carver	64.7	a	83	a	4657	a	79.7	a	108	c	198.7	c	82	ab	4733	a
	CDC Lewochko	63.8	a	91	a	4819.6	a	78.1	a	108	c	150.8	c	88	ab	4367	a
Faba bean	Fabelle	65.1	a	112.3	c	4073.2	ab	73.8	a	112	b	38.4	c	--		--	
	Malik	59.7	a	112.3	c	2907	c	66.7	ab	112	b	190.9	c	--		--	
	Snowbird	57.7	a	111.5	c	3254.6	bc	65.8	abc	112	b	32.0	c	--		--	

Values followed by the same letter in the same column are not significantly different

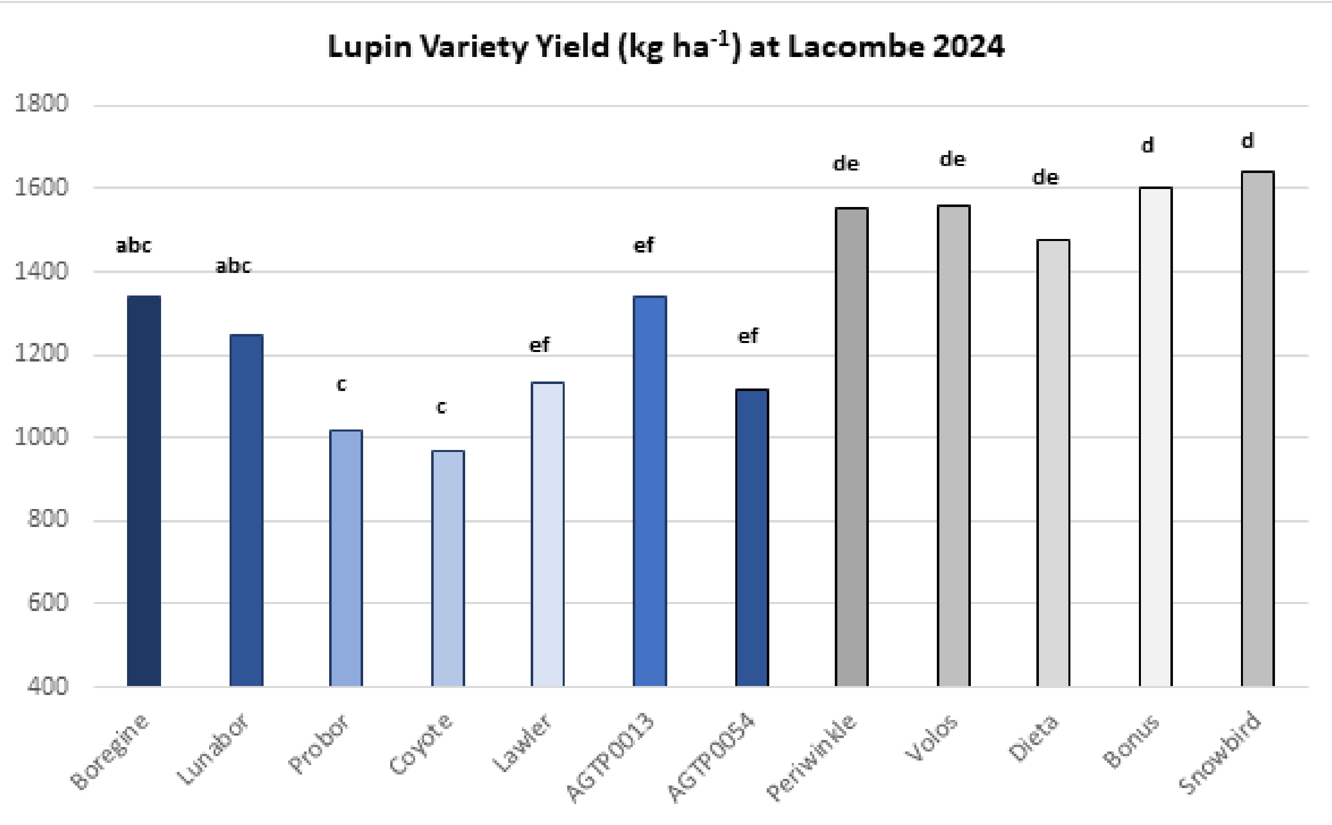


Figure 2. Yield of blue and white lupin cultivars tested at Lacombe, Alberta in 2024

After hail

RVT PULSE TRIALS - YELLOW/GREEN PEAS AND FABABEAN

Co-Operator: Ken Anderson (NW 32-59-2-W5)

In 2024, the GRO Pulse site was set up at Anderson Seed Growers home quarter along Highway 18 between Westlock and Barrhead. Unfortunately, a hailstorm hit on July 24, 2024, causing so much damage that all the pulse trials had to be abandoned.

We are using data from the Lacombe site for this report on pulse RVT trials. Lacombe is in a black soil zone with a short growing season, similar to the conditions in Westlock. This makes it a good alternative for gathering data in a comparable environment.

In the 2024 growing season, yellow and green peas were combined into one trial, instead of having separate trials like in past years. The trial had 20 entries in total—17 yellow pea varieties and 3 green pea varieties. On the other hand, the Fababean trial was done separately and included 11 different varieties

Agronomy – Site Location: Lacombe
Seeding Date: Yellow Peas and Green Peas and Faba Beans: May 10,2024
Previous Crop: Barley
Plant density: Peas – 88 plants/m²; Faba beans – 44 plants/m²
Fertility:
    Soil Test Report:
        Nitrogen: 20 lbs/ac; Phosphorus: 56 lbs/ac; Potassium: 150 lbs/ac; Sulphur: 8 lbs/ac
    Nutrient Applied – Spring 2024
        Nitrogen: 6 lbs/ac; Phosphorus: 45 lbs/ac; Potassium: 38 lbs/ac; Sulphur: 0 lbs/ac;
        ** Zn was added to the fertilizer blend.
Herbicide
    Basagran Forte 800 ml/ac June 19
Rainfall
    Recorded from May 1 to September 10, 2024: 203 mm
Desiccation
    Reglone Ion@1.5 l/ac on August 09 (Peas)
    Reglone Ion@1.5 l/ac on September 06 (Faba Beans)
Harvest Date
    Yellow/Green Peas – August 23, 2024
    Faba Beans – September 11, 2024

Results and Discussion: The tables were obtained from the Alberta Pulse Growers Website, which provides publicly accessible information. Please note that the data reflects a single year from one location and may not fully represent the characteristics of any specific variety. Additionally, we were unable to locate any relevant statistical details for these tables. Therefore, we recommend exercising careful judgment when making decisions based on this information.

Table: Yellow/Green Peas; Site-Lacombe				
		Maturity Rating	**Standability**	**Yield**
Yellow Pea Cultivars		**Early-Late**	**1 (erect) - 9 (flat)**	**Bu/ac at 14 % Moisture**
1	**CDC Amarillo (check)**	Medium	2	**77**
2	CDC Boundless	Medium	2	**63**
3	CDC Hickie	Medium	3	**78**
4	AAC Planet	Medium	2	**62**
5	CDC Citrine	Medium	3	**70**
6	AAC Ardill	Medium	4	**74**
7	CDC Engage	Medium	3	**60**
8	CDC 5845	Medium	3	**61**
9	CS ProStar	Medium	4	**72**
10	CDC 5791-9	Medium/Late	2	**76**
11	AAC McMurphy	Medium/Late	2	**62**
12	P1209-2119 (AAC Harrison)	Medium	2	**69**
13	Caphorn	Medium	3	**70**
14	LN4228	Medium	2	**67**
15	CDC Tollefson	Medium	2	**73**
16	Boost	Early	4	**71**
17	6020 11	Medium	2	**65**
Green Pea Cultivars				
1	**CDC Limerick (check)**	Medium	3	**53**
2	CDC Rider	Medium/Late	2	**63**
3	CDC Huskie	Medium	2	**65**

Table: Faba Beans; Site-Lacombe				
		Maturity Rating	**Standability**	**Yield**
	Faba Beans	**Early-Late**	**1(erect)-9(flat)**	**Bu/ac at 16% Moisture**
1	**Fabelle (check)**	Medium	**1**	**97**
2	CDC 1089	Medium	**1**	**85**
3	Dosis	Early	**1**	**83**
4	Allison	Early/Medium	**1**	**76**
5	CDC 1310	Medium	**1**	**76**
6	Futura	Medium/Late	**1**	**104**
7	Hammer	Medium	**1**	**106**
8	Juno	Medium	**1**	**104**
9	Victus	Medium	**1**	**93**
10	Navi	Medium/Late	**1**	**93**
11	CDC 1142	Medium	**1**	**84**

Source: https://www.albertapulservt.com/?app=n

Acknowledgment:
GRO sincerely thanks AgCall and Alberta Pulse Growers for their generous contributions, which have been essential in supporting the execution and management of these trials.

GRO
CEREAL SITE

Co-operator: Randy Pidsadowski (NW 21-60-26-W4);

The 2024 GRO Cereal site, located at the intersection of Highway 44 and Township Road 604, spanned over 8 acres and featured approximately 1400 small plots. It served as a hub for various trials including cereal RVTs, Breeder's variety selection trials, Variety Registration trials, public-funded trials, and industrial trials and demonstrations.

Between May 1 and September 15, 2024, the site recorded a total precipitation of 221.2 mm, which accounted for approximately 75% of the region's normal annual average for the Westlock area. This significant moisture shortfall contributed to drier-than-usual growing conditions throughout the season. As a result, crop yields were impacted, with an estimated reduction of around 10% compared to typical production levels observed in previous years. Despite the challenges posed by the drier conditions, no lodging was observed in any of the cereal varieties grown during this period, indicating that the crops maintained good structural integrity and resilience.

Randy Pidsadowski, the site co-operator, applied 75 lbs/ac of actual nitrogen in Fall 2023 using Neon Air Coated Urea as the nitrogen source. Specific fertilization strategies tailored to different crop types were determined based on soil test results.

REGIONAL VARIETY TRIALS

Alberta's Regional Variety Trials play a critical role in assisting farmers with making well-informed decisions, enhancing crop productivity, and contributing to the advancement of agricultural research and breeding initiatives across the region.

"In this report, we are providing data from the GRO site (Westlock). However, it is important to note that single-site, single-year data may not provide a comprehensive assessment of variety performance. For a more reliable evaluation based on multi-site and multi-year data, please consult the January 2025 edition of the Alberta Seed Guide. Furthermore, it may take several years before some entries become available in the market."

Agronomic Information for the Regional Variety Trials:

Seeding Dates:
- Wheat, Triticale, and Flax: May 10, 2024
- Oats: May 15, 2024
- Barley: May 21, 2024

Seeding - done with Fabro zero-till drill:
- Depths: Wheat: 1.25 inch
    - Barley, Oats, Triticale, Flax: 1 inch
- Seeding Rates:
    - Barley: 270 plants/m^2
    - Oats: 300 plants/m^2
    - Triticale: 310 plants/m^2
    - Wheat: 330 plants/m^2
    - Flax: 800 plants/m^2
- Seed Treatment:
    - Teraxxa F4 @ 300 ml/100 kg of seed, except for flax (untreated)

Fertilizer:
- Fall 2023 applied by producer: 46-0-0 (coated with Neon Air) @ 163.04 lb/ac (75 lbs/ac actual N)
- Spring Applied - side banded:
    - Wheat/Triticale: 18.3-2.1-28.5-4.3 @ 350.7 lb/ac
        - 64.1 lb/ac actual N; 7.2 lb/ac actual P; 100.0 lb/ac actual K; 15.0 lb/ac actual S
    - Barley/Oats/Flax: 15.6-3.3-27.4-6.9 @ 218.8 lb/ac
        - 34.1 lb/ac actual N; 7.2 lb/ac actual P; 60.0 lb/ac actual K; 15.0 lb/ac actual S
- Seed Placed (for all cereals):
    - 11-52-0 @ 53.5 lb/ac - 5.9 lb/ac actual N; 27.8 lb/ac actual P
- Seed Placed - Flax:
    - 11-52-0 @ 26.7 lb/ac - 2.9 lb/ac actual N; 13.9 lb/ac actual P

Herbicide:
- Cereals:
    - MCPA Ester 600 + Pardner @ 320 ml/ac + 400 ml/ac — June 10
    - Prestige A+B @ 710 ml/ac + 600 ml/ac — June 24
    - Bison 400 L (except oats) @ 200 ml/ac — June 24
- Flax:
    - MCPA Ester 600 + Pardner @ 320 ml/ac + 400 ml/ac — June 10

Rainfall - recorded from May 1 - Sept 15: 221.2 mm

Dessication: Flax: Reglone @ 1.5L/ac on September 25

Harvest:
- Barley: September 16
- Wheat/Triticale: September 18
- Oats: September 20
- Flax: October 4

REGIONAL VARIETY TRIALS - BARLEY

Barley is an exceptionally versatile cereal crop grown globally for a wide range of purposes, including livestock feed, malting, and human consumption. **The 2024 Barley Regional Variety Trial included 20 entries, with the majority being two-row barley (more uniform kernels) varieties.** This trial evaluated both feed and malt barley types, offering valuable data on their performance and suitability for diverse applications.

Feed barley is primarily cultivated to provide high-energy, easily digestible nutrition for livestock. Breeding efforts for these varieties focus on enhancing yield, biomass, and nutritional quality, ensuring their effectiveness as a key component of animal feed. In contrast, malt barley is specifically grown to meet the stringent requirements of the brewing and distilling industries, where it is processed into malt for producing beer, whiskey, and other beverages.

The results reveal substantial variations in performance, with statistical analysis (ANOVA $p\text{-value} < 0.0001$) confirming significant differences among the varieties tested. The coefficients of variation (CV%) for yield, height, bushel weight, and kernel weight were notably low, indicating a high degree of consistency across the trial.

Barley - 2024										
	Variety Name	2 or 6 Row	Yield (% of AAC Synergy)		Height (cm)		Test Weight (LB/BU)		TKW (g/1000 seeds)	
1	**AAC SYNERGY (CHECK)**	**2**	**100%**	**cde**	**79**	**def**	**56**	**abcd**	**47**	**fg**
2	SY STANZA	2	107%	a	70.3	i	54	ef	49.7	bcdef
3	RGT ASTEROID	2	107%	a	70	i	54.3	def	51.2	bcd
4	AAC LARIAT	2	103%	b	81.3	cd	55.3	bcde	52.4	ab
5	FERGUSON	2	103%	bc	80.7	cde	55.5	bcde	47.9	efg
6	AB MAXIMIIZER	2	103%	bc	80.3	cde	56	abc	48.	efg
7	CDC CHURCHILL	2	103%	bc	77.3	efg	55.7	bcd	46.1	gh
8	AB FOOTHILLS	2	100%	cd	83.3	bc	55.7	bcd	46.8	fg
9	CARLETON	2	99%	de	75.7	fgh	57.3	a	49	def
10	AAC STOCKON	2	99%	def	84	bc	56	abcd	52.5	ab
11	RICHER	6	98%	defg	97.7	a	53	fg	46.6	fgh
12	AB STANDSWELL	6	97%	efg	74.3	gh	52	g	43.3	h
13	CDC COPELAND	2	95%	g	86.7	b	55.7	bcd	48.9	defg
14	AS MANON	2	91%	h	83.3	bc	55.7	bcd	51.6	bcd
15	AS LAFLEUR	2	91%	h	82.7	cd	57.3	a	50.5	bcde
16	CDC AUSTENSON (BENCHMARK CHECK)	2	89%	hi	79.3	def	57	ab	51.8	abc
17	AB DRAM	2	88%	ij	81.3	cd	55.7	bcd	49.2	cdef
18	AC METCALFE	2	85%	j	79.3	def	56.5	abc	46.9	fg
19	VARIETY X	2	Data for unregistered varieties cannot be published							
20	VARIETY Y	6								
Average			**4787 g/plot**		**80 cm**		**55.5 lbs/bu**		**49 g/1000**	
ANOVA p-value			**<0.0001**		**<0.0001**		**<0.0001**		**<0.0001**	
CV%			**6.75%**		**7.83%**		**2.66%**		**6.51%**	

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

REGIONAL VARIETY TRIALS - WHEAT

Canada's wheat classification system is a framework designed to categorize varieties based on their quality, functionality, and end-use suitability. It ensures consistency and reliability in wheat production, processing, and export. Managed by the Canadian Grain Commission (CGC), the system helps producers, marketers, and buyers understand the quality of Canadian wheat.

In 2024, GRO conducted two wheat trials. The first trial focused on CWRS wheat varieties, comprising 19 entries, while the second trial included all other wheat classes (CPSR, CWSP, and CWSWS) and featured 13 entries.

CWRS Wheat - 2024											
	Variety Name	**Yield (% of AAC Brandon)**		**Height**		**Lodging**		**Lbs/BU**		**TKW (g/1000 seeds)**	
1	**AAC BRANDON (CHECK)**	**100%**	**fgh**	**87.3**	**cde**	**2.3**	**cd**	**67.0**	**abc**	**40.0**	**cdef**
2	BAKER	115%	a	82.7	ghi	2.7	bc	67.7	ab	38.9	efgh
3	AAC CRAVEN	108%	b	82.0	hi	2.0	cde	67.0	abc	36.8	h
4	BREADWINNER	108%	bc	86.3	cdef	3.7	a	67.3	abc	43.3	ab
5	AAC STOUGHTON	107%	bc	88.3	c	1.3	ef	67.7	ab	41.9	abcd
6	PALISADE	107%	bc	87.3	cde	2.0	cde	67.7	ab	41.0	bcde
7	CDC ENVY	107%	bc	87.7	cd	3.3	ab	66.0	c	39.7	cdefg
8	AAC VIEWFIELD (BENCHMARK CHECK)	106%	bcd	80.7	i	2.3	cd	67.7	ab	36.8	h
9	AAC SPIKE	106%	bcd	82.3	ghi	1.3	ef	67.3	abc	37.1	gh
10	AAC WALSH	106%	bcd	85.3	cdef	1.0	f	66.0	c	43.9	a
11	AAC WESTKING	105%	bcde	84.0	fgh	1.0	f	66.7	bc	42.1	abc
12	AAC HOCKLEY	103%	cdef	80.7	i	1.0	f	67.7	ab	38.8	efgh
13	AAC WALKER	102%	defg	85.0	defgh	2.0	cde	67.0	abc	37.1	fgh
14	FLAME	101%	efg	85.3	cdefg	2.0	cde	68.3	a	39.3	cdefgh
15	AAC DARBY VB	101%	efg	91.7	b	1.3	ef	67.0	abc	39.9	cdefg
16	GARDE	100%	efgh	76.0	j	1.3	ef	66.7	bc	37.5	fgh
17	AAC OAKMAN	99%	fgh	84.3	efgh	1.0	f	67.3	abc	39.1	defgh
18	DONALDA	97%	gh	83.7	fghi	1.7	def	67.7	ab	40.4	bcde
19	ZEALAND	96%	h	104.0	a	2.0	cde	67.0	abc	39.8	cdefg
Average		**4446 g/plot**		**86 cm**		**1.9 (1-9)**		**67.2 lbs/bu**		**39.6 g/1000 seeds**	
ANOVA p-value		**<0.0001**		**<0.0001**		**<0.0001**		**0.0205**		**<0.0001**	
CV%		**2.70%**		**2.20%**		**22.30%**		**1.30%**		**4.40%**	

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

CPSR/CWSP/SWS Wheat - 2024									
	Variety Name	**Yield (% of AAC Brandon)**		**Height**		**Lbs/BU**		**TKW (g/1000 seeds)**	
1	**AAC BRANDON (CHECK)**	**100%**	**g**	**84.3**	**c**	**68.3**	**a**	**42.8**	**cdef**
2	AAC GALORE	136%	a	92.0	a	67.7	ab	44.6	abcd
3	AC SADASH	131%	b	91.7	a	67.7	ab	43.1	bcdef
4	ALOTTA	126%	c	81.3	e	65.7	d	47.5	a
5	UA FOREFRONT	118%	d	80.7	e	67.3	ab	44.4	abcde
6	AAC AWESOME	118%	d	88.0	b	67.3	ab	46.2	ab
7	FIERCE	116%	d	82.0	de	68.3	a	38.1	g
8	AC ANDREW	115%	de	84.0	cd	66.0	cd	41.5	def
9	RECOIL	111%	ef	77.0	f	67.0	bc	40.1	fg
10	AAC CAMROSE	111%	ef	76.3	f	67.3	ab	41.3	ef
11	AAC GOODWIN	108%	f	86.0	bc	68.3	a	42.7	def
12	AAC PENHOLD	103%	g	76.0	f	67.3	ab	44.3	abcde
13	VARIETY X	Data for unregistered variety cannot be published							
Average		**4690 g/plot**		**84 cm**		**67 lbs/bu**		**43.3 g/1000**	
ANOVA p-value		**<0.0001**		**<0.0001**		**0.0084**		**0.0004**	
CV%		**2.00%**		**1.50%**		**1.10%**		**4.50%**	

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

The results reveal substantial variations in performance, with statistical analysis (ANOVA p-value < 0.0001) confirming significant differences among the varieties tested. The coefficients of variation (CV%) for yield, height, bushel weight, and kernel weight were notably low, indicating a high degree of consistency across the trial.

REGIONAL VARIETY TRIALS - OATS

Oats play a crucial role in Canadian agriculture, with Canada being one of the world's largest producers and exporters, particularly from the Prairie provinces of Alberta, Saskatchewan, and Manitoba. Well-suited to the country's cool climate, oats thrive where other grains may struggle, making them a reliable crop for farmers. They contribute significantly to the economy, serving both as a staple in human consumption—found in oatmeal, granola, and health foods—and as livestock feed. Oats are also valued for their nutritional benefits, being rich in fiber and essential minerals. Additionally, they support sustainable farming through crop rotation, helping maintain soil health and prevent disease cycles.

In 2024, the RVT Oat trial featured 13 entries, showcasing ongoing research and development in oat cultivation.

OATS - 2024									
	Variety Name	**Yield (% of CS CAMDEN)**		**Height**		**Lbs/BU**		**TKW (g/1000 seeds)**	
1	**CS CAMDEN (CHECK)**	**100%**	**efg**	**83.7**	**cd**	**44**	**abc**	**44.2**	**cde**
2	AAC WESLEY	107%	a	75.3	e	45	ab	42.4	e
3	CDC WESTGATE	105%	ab	114.3	a	44	bc	44.2	cde
4	AAC ANTHONY	104%	abc	87.3	b	42	cd	49.6	a
5	CDC BYER	103%	bcd	81.7	d	44	abc	43.6	e
6	KYRON	103%	bcd	83.3	cd	46	ab	42.8	e
7	CDC ANSON	102%	cde	72.7	f	45	ab	44.7	bcde
8	AAC NEVILLE	101%	def	77.3	e	45	ab	43.1	e
9	CDC ARBORG	99%	gf	88.0	b	45	ab	43.9	de
10	AAC FEDAK	99%	gf	85.7	bc	46	a	47.6	ab
11	AC MORGAN	98%	gf	87.3	b	47	a	46.7	abcd
12	OREBOOST	91%	h	86.3	b	40	d	49.5	a
13	VARIETY X	Data for unregistered variety cannot be published							
Average		**4598 g/plot**		**85.3 cm**		**44.5 lbs/bu**		**45.3 g/1000 seeds**	
ANOVA p-value		**<0.0001**		**<0.0001**		**0.0006**		**0.0002**	
CV%		**1.60%**		**1.80%**		**3.50%**		**3.90%**	

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

The results reveal substantial variations in performance, with statistical analysis (ANOVA p-value < 0.0001) confirming significant differences among the varieties tested. The coefficients of variation (CV%) for yield, height, bushel weight, and kernel weight were notably low, indicating a high degree of consistency across the trial.

REGIONAL VARIETY TRIALS - TRITICALE AND FLAX

Triticale, a hybrid of wheat and rye, is adaptable with high yield potential. As of 2003, Alberta accounted for approximately 80% of the Prairie's triticale production, utilizing it primarily for feed, forage, and grazing purposes. Recent advancements in breeding programs within Alberta has led to the development of improved triticale varieties. These new cultivars offer earlier maturity, shorter stature to prevent lodging, and enhanced drought resistance, making them increasingly popular among farmers.

In 2024, the RVT Triticale trial included three entries.

Triticale - 2024										
	Variety Name	Yield (% of BREVIS)		Height		Lbs/BU		TKW g/1000 seeds	
1	**BREVIS (CHECK)**	**100%**	**a**	**93**	**c**	**64**	**a**	**44.4**	**a**
2	AB SUNBEAM	102%	a	97.7	b	64.3	a	47.2	a
3	PRONGHORN	93%	b	102.7	a	60.7	b	43.5	a
Average		**4542 g/plot**		**97.8 cm**		**63 lbs/bu**		**45 g/1000 seeds**	
ANOVA p-value		**0.0109**		**0.0027**		**0.0019**		**0.6072**	
CV%		**1.60%**		**1.10%**		**0.60%**		**7.50%**	

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

The results reveal substantial variations in performance, with statistical analysis (ANOVA p-value < 0.0001) confirming significant differences among the varieties tested. The coefficients of variation (CV%) for yield, height, bushel weight, and kernel weight were notably low, indicating a high degree of consistency across the trial.

Flax production in Canada plays a significant role in the country's agricultural sector, with Canada being one of the world's top producers and exporters of flaxseed. The majority of flax is grown in the Prairie provinces, with Saskatchewan leading production, followed by Manitoba and Alberta. The crop thrives in the region’s well-drained soils and cool growing conditions, making it well-suited for the Canadian climate. Typically planted in May and harvested from mid-September to late October, flax is relatively drought-resistant, which is beneficial for the often-unpredictable weather in the Prairies. **GRO acted as the volunteer site for the RVT Flax trial, which featured three varieties.**

Flax - 2024					
	Variety Name	Yield (% of CDC GLAS)		Height	
1	**CDC GLAS (CHECK)**	**100%**	**a**	**56.3**	**c**
2	CDC ESME	103%	a	52.2	b
3	CDC KERNEN	93%	b	53.3	a
Average		**2231 g/plot**		**54 cm**	
ANOVA p-value		**0.0657**		**0.1262**	
CV%		**2.70%**		**2.60%**	

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

GRO continues to work towards ensuring local producers have the best information on the viability of flax as a growth in this area. The success of this voluntary trial increases the likelihood that going forward, this area will have a full trial to help local producers decide whether or not flax should be considered a part of their farm rotation, alone or in combination with other species in a polyculture crop.

REGIONAL VARIETY TRIALS

Remember:
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 2025 - 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.

Acknowledgment:

GRO would like to extend its sincere appreciation to the financial supporters who have made this program possible. We would like to acknowledge the generous contributions from RDAR (Results Driven Agriculture Research), Alberta Grains, Western Grains Research Foundation (WGRF), Alberta Seed Processors, Alberta Oat, and the Alberta and British Columbia Seed Growers Associations. Their invaluable support, along with the partnership of all industry stakeholders, has played a crucial role in the successful operation and continuation of this program.

ADVANCED AGRONOMIC WHEAT TRIAL

Gateway Research Organization (GRO) has been actively involved in Regional Variety Trials (RVTs) since 1988, playing a crucial role in evaluating and comparing the performance of different crop varieties under regional conditions. These trials have provided valuable insights into the adaptability, yield potential, and agronomic performance of numerous wheat varieties.

However, not all locally grown wheat varieties are included in the RVT program, sparking interest among regional producers who seek direct comparisons between newer varieties in the RVT program and the most widely cultivated, established varieties in the area. Addressing this gap would give producers a clearer understanding of how emerging varieties compare to their current options, helping them make more informed decisions based on their agronomic and economic goals.

At the start of the 2024 season, GRO's crop committee met with GRO staff to review the RVT wheat trial treatment list. Following their review, the committee recommended including a trial for locally grown varieties. They selected 20 varieties for the trial, but some seed dealers declined to allow their entries. Ultimately, the trial was established with 17 entries, consisting of 9 CWRS, 4 CPSR, 1 CNHR, and 3 CWSWS varieties.

Agronomics:

Seeding Date: May 10, 2024
Seeding Depth: 1.25 inch
Seeding Rate: 330 plants/m^2 - CWRS, CPSR, CNHR, CWSWS
Seed Treatment: Teraxxa F4 @ 300 mL/100 kg of seed
Fertilizer:
- Fall applied by producer: 46-0-0 (coated with Neon Air) @ 163.04 lbs/ac = 75 lbs/ac actual N
- Spring applied:
  - side banded: 18.3-2.1-28.5-4.3 @ 350.7 lbs/ac = 64.1 lbs.ac actual N; 7.2 lbs/ac actual P; 100.0 lbs/ac actual K; 15.0 lbs/ac actual S
  - seed placed: 11-52-0 @ 53.5 lbs/ac = 5.9 lbs/ac actual N; 27.8 lbs/ac actual P

Pesticide:
- MCPA Ester 600 + Pardner @ 320 mL/ac on June 10
- Prestige A+B @ 710 mL/ac + 600 mL/ac on June 24
- Bison 400L @ 200 mL/ac on June 24
- Miravis Ace @ 404 mL/ac on July 12

Rainfall: recorded from May 1 - September 15: 221.2 mm
Harvest Date: September 10, 2024

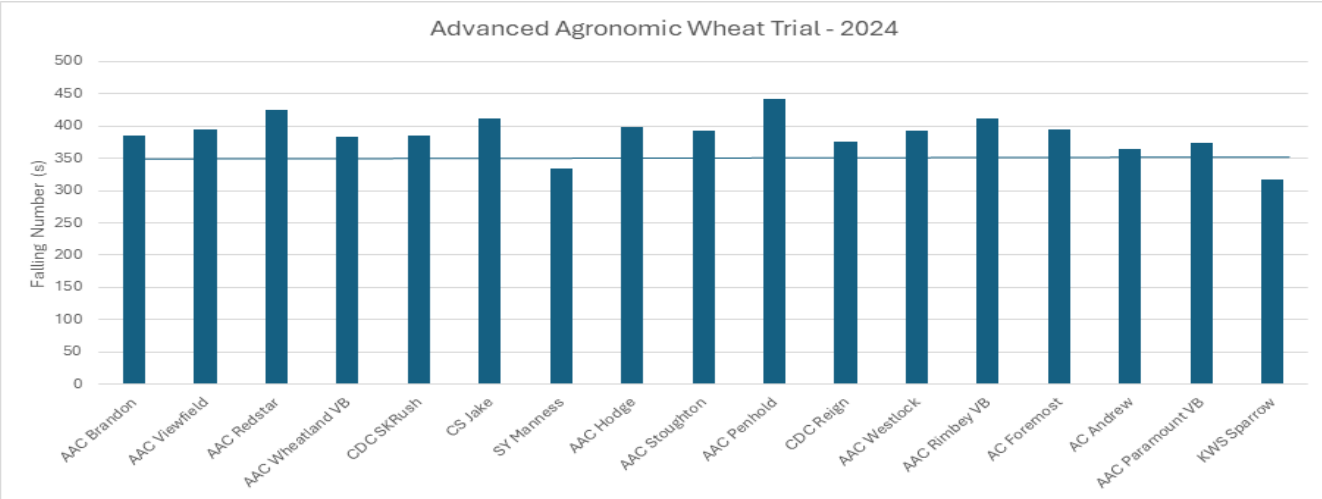
Following harvest, grain samples were collected and analyzed using a Near-Infrared (NIR) Spectroscopy machine to assess key quality parameters. This preliminary analysis was conducted on-site to provide immediate insights into the grain's composition. Additionally, a composite sample was prepared for each treatment by combining representative subsamples. These composite samples (one per treatment) were then sent to a Cereal Breeding Lab (CBL) for a Falling Number (FN) test. The FN test is a critical assessment used to evaluate enzymatic activity and potential sprout damage, ensuring a comprehensive quality evaluation of the harvested grain.

ADVANCED AGRONOMIC WHEAT CONT'D

Advanced Agronomic Wheat Trial - 2024

Trt #	Trt Name	Wheat Class	Height (cm)		Lodging (1-9)		Yeild at 13% Moisture kg/ha		Yeild at 13% Moisture bu/ac		Test Weigh lb/bu		Test Weigh kg/HL		TKW (g/1000 seeds)		Protein (%)		Gluten (%)	
1	AAC Brandon	CWRS	77	d-g	1	na	5227	f-i	**78**	fgh	69	a-d	85	a-d	39.86	def	14.5	abc	36.1	a
2	AAC Viewfield	CWRS	81	bcd	1	na	5580	def	**83**	de	70	a	86	abc	37.48	fgh	14.6	abc	36.4	a
3	AAC Redstar	CWRS	79	b-f	1	na	5091	hij	**76**	ghi	68	cd	84	bcd	37.52	fgh	14.2	abc	34.4	abc
4	AAC Wheatland VB	CWRS	77	c-g	1	na	5282	e-i	**79**	efg	70	ab	86	abc	40.31	c-f	13.6	a-d	34.0	abc
5	CDC SKRush	CWRS	83	abc	1	na	5199	ghi	**77**	ghi	69	a-d	84.5	a-d	35.4	gh	13.6	a-d	33.9	abc
6	CS Jake	CWRS	78	c-g	1	na	4926	ij	**73**	hi	69	a-d	84.5	a-d	35.26	gh	14.4	abc	34.7	ab
7	SY Manness	CWRS	87	a	1	na	4835	j	**72**	i	69	a-d	85.5	a-d	34.24	h	14.6	abc	35.2	ab
8	AAC Hodge	CWRS	81	bcd	1	na	5541	d-g	**82**	def	70	abc	86	abc	37.41	fgh	13.2	a-d	33.0	abc
9	AAC Stoughton	CWRS	79	c-f	1	na	5546	d-g	**82**	def	70	a	86.5	ab	42.71	a-e	14.9	ab	35.3	ab
10	AAC Penhold	CPSR	74	fg	1	na	5914	c	**88**	c	68	bcd	84.5	a-d	42.25	b-e	13.7	a-d	32.1	a-d
11	CDC Reign	CPSR	78	c-g	1	na	5428	d-h	**81**	d-g	69		85.5	a-d	39.17	ef	13.6	a-d	34.3	abc
12	AAC Westlock	CPSR	73	g	1	na	5928	c	**88**	c	68	bcd	84.5	a-d	46.51	a	13.3	a-d	31.7	a-d
13	AAC Rimbey VB	CPSR	80	b-e	1	na	5896	c	**88**	c	68	d	83.5	cd	46.39	a	12.4	bcd	30.5	bcd
14	AC Foremost	CNHR	86	a	1	na	4927	ij	**73**	hi	68	d	83	d	44.27	ab	13.6	a-d	33.7	abc
15	AC Andrew	CWSWS	74	efg	1	na	5709	cd	**85**	cd	69	a-d	84.5	a-d	43.68	abc	12.4	bcd	29.4	cd
16	AAC Paramount VB	CWSWS	81	bcd	1	na	7312	a	**108**	a	69	a-d	84.5	a-d	46.54	a	11.4	d	25.6	e
17	KWS Sparrow	CWSWS	76	d-g	1	na	6860	b	**102**	b	66	e	81	e	42.51		12.0	cd	28.0	de
LSD P=.05			3.43		.		233.17		3.38		1.09		1.53		2.4554		1.44		2.994	
Standard Deviation			2.07		0		141.07		2.04		0.66		0.73		1.4855		0.688		1.811	
CV			2.63		0		2.54		2.47		0.96		0.86		3.63		5.08		5.46	

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



Results and Discussion: The Least Significant Difference (LSD) at P=0.05 for yield was 233.17 kg/ha, indicating that many yield differences between varieties were statistically significant. This variation is largely due to the inclusion of different wheat classes in a single trial. However, within each wheat class, the differences were not statistically significant. The coefficient of variation (CV) for yield was 2.54%, demonstrating a relatively low level of experimental error, which strengthens the reliability of these findings.

The falling number of test results for the 17 wheat varieties in this trial indicate notable differences in sprouting resistance and grain quality. Most varieties displayed falling numbers between 370 and 410, indicating moderate stability in grain quality. Overall, the results suggest that varieties with falling numbers above 400, are likely better suited for high-quality flour production. Conversely, varieties with lower falling numbers may require careful management to mitigate sprouting risks. These findings provide valuable insights for growers selecting wheat varieties based on regional climate conditions and end-use quality requirements.

Acknowledgment: We sincerely appreciate the industry stakeholders for their valuable contributions. Additionally, we extend our gratitude to the Cereal Breeding Lab team for conducting the Falling Number analysis.

ARBUSCULAR MYCORRHIZAL FUNGI EFFECTS ON WHEAT PERFORMANCE

Canada is a world-leading wheat producer, with 9.9 million mt of spring wheat produced in 2022. However, many regions in western Canada have been experiencing frequent and severe droughts over the last few decades, which can lead to 50% yield losses in spring wheat. Wheat plants can form a mutually beneficial arrangement with a fungus that form tree-like structures (arbuscules) on cortical root cells of the plant. It is well known that mycorrhizal plants are more drought tolerant compared to non-mycorrhizal plants. Earlier studies have shown that some genotypic variability exists for arbuscular mycorrhizal fungi (AMF) root colonization in durum wheat and its subsequent impact on wheat production in Canada. These studies have shown positive responses of AMF for plant biomass, nutrient uptake, and yield. With the current crop rotation in Alberta, non-mycorrhizal crops disrupt the AMF stabilization in the soil. Therefore, effective AMF inoculants may help to re-establish the AMF-plant symbiotic relationship.

Wheat is very sensitive to drought stress at tillering, heading, and flowering. Many reports reveal that AMF effectively improves crop production, especially under drought conditions. AMF are obligate biotrophs, which are associated with 80% of the land plants. AMF forms an extensive fungal network within the soil and explores soil pores, where the plant root system cannot contact, accessing water unavailable to non-AM plants. AMF also improves water retention capacity, which supports plant growth even under drought conditions. AMF modulates protein under drought stress in wheat roots reducing the osmotic stress and maintaining cellular integrity. However, detailed field studies have not been conducted to identify Canadian spring wheat cultivars that encourage AMF and alleviate drought stress under Alberta soil and climatic conditions. Therefore, the identification of spring wheat cultivars for enhanced compatibility with AMF under drought conditions will help wheat producers mitigate the negative effects of drought stress, thus improving plant growth, yield, grain quality, and profitability.

This study was conducted at two locations (U of A and GRO) to assess the performance of six Canadian Western Red Spring (CWRS) wheat cultivars under field conditions. The cultivars evaluated in this study included Go Early, CDC Utmost, AAC Hodge, AAC Hockley, AAC Viewfield, and AAC Brandon. Key parameters examined included root colonization, water-use efficiency, plant growth, nutrient uptake, grain yield, and grain protein production. The preliminary findings presented in this report are based on data collected from the GRO site.

Agronomics:

Seeding Date: May 14, 2024
Seeding Depth: 1 inch
Seeding Rate: 350 plants/m^2
Fertilizer:
    Fall applied by producer: 46-0-0 (coated with Neon Air) @ 163.04 lbs/ac = 75 lbs/ac actual N
    Spring applied:
        side banded: 18.5-4.6-26.4-4.0 @ 378.55 lbs/ac = 70 lbs.ac actual N; 17 lbs/ac actual P; 100.0 lbs/ac actual K; 15.0 lbs/ac actual S
Pesticide:
    MCPA Ester 600 + Pardner @ 320 mL/ac on June 10
    Prestige A+B @ 710 mL/ac + 600 mL/ac on June 24
    Bison 400L @ 200 mL/ac on June 24
Rainfall: recorded from May 1 - September 15: 221.2 mm
Harvest Date: September 18, 2024

Results and Discussion:

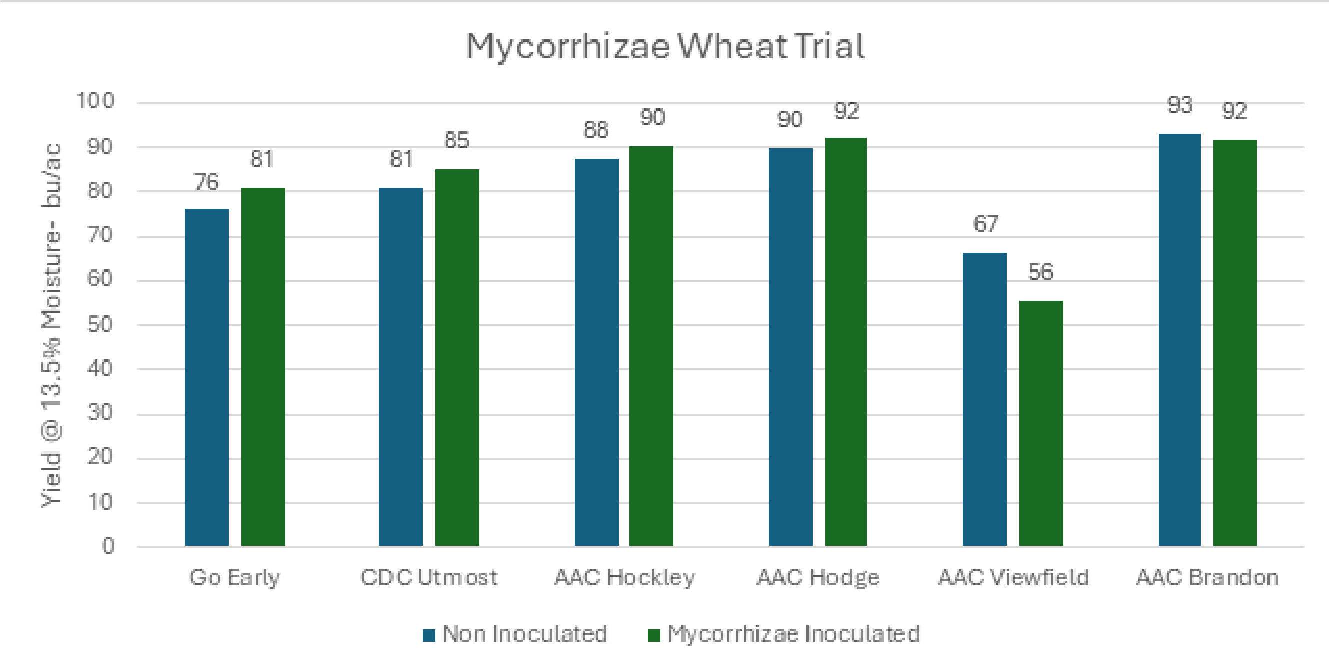
In conclusion, although Mycorrhizae inoculation did not consistently outperform non-inoculated treatments across all evaluated parameters, it exhibited significant benefits in terms of plant height and specific quality attributes. These findings suggest that while Mycorrhizae may not provide an immediate increase in yield, its potential long-term contributions to soil health and overall plant performance require further investigation over multiple growing seasons.

Mycorrhizae Wheat Trial -Westlock - 2024

Trt #	Treatment Name		Height (cm)		Lodging (1-9)		Yield (bu/ac)		Test Weight lbs/bu		Test Weight kg/HL		TKW (g/1000 seeds)		Protein (%)		Gluten (%)	
1	Go Early	Non-Inoculated	94	a	1	-	76	d	66.3	bcd	81.8	b-e	51.30	ab	15.8	ab	41.8	-
2	CDC Utmost	Non-Inoculated	85	b	2.3	-	81	c	67.0	abc	82.3	bcd	48.99	cde	15.1	ab	40.0	-
3	AAC Hockley	Non-Inoculated	74	d	1	-	88	ab	67.5	abc	83.3	a-d	50.85	abc	15.5	ab	38.9	-
4	AAC Hodge	Non-Inoculated	80	c	1	-	90	ab	68.5	ab	84.5	ab	49.64	bcd	15.0	ab	41.4	-
5	AAC Viewfield	Non-Inoculated	68	e	1	-	67	e	65.8	cd	81.0	de	47.51	e	16.4	a	41.8	-
6	AAC Brandon	Non-Inoculated	80	c	1.0	-	93	a	68.3	abc	84.5	ab	52.26	a	15.2	ab	40.2	-
7	Go Early	Mycorrhizae Inoculated	96	a	1.3	-	81	c	66.0	bcd	81.5	cde	51.35	ab	15.9	ab	42.4	-
8	CDC Utmost	Mycorrhizae Inoculated	87	b	2.8	-	85	bc	67.3	abc	83.0	a-d	48.83	de	15.4	ab	41.0	-
9	AAC Hockley	Mycorrhizae Inoculated	75	d	1.0	-	90	ab	68.3	abc	84.3	ab	50.49	a-d	15.4	ab	38.4	-
10	AAC Hodge	Mycorrhizae Inoculated	82	c	1	-	92	a	68.3	abc	84.0	abc	50.54	a-d	14.8	b	40.2	-
11	AAC Viewfield	Mycorrhizae Inoculated	66	e	1	-	56	f	64.3	d	79.5	e	44.54	f	16.2	ab	40.5	-
12	AAC Brandon	Mycorrhizae Inoculated	79	c	1	-	92	a	69.0	a	85.3	a	51.41	ab	15.4	ab	40.2	-
LSD P=.05 (% mean diff)			2.87 (4%)		0.50 (40%)		4.08 (5%)		1.58 (3%)		1.75 (3%)		1.3525 (3%)		0.868 (6%)		2.689 (7%)	
Standard Deviation			2		0.35		2.84		1.1		1.22		0.94		0.6		1.87	
CV			2.5		27.5		3.44		1.64		1.47		1.89		3.9		4.61	

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

ARBUSCULAR MYCORRHIZAL FUNGI EFFECTS ON WHEAT PERFORMANCE CONT'D



Acknowledgments:

We extend our sincere gratitude to RDAR for their generous financial support, which made this research possible. We would also like to express our appreciation to Dr. Malinda Thilakarathna (University of Alberta) for providing the necessary resources and facilities to conduct this study.

Results Driven Agriculture Research

OATS, PGRS, SEEDING RATES AND THEIR INTERACTIONS ON LODGING AND SHATTERING

Oats are an important crop whose acreage in the prairies has increased in recent years as a result of breeding efforts resulting in high-yielding varieties. Several agronomic projects in the past have determined the relationship between seeding rates, dates, and wild oat suppression, the relationship between caryopsis sizes, seedling vigor, and competition with wild oats. A recent report from a one-year trial in Saskatchewan indicated that plant growth regulators (PGRs) had a significant effect on agronomic parameters in tall and short oat varieties. Increased seeding rates are associated with better weed competition and increased yields. However, there is an optimum seeding rate for oats after which there are no benefits. For new oat varieties, the jury is still out on whether the current standard seeding rate is optimum. Oat yields and quality are affected by lodging and shattering, both of which pose a challenge for producers. PGRs used to address lodging were proven effective. However, how PGRs interact with seeding rates and their effects on shattering is unknown. While there is a genetic component to shattering, a study in China has attributed shattering to palea and lemma morphological polymorphism in naked oat varieties. Management and environmental conditions are also huge contributing factors to shattering in addition to genetics.

This project aims to explore the interaction between plant growth regulators (PGRs), specifically Moddus® and Manipulator®, and increased oat seeding rates, as well as their impact on shattering across different prairie locations, both under normal field conditions and drought conditions in a greenhouse setting.

The 2024 season marked the first year of the project, and this report presents the findings from the GRO site. **It is important to note that data from a single site and year is generally not sufficient to draw scientific conclusions.**

Agronomics:

Seeding Date: May 15, 2024
Seeding Depth: 1 inch
Seeding Rate: 300 plants/m^2 ; 400 plants/m^2
Fertilizer:
Fall applied by producer: 46-0-0 (coated with Neon Air) @ 163.04 lbs/ac = 75 lbs/ac actual N
Spring applied:
side banded: 15.6-3.3-27.4-6.9 @ 218.81 lbs/ac = 34.1 lbs.ac actual N; 7.2 lbs/ac actual P; 60.0 lbs/ac actual K; 15.0 lbs/ac actual S
seed placed: 11-52-0 @ 53.5 lbs/ac = 5.9 lbs/ac actual N; 27,8 lbs/ac actual P
Pesticide:
MCPA Ester 600 + Pardner @ 320 mL/ac on June 10
Prestige A+B @ 710 mL/ac + 600 mL/ac on June 24
PGR Application @ GS 31-32
Manipulator @ 930 mL/ac on July 11
Moddus @ 340 mL/ac on July 11
Rainfall: recorded from May 1 - September 15: 221.2 mm
Harvest Date: September 20, 2024

Results and Discussion:

A linear mixed-effects model formula has been used for analyzing data, specifically for predicting yield based on various factors (PGR, Seeding Rate, Variety) and their interactions (PGR*Seeding Rate, PGR*Variety, Seeding Rate*Variety).

Regarding Yield, both PGR and Variety exhibited significant effects, whereas Seeding Rate did not. Plots treated with PGR showed higher yields compared to the control, with no significant differences observed among different types of PGR. Among the varieties, Morgan and Camden yielded higher, while Summit showed lower yields.

OATS & PGRS CONT'D

For Days to Maturity (DTM), all factors—PGR, Variety, and Seeding Rate—had individual significant effects, though their interactions did not show significance. In contrast, for Days to Flowering (DTF), only Variety showed significance, indicating that PGR and Seeding Rate did not affect flowering significantly.

The number of tillers was significantly influenced by the Seeding Rate, with plots having fewer plants showing more tillers. Lodging was significantly affected by both PGR and Variety, while the Seeding Rate did not show a significant effect. Plots treated with Manipulator exhibited less lodging compared to the control and Moddus. Among varieties, AAC Morgan had the least lodging, whereas AC Summit had the highest.

Similarly, both PGR and Variety significantly affected Plant Height, with Manipulator-treated plots being shorter than controls. Among varieties, AC Summit was the shortest, while Arborg was the tallest. Thousand Kernel Weight (TKW) showed significance only among Varieties, while other factors did not. Plant count measurements were highly significant with the Seeding Rate.

This analysis underscores the differential impacts of PGR, Seeding Rate, and Variety on various agronomic traits, highlighting their potential for optimizing crop yield and plant characteristics in agricultural practices.

Source of variation	Yield (kg/ha)	TKW	DTM	DTF	Tillers	Plant counts	Lodging	Plant height (cm)
	Pr(>F)	Pr(>F)	Pr(>F)	Pr(>F)	Pr(>F)	Pr(>F)	Pr(>F)	Pr(>F)
PGR	0.001**	ns	0.0001***	ns	ns	na	0.001**	0.0001***
Seeding Rate	ns	ns	0.001**	ns	0.001**	0.0001**	ns	ns
Variety	0.0001***	0.0001***	0.001**	0.001*	ns	ns	0.0001***	0.0001***
PGR & Seeding Rate	ns	ns	ns	ns	ns	ns	ns	ns
PGR & Variety	ns	ns	ns	ns	ns	na	0.0001***	ns
Seeding Rate &Variety	ns	ns	ns	ns	ns	ns	ns	ns

Table1 : Analysis of variance of treatments imposed during the experiment

PGR	**Yield (kg/ha)**	**Plant Height (cm)**	**DTM**	**DTF**	**Tillers**	**Plant counts**	**Lodging**	**TKW**
Manipulator	6753 a	79.3 a	102 b	64.1 a	1.08 a	227 b	1.81 a	43.9 a
Control	6564 b		101 a	63.8 a	1.08 a	220 b	2.59 b	43.4 a
Moddus	6775 a	80.8 b	101 a	63.9 a	1.07 a	240 a	2.25 b	44.0 a
Seeding Rate	**Yield (kg/ha)**	**Plant Height (cm)**	**DTM**	**DTF**	**Tillers**	**Plant counts**	**Lodging**	**TKW**
400	6663 a	81.9 a	101 a	64.0 a	1.03 a	249 a	2.42 b	43.6 a
300	6732 a	82.6 a	102 b	63.9 a	1.12 b	209 b	2.02 a	43.8 a
Variety	**Yield (kg/ha)**	**Plant Height (cm)**	**DTM**	**DTF**	**Tillers**	**Plant counts**	**Lodging**	**TKW**
AC Summit	5847 c	79.0 a	102 bc	63.5 a	1.08 a	232 a	5.33 b	41.2 c
CS Camden	7057 a	80.0 a	101 ab	64.3 b	1.07 a	234 a	1.08 a	43.5 bc
CDC Arborg	6791 b	87.7 c	100 a	63.9 ab	1.08 a	227 a	1.42 a	44.6 b
AAC Morgan	7094 a	82.2 b	102 c	64 ab	1.08 a	222 a	1.04 a	45.6 a

Values with the same letter do not differ significantly

Acknowledgments:
We extend our sincere gratitude to RDAR for their generous financial support, which made this research possible. We would also like to express our appreciation to Dr. Linda Gorim (University of Alberta) for providing the necessary resources and facilities to conduct this study.

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Results Driven Agriculture Research

UNIVERSITY OF ALBERTA

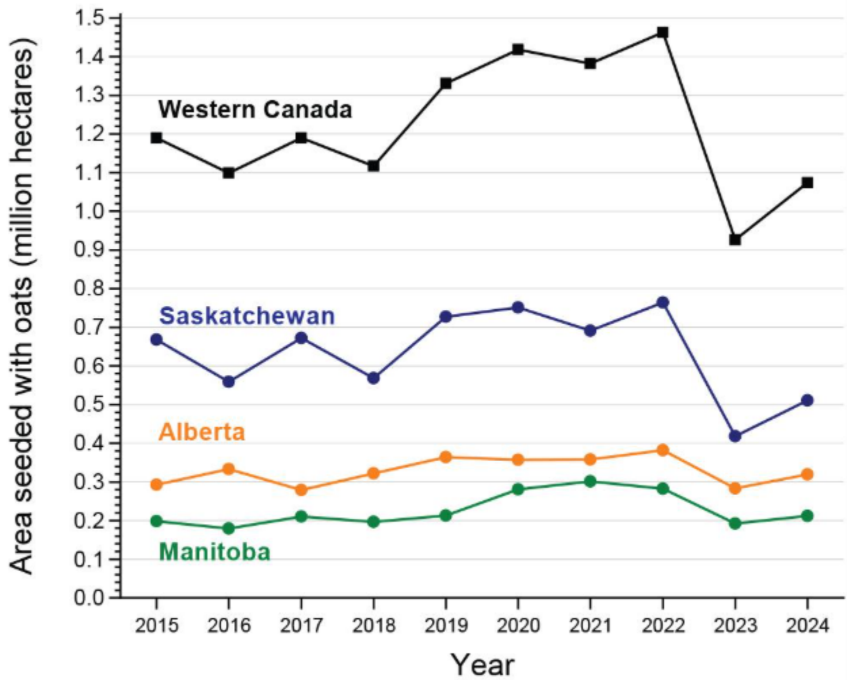
2024 POGA MILLING OATS TRIAL

Purpose: Increase the Oat Acres in Alberta by Finding a High-Yielding Oat Variety that Maximizes Producer Income and Meets the Demands of the Millers

Cooperator: Randy Pidsadowski – NW21-60-26-W4 (Westlock Site)
Gilles Garand - SW 27-77-20 W5 (Peace Region Site)

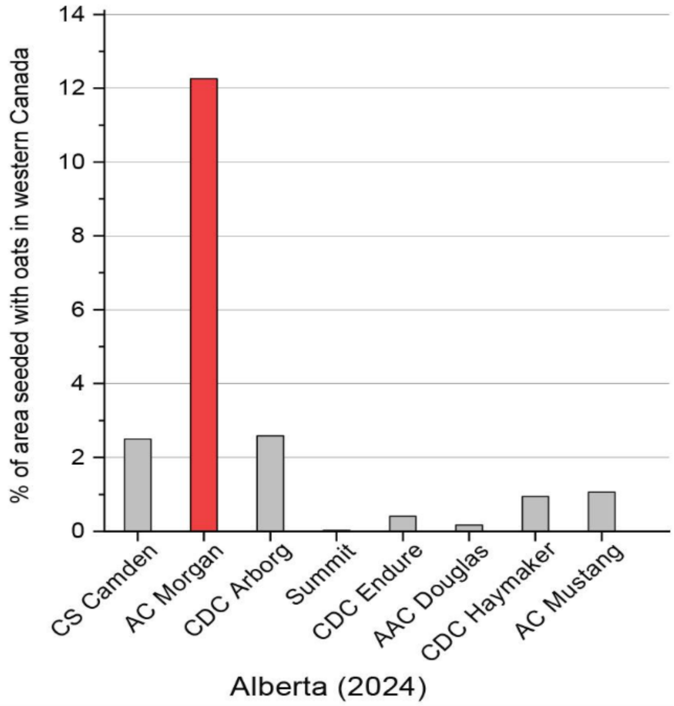
Abstract:
Since 2016, Gateway Research Organization (GRO) has collaborated with the Prairie Oat Growers Association (POGA) to conduct an in-depth evaluation of eleven approved oat milling varieties, focusing on their performance and beta-glucan content in central Alberta (Westlock) and the Peace Region (Falher). This ongoing initiative aims to provide valuable insights into how different oat varieties and regional growing conditions influence yield and the functional attributes associated with beta-glucan levels. Over the years, the study has consistently highlighted notable varietal differences in yield and beta-glucan content across the two regions. In 2024, the Westlock site experienced lower-than-average precipitation in May, which resulted in a delayed start to the growing season. Despite these challenges, at both locations, the overall crop yields were average and met the expectations of grain producers, reaffirming the resilience of the evaluated oat varieties.

Project Background:
Oat acreage in Alberta experienced a decline in the early 2010s but has shown a consistent upward trend since 2018. While there was a slight decrease in 2023, the trend rebounded in 2024. According to Statistics Canada, total oat production in 2024 increased by 27.0%, reaching 3.4 million tonnes. This growth was driven by a 20.3% rise in harvested area, totaling 2.5 million acres, and a 5.7% improvement in yield, averaging 88.7 bushels per acre.



Source: https://www.grainscanada.gc.ca/en/grain-research/grain-harvest-export quality/oats/2024/

However, many major millers would not accept oats from Alberta or look to Alberta only after Manitoba and Saskatchewan's supply is gone because Morgan is the main oat variety grown in Alberta.



Source: https://www.grainscanada.gc.ca/en/grain-research/grain-harvest-export quality/oats/2024/

A minimum of 4% β-glucan is required for companies to be able to label their products with the Heart Healthy claim. Morgan is consistently at or below that amount. Therefore, oat producers in Alberta need an oat variety that can consistently meet or beat the yields of Morgan but that also has the higher β-glucan amounts that oat millers desire. To emphasize this fact, since 2015 Grain Millers Canada Corp. has helped to fund this variety trial, hoping to identify oat varieties that will help Alberta producers access the milling market more consistently.

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

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

Oats are regularly affected by crown rust in other parts of Western Canada, and this disease is moving west, towards Alberta. Morgan does not have crown rust resistance but selecting new disease-resistant varieties can overcome the problem. The information to assist a producer in choosing a newer and higher-yielding variety, specific to their region, is therefore, a particularly important step to staying profitable in oat production. The β-glucan content in oats may vary with changes in growing conditions (Perez Herrera et al., 2016). The current trial will provide valuable agronomic information for the producers in Alberta to grow oat varieties with higher yields and increased functional properties (β-glucan) attributes.

POGA TRIALS CONTINUED

Objective:

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

Methodology:

In 2024, eleven milling oat varieties were evaluated. Fertilizers were applied according to soil fertility recommendations to ensure optimal growing conditions. Seeding rates for each variety were determined using a seed counter and calculated based on the 1,000-kernel weight, desired plant density, and germination percentage. A 9-inch spaced; six-row Fabro small plot seeder was used for planting. Each variety was sown in plots measuring 9.59 square meters (1.37 meters wide and 7 meters long), with four replications for statistical reliability.

The trial site was meticulously maintained weed-free through the application of herbicides. Harvesting was conducted using a Zurn 150 plot harvester equipped with a 5-foot header. Grain yields from each plot were recorded using electronic scales. Additionally, a clean composite sample of 500 grams was collected from each plot and submitted for β-glucan analysis.

	Nitrogen (lbs/ac)	Phosphorus (lbs/ac)	Potassium (lbs/ac)	Sulphur (lbs/ac)	pH (0-14)	CEC (meq/100g)	Organic Matter (%)
Westlock	34	38	228	32	5.6	24.8	7.7
Peace Region	13	58	238	22	5.5	17.9	4.8

Table 1: 2024 Soil Information

Agronomics:

	Westlock	***Peace Region***
Seeding Date:	May 15, 2024	May 8, 2024
Soil Temp:	9°C	12.3°C
Soil Moisture:	Excellent	Excellent
Seeding Depth:	1 inch	3/4 inch
Rainfall (mm):	221.2 mm	275 mm
Fertilizer:	110N*-35P-60K-15S *Fall 2023 the producer applied 70 lbs/ac actual N. The remaining 40 lbs/ac of actual N was applied at seeding to ensure adequate nutrient availability for optimal crop growth.	93N-20P-15K-15S
Pesticides:		
Pre-emergence	None	Pre-Pass Flex @ 8.1 g/ac + Roundup @ 1L/ac May 11
In-crop:	MCPA Ester 600 @ 320 mL/ac + Pardner @ 400 mL/ac on June 10 Prestige A @ 710 mL/ac + Prestige B @ 600 mL/ac on June 24	Stellar XL @ 405 mL/ac on June 22
Insecticide:	None	None
Harvest Date:	September 20, 2024	September 11, 2024

In 2024, three new entries—CDC Byer, AAC Anthony, and AAC Neville—were incorporated into a trial. Simultaneously, prior entries, including Kalio, OReLevel 50, and OT 6024, were removed from consideration.

2024 Yield Comparison

		Westlock			Peace Region		
Trt #	Variety Name	% of AC Morgan	Yield (bu/ac)		% ofAC Morgan	Yield (bu/ac)	
1	AC Morgan	100%	178.5	cd	100%	184.3	-
2	CS Camden	104%	186.3	bc	94%	173	-
3	CDC Arborg	104%	185.8	bc	97%	179.3	-
4	CDC Endure	107%	190.3	b	99%	182.3	-
5	AAC Douglas	97%	173.3	d	94%	173	-
6	CDC Byer*	112%	199.3	a	98%	181	-
7	CDC Anson	101%	180.3	bcd	93%	171.5	-
8	CDC Ruffian	103%	184.3	bc	102%	188	-
9	AAC Wesley	96%	171.3	d	100%	184.5	-
10	AAC Anthony*	97%	173.0	d	100%	184.5	-
11	AAC Neville*	95%	169.3	d	96%	177.8	-

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

Across both regions, AC Morgan consistently achieves high yields, with slightly higher yields in the Peace Region compared to Westlock. In Westlock, CDC Byer and CDC Endure were the highest-yielding varieties for 2024, followed by CS Camden. In the Peace Region, CDC Ruffian demonstrated superior yield performance compared to the other entries in the trial.

Other Results from the 2024 POGA Trial - Westlock site

Trt#	Variety Name	Height (cm)		Lodging (1-9)		Test Weight lbs/bu		Test Weight kg/HL		TKW (g/1000 seeds)	
1	AC Morgan	90	b	1	na	44.3	ab	54.7	ab	41.9	b
2	CS Camden	89	b	1	na	43.5	abc	53.7	abc	40.3	bcd
3	CDC Arborg	95	a	1	na	45.2	a	55.7	a	40.9	bc
4	CDC Endure	90	b	1	na	44.4	ab	54.8	ab	39.6	bcd
5	AAC Douglas	85	bc	1	na	43.6	abc	53.8	abc	39.4	bcd
6	CDC Byer	83	c	1	na	44.5	ab	54.9	ab	38.4	cd
7	CDC Anson	74	d	1	na	43.5	abc	53.6	abc	39.7	bcd
8	CDC Ruffian	82	c	1	na	44.2	ab	54.6	ab	37.3	d
9	AAC Wesley	78	d	1	na	42.9	bc	53	bc	38.8	cd
10	AAC Anthony	88	b	1	na	42	c	51.8	c	46.3	a
11	AAC Neville	75	d	1	na	44.1	ab	54.5	ab	39.2	bcd
LSD P=.05		3.88		.		1.22		1.5		1.87	
Standard Deviation		2.69		0		0.84		1.04		1.29	
CV		3.19		0		1.92		1.92		3.22	

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

POGA TRIALS CONTINUED

Other Results from the 2024 POGA Trial - Peace Region site

Trt#	Variety Name	Height (cm)		Lodging (1-9)		Test Weight				TKW (g/1000 seeds)	
						lbs/bu		kg/HL			
1	AC Morgan	87	abc	1	na	44.6	a	55.1	a	43.0	b
2	CS Camden	84	cd	1	na	43.0	c	53.0	c	42.5	b
3	CDC Arborg	88	ab	1	na	44.6	a	55.0	a	42.5	b
4	CDC Endure	91	a	1	na	43.2	bc	53.4	bc	44.9	a
5	AAC Douglas	86	bc	1	na	42.5	cd	52.5	cd	42.3	b
6	CDC Byer	81	d	1	na	44.6	a	55.1	a	39.2	e
7	CDC Anson	71	f	1	na	43.4	bc	53.6	bc	41.0	c
8	CDC Ruffian	82	d	1	na	44.2	ab	54.5	ab	39.8	de
9	AAC Wesley	77	e	1	na	42.6	cd	52.6	cd	40.7	cd
10	AAC Anthony	87	abc	1	na	41.8	d	51.5	d	45.0	a
11	AAC Neville	77	e	1	na	45.0	a	55.5	a	40.3	cd
LSD P=.05		3.08		.		0.83		1.02		0.82	
Standard Deviation		2.13		0		0.57		0.71		0.57	
CV		2.57		0		1.32		1.32		1.35	

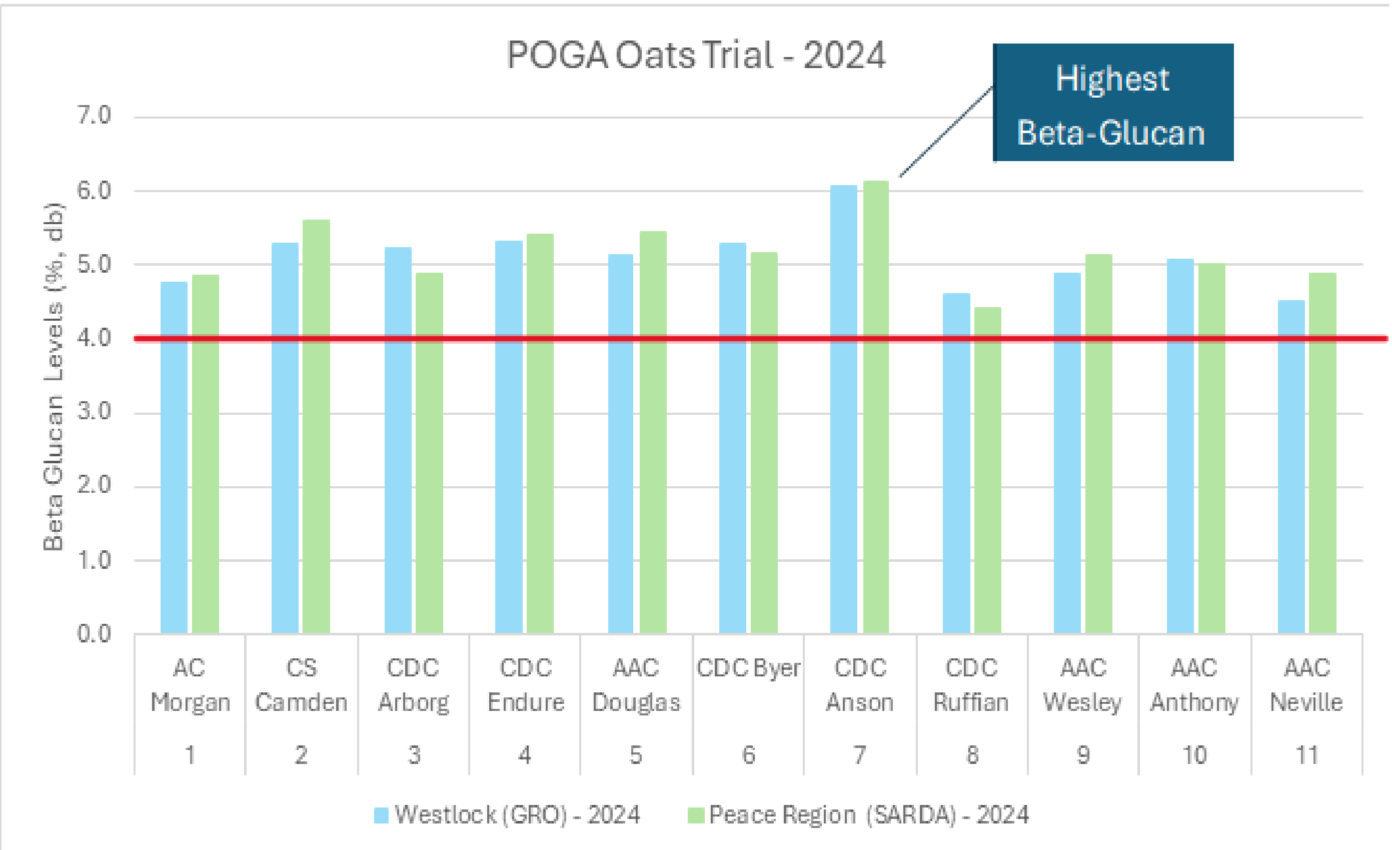
Means followed by the same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Test weight is a vital parameter in assessing the milling quality of grain, particularly oats. A higher test weight typically correlates with better processing characteristics, reduced waste, and improved end-product quality, making it an essential metric for both producers and processors in the oat industry.

In recent evaluations, CDC Arborg demonstrated the highest test weight at the Westlock location, showcasing its superior grain density and potential for high milling yield in that region. Similarly, AAC Neville outperformed other varieties in test weight at the Peace region site, highlighting its adaptability and quality performance under the specific conditions of that area. These results underscore the importance of selecting oat varieties with optimal test weight characteristics to maximize economic returns and ensure consistent milling quality.

Beta-Glucan Test Results form POGA Trial 2024

		Westlock (GRO) - 2024		Peace Region (SARDA) - 2024	
Trt #	**Variety Name**	**Hull percentage (%)**	**Flour BG (%, db)**	**Hull percentage (%)**	**Flour BG (%, db)**
1	AC Morgan	24.9	4.8	24.5	4.9
2	CS Camden	26.0	5.3	26.3	5.59
3	CDC Arborg	24.3	5.24	23.9	4.9
4	CDC Endure	22.5	5.3	22.0	5.4
5	AAC Douglas	24.9	5.1	25.7	5.4
6	CDC Byer	24.3	5.3	24.6	5.2
7	CDC Anson	23.2	6.1	22.2	6.1
8	CDC Ruffian	21.1	4.6	21.3	4.4
9	AAC Wesley	23.8	4.9		5.1
10	AAC Anthony	26.8	5.1	26.5	5.0
11	AAC Neville	27.2	4.5	26.7	4.9



POGA TRIALS CONTINUED

Overall Trial Summary - Yield from 2016 to 2024 at Westlock

Milling Oats	Yield % of AC Morgan	Overall Ave Yield (Bu/Ac)	2024	2023	2022	2021	2020	2019	2018	2017	2016
			Yield (Bushel/Acre)								
AC Morgan	100%	206	179	257	192	161	203	243	226	212	178
CS Camden	99%	204	186	257	189	150	211	241	206	226	167
CDC Ruffian	100%	205	184	239	208	147	206	219	207	245	193
CDC Arborg	102%	210	186	263	198	150	208	244	221	-	-
CDC Endure	101%	207	190	252	195	143	194	249	226	-	-
CDC Anson - OT3112	95%	196	180	254	195	140	213	-	-	-	-
AAC Douglas	94%	194	173	261	193	148	-	-	-	-	-
AAC Wesley	97%	200	171	230	199	-	-	-	-	-	-
CDC Byer	97%	199	199	-	-	-	-	-	-	-	-
AAC Anthony	84%	173	173	-	-	-	-	-	-	-	-
AAC Neville	82%	169	169	-	-	-	-	-	-	-	-
Kalio	93%	191	-	252	180	141	-	-	-	-	-
ORE Level 50	99%	205	-	227	182	-	-	-	-	-	-
OT 6024	106%	217	-	241	193	-	-	-	-	-	-
AC Summit	92%	189	-	-	-	121	178	245	203	217	167
CDC Skye	91%	188	-	-	-	115	211	237	-	-	-
ORE3541M	56%	115	-	-	-	115	-	-	-	-	-
CDC Seabiscuit	102%	211	-	-	-	-	205	237	212	208	189
ORE3542M	97%	199	-	-	-	-	183	214	201	-	-
CDC Norseman	101%	208	-	-	-	-	190	222	213	-	-
Triactor	103%	212	-	-	-	-	-	238	229	208	172
Akina	100%	206	-	-	-	-	-	-	221	222	176
CDC Orrin	98%	202	-	-	-	-	-	-	218	221	168
Souris	85%	175	-	-	-	-	-	-	-	194	155
Kara	97%	199	-	-	-	-	-	-	-	222	175

Overall Trial Summary - Yield from 2016 to 2024 at Peace Region

Milling Oats	Yield % of AC Morgan	Overall Ave Yield (Bu/Ac)	2024	2023	2022	2021	2020	2019	2018	2017	2016
			Yield (Bushel/Acre)								
AC Morgan	100%	193	184	187	235	20	211	224	252	220	203
CS Camden	98%	190	173	192	265	29	183	232	217	226	190
CDC Ruffian	102%	197	188	188	259	21	207	203	241	249	218
CDC Arborg	99%	192	179	194	269	28	199	236	237	-	-
CDC Endure	97%	186	182	184	240	25	206	225	243	-	-
CDC Anson - OT3112	85%	164	172	177	268	23	180	-	-	-	-
AAC Douglas	82%	158	173	185	254	20	-	-	-	-	-
AAC Wesley	111%	214	185	190	266	-	-	-	-	-	-
CDC Byer	94%	181	181	-	-	-	-	-	-	-	-
AAC Anthony	96%	185	185	-	-	-	-	-	-	-	-
AAC Neville	92%	178	178	-	-	-	-	-	-	-	-
Kalio	78%	151	-	184	248	22	-	-	-	-	-
ORE Level 50	104%	200	-	181	219	-	-	-	-	-	-
OT 6024	116%	223	-	196	250	-	-	-	-	-	-
AC Summit	90%	173	-	-	-	19	181	227	228	210	173
CDC Skye	74%	143	-	-	-	20	196	213	-	-	-
ORE3541M	14%	27	-	-	-	27	-	-	-	-	-
CDC Seabiscuit	115%	221	-	-	-	-	196	240	242	224	203
ORE3542M	108%	209	-	-	-	-	197	205	225	-	-
CDC Norseman	111%	214	-	-	-	-	190	214	238	-	-
Triactor	118%	227	-	-	-	-	-	224	256	240	189
Akina	112%	215	-	-	-	-	-	-	242	214	190
CDC Orrin	110%	211	-	-	-	-	-	-	239	227	168
Souris	93%	180	-	-	-	-	-	-	-	191	169
Kara	108%	208	-	-	-	-	-	-	-	226	190

POGA TRIALS CONTINUED

Overall Summary of the Trial - Beta-glucan (%) contents in milling oats from 2016 to 2024

Milling Oats	Average		2024		2023		2022		2021		2020		2019		2018		2017		2016	
	WL	PR	WL	PR	WL	PR	WL	PR	WL	PR	WL	PR	WL	PR	WL	PR	WL	PR	WL	PR
AC Morgan	3.80	3.85	4.75	4.86	3.21	3.36	3.30	3.70	3.50	3.50	3.90	3.80	3.90	3.70	3.90	3.40	3.80	4.20	3.90	4.10
CS Camden	4.32	4.47	5.28	5.59	4.20	4.61	3.80	4.2[illegible]	4.00	4.00	4.70	4.30	4.40	5.20	4.40	3.80	4.40	4.60	3.70	3.90
CDC Ruffian	3.67	3.76	4.59	4.41	3.51	3.30	3.60	5.10	3.30	3.90	4.30	3.50	3.60	3.70	3.60	2.70	3.80	3.90	2.70	3.30
CDC Arborg	4.38	4.39	5.24	4.90	4.25	4.41	4.20	5.50	3.80	4.20	4.60	3.60	4.20	4.30	4.40	3.80	-	-	-	-
CDC Endure	4.75	4.92	5.31	5.41	4.52	5.04	4.90	6.00	4.10	4.50	5.20	4.60	4.50	4.70	4.70	4.20	-	-	-	-
CDC Anson	5.43	5.31	6.08	6.13	5.19	5.12	4.90	5.40	4.90	5.10	6.10	4.80	-	-	-	-	-	-	-	-
AC Douglas	4.87	4.71	5.14	5.43	5.85	4.11	4.80	5.20	3.70	4.10	-	-	-	-	-	-	-	-	-	-
AAC Wesley	4.59	4.93	4.90	5.14	4.88	4.35	4.00	5.30	-	-	-	-	-	-	-	-	-	-	-	-
CDC Byer	5.30	5.17	5.30	5.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AAC Anthony	5.06	5.00	5.06	5.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AAC Neville	4.52	4.88	4.52	4.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kalio	4.01	3.67	-	-	3.84	3.11	4.60	4.10	3.60	3.80	-	-	-	-	-	-	-	-	-	-
ORE Level 50	4.43	4.28	-	-	4.16	3.35	4.70	5.20	-	-	-	-	-	-	-	-	-	-	-	-
OT 6024	4.53	5.37	-	-	4.76	4.83	4.30	5.90	-	-	-	-	-	-	-	-	-	-	-	-
AC Summit	4.12	4.05	-	-	-	-	-	-	3.40	3.40	4.80	4.50	4.30	4.60	4.30	3.70	4.30	4.40	3.60	3.70
CDC Skye	4.47	4.73	-	-	-	-	-	-	4.00	4.20	4.90	5.00	4.50	5.00	-	-	-	-	-	-
ORE 3541M	3.60	3.80	-	-	-	-	-	-	3.60	3.80	-	-	-	-	-	-	-	-	-	-
CDC Seabiscuit	4.36	4.04	-	-	-	-	-	-	-	-	4.60	4.00	4.50	4.20	4.40	3.70	4.60	4.60	3.70	3.70
ORE3542M	4.07	3.83	-	-	-	-	-	-	-	-	4.40	3.80	3.80	4.20	4.00	3.50	-	-	-	-
CDC Norseman	4.67	4.27	-	-	-	-	-	-	-	-	4.80	4.60	4.70	4.40	4.50	3.80	-	-	-	-
Triactor	4.10	4.13	-	-	-	-	-	-	-	-	-	-	4.10	4.30	4.40	4.00	4.40	4.50	3.50	3.70
Akina	4.53	4.20	-	-	-	-	-	-	-	-	-	-	-	-	4.80	4.00	5.00	4.90	3.80	3.70
CDC Orrin	3.90	3.70	-	-	-	-	-	-	-	-	-	-	-	-	4.10	3.40	4.40	4.00	3.20	3.70
Souris	4.25	4.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.90	4.40	3.60	4.40
Kara	3.95	4.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.30	5.00	3.60	3.70
CDC Minstrel	3.40	3.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.90	4.30	2.90	3.50

All the oat varieties present in the trial, exceed the industry's minimum standard of 4% beta-glucan content, ensuring they meet the required nutritional benchmarks. The entries placed above the red line represent the top-tier quality, as they not only meet but surpass the established criteria for premium oats. These exceptional varieties are distinguished by their superior beta-glucan levels, positioning them as ideal candidates for products that prioritize high nutritional value and health benefits, such as those making heart health or cholesterol-lowering claims.

Crop Year	Top 3 Varieties for Beta Glucan at Westlock		
2024	CDC Anson	CDC Endure	CDC Byer
2023	AAC Douglas	CDC Anson	AAC Wesley
2022	CDC Endure	OT3112	AAC Douglas
2021	OT3112	CDC Endure	CDC Skye
2020	OT3112	CDC Endure	CDC Skye
2019	CDC Endure	CDC Arborg	AC Morgan
2018	CDC Endure	CDC Arborg	Triactor
2017	CS Camden	Akina	CDC Ruffian
2016	CDC Seabiscuit	CDC Ruffian	CDC Orin
	Top 3 Varieties for Beta Glucan at Peace Region		
	CDC Anson	CS Camden	AAC Douglas
2023	CDC Anson	CDC Endure	OT 6024
2022	CDC Endure	OT 6024	CDC Arborg
2021	OT3112	CDC Endure	CDC Skye
2020	CDC Skye	OT3112	CDC Endure
2019	CDC Seabiscuit	CDC Arborg	CS Camden
2018	Triactor	AC Morgan	CDC Endure
2017	CDC Ruffian	CS Camden	CDC Orin
2016	CDC Ruffian	AC Morgan	CDC Seabiscuit

**Colours donate the same variety from year to year*

Results and Discussion

The environment played a significant role in shaping outcomes this year. The Westlock site experienced below-average rainfall, receiving only 75% of the annual norm, while the Peace region recorded rainfall levels consistent with a typical year. This disparity largely explains why the average yield at the Westlock site did not surpass 200 bushels per acre. The average crop yield in Westlock reached 181 bu/ac—lower than a normal year—but slightly higher than the Peace region's average of 180 bu/ac. However, this difference was not statistically significant.

POGA TRIALS CONTINUED

All tested varieties demonstrated excellent lodging resistance, with no lodging incidents reported across either location. Plant height also showed no notable variation between the Westlock and Peace regions. In terms of test weights, the Westlock site exhibited a minor variation of up to 3.9 kg/hL between minimum and maximum values, while the Peace region showed a slightly higher difference of 4 kg/hL. Hull percentages were consistent across both sites, with CDC Ruffian consistently achieving the lowest hull percentage in both locations.

This comprehensive study highlights the potential of modern genetics to deliver robust performance in terms of both yield and quality. For instance, AAC Wesley, a newer cultivar, consistently ranked among the top three varieties over two years for beta-glucan content, demonstrating its strong genetic potential.

In conclusion, both cultivar selection and location significantly influence crop yield and beta-glucan levels. Environmental factors remain critical in determining a variety's productivity and quality traits, underscoring the importance of continued research to optimize performance under varying conditions.

Acknowledgements:
We would like to thank the Prairie Oat Growers Association (POGA) and Grain Millers Canada for their full financial assistance.

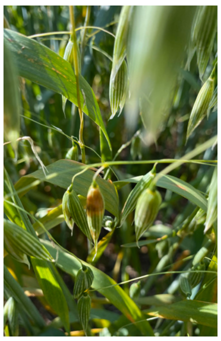
POGA Prairie Oat Growers Association

GRAIN MILLERS

Special thanks to Paul Richter (Oat Breeder at General Mills) for contributions to lab analysis for this trial.

We would also like to thank: Alliance Seed, Canterra Seed, Canada Seed Depot, FP Genetics, and SeCan for their generous seed donations for this trial.

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



ALBERTA GRAINS DEMONSTRATIONS

Introduction:

With the support of Alberta Grains and a local grain producer, GRO conducted three demonstrations of current and potential farming practices. These practices include:

Demo 1: Fusarium head blight management in wheat,
Demo 2: Increasing yield potential through agronomy, protecting yield from disease and insect threats and increasing sustainability with system health, and
Demo 3: Investigating the impact of fertility and PGR management practices on barley lodging.

As these are demonstrations and only replicated once, any data taken from these plots can only be considered as observations without any statistical significance. Suffice it to say however, the observations taken from these demonstration plots generally followed expectations. These trials were widely viewed on organized tour dates and in private viewings, and local producers had many opportunities to study these plots and draw their own conclusions about how these practices may be applied to their own operations.

Alberta Grains Demo 1: Fusarium Head Blight Management in Wheat

Four varieties with different resistance to fusarium head blight were seeded twice, then one plot of each variety was sprayed at an appropriate time with Prosaro PRO fungicide.

Agronomics:
Seeded: May 13, 2024
Seed depth: 1 inch
Soil temperature: 9 ^{o}C
Rainfall recorded: May 1 to July 31, 2023: 167.3 mm or 6.6"
Varieties: AAC Viewfield and AAC Wheatland (intermediate fusarium resistance)
AAC Brandon and AAC Hodge VB (moderate fusarium resistance)
Fall Applied Fertilizer:
46-0-0 (Coated with Neon Air) @ 152.2 lbs/ac = 70 lbs/ac actual N
Spring Applied Fertilizer:
Side banded: 18.3-2.1-28.5-4.3 @ 350.7 lbs/ac = 64.1 lbs/ac actual N; 7.2 lbs/ac actual P; 100 lbs/ac actual K; 15 lbs/ac actual S
Seed Placed: 11-52-0 @ 53.5 lbs/ac = 5.9 lbs/ac actual N; 27.8 lbs/ac actual P
Pesticide:
Pardner + MCPA ester 600 @ 400ml/ac + 320ml/ac on June 10, 2024
Bison 400L @ 200ml/ac on June 24, 2024
Prestige A + B @ 710ml/ac + 600ml/ac on June 24, 2024
Prosaro PRO Fungicide + Agral 90 @ 325ml/ac + 0.125% on July 15, 2024
Treatments: AAC Viewfield
AAC Viewfiled, with fungicide applied
AAC Wheatland
AAC Wheatland with fungicide applied
AAC Brandon
AAC Brandon with fungicide applied
AAC Hodge VB
AAC Hodge with fungicide applied

Again, while we cannot actually conduct any calculations on the comparisons of each variety that were sprayed with fungicide versus those that were not, what little differences seemed to exist followed expected results. Due to the unreplicated nature of the trial, samples were not sent away for fusarium testing.

ALBERTA GRAINS DEMONSTRATIONS CONT'D

Alberta Grains Demo 2: Increasing Yield Potential Through Agronomy, Protecting Yield from Disease and Insect Threats while Increasing Sustainability with System Health.

CPS wheat varieties included: AAC Penhold, AAC Foray, Forefront.

Plots of a single variety are compared with equal blends of two or even all three to see if varieties in combination reduce insect and disease infestations.

Seeding date and depth, fertility moisture and weed control are the same as the first trial, except no fungicide was applied.

Plots include seeded mixes of:
AAC Penhold - 100%
AAC Foray - 100%
Forefront - 100%
AAC Penhold 50%, + AAC Foray 50%
AAC Penhold 50% + Forefront 50%
AAC Foray 50% + Forefront 50%
AAC Penhold 33.3% + AAC Foray 33.3% + Forefront 33.3%

From a yield perspective, and again these unreplicated plots cannot be statistically analyzed, there appeared to be no improvement in yield at least if varieties are blended. Fusarium presence results per plot may show some potential if not statistically valid differences by blending varieties. To further indicate if blending registered varieties actually reduce insect and disease presence and damage, repeated replicated trials must be conducted.

Alberta Grains Demo 3 Investigating the Impact of Fertility and PGR Management Practices on Barley Lodging.

Half of the AAC Austenson and Sirish barley plots were seeded with recommended fertilizer; the other half were seeded with 50% more than the recommended amount. This demonstration was further subdivided into half of each fertility regimes with an application of Moddus plant growth regulator (PGR) on June 26th. Other than that, this plot was treated the same as the first two Alberta Grains Demonstration. So, the plots were as follows:

CDC Austenson, Recommended Fertility
CDC Austenson, Recommended Fertility, PGR Applied
CDC Austenson. 1.5 X Recommended Fertility
CDC Austenson, 1.5 X Recommended Fertility, PGR Applied
Sirish, Recommended Fertility
Sirish, Recommended Fertility, PRG Applied
Sirish, 1.5 X Recommended Fertility
Sirish, 1.5 X Recommended Fertility, PGR Applied

In the year that it was in 2024, there was no lodging in any plot, so the primary purpose of this demonstration did not show any indication of a potential statistical difference in replicated trials. Even the additional fertilizer did not seem to produce any marked yield difference that would encourage a more serious investigation.

Conclusions and Acknowledgements:

All in all, these demonstrations indicate a continued need for similar demonstrations with the support of Alberta Grains. Cereal producers appreciate hands-on trials that can show what common questions indicate in field scale or even small plot situations. While some of these demonstrations may indicate a need for replicated, statistically valid research, others may not indicate such a need. GRO and the producers in the area appreciate the support Alberta Grains contributes to demonstrations that are based on questions. Further work, both as demonstrations and research is recommended by GRO with the help of Alberta Grains, particularly with the support of local grain producers (such as Randy Pidsadowski in this case).

Alberta Grains

ALBERTA GRAINS PLOT2FARM TRIAL

Introduction:

While it is easy and efficient to create statistically valid research results from small, replicated plots, there is a much better visual impact from larger-scale producer-managed, replicated strips. Alberta Grains recognizes this, and created a program called Plot2Farm, where enthusiastic grain producers, in conjunction with researchers, can apply to have support from them to create such replicated strips.

GRO is particularly fortunate to have a good contingent of hard-working, well-equipped, organized producers, many of whom are more than willing to attempt such trials to demonstrate research results as it applies to north central Alberta. William Punko of Punko Farms is such a producer and GRO was pleased to be able to work with him and Alberta Grains to create and conduct a trial, designed to determine the short-term benefit of using different rates of humic acid on a wheat crop.

The project plan was to seed a wheat field as normal, then go in shortly after and, with GPS mapping, create four randomized replicates of three treatments:

- a control with no humic acid added,
- a strip with 2 L/ac humic acid,
- and a strip of 4 L/ac humic acid.

All strips were 90 ft wide, which worked well for William's equipment. Emergence and yield results were to be taken from each strip.

Agronomics:
Location: Dark Grey Chernozem soil
Variety: AAC Connery
Seeding Date: May 12, 2024, seeded to moisture at about 1.5 inches
Humic product applied on May 13, 2024
Rainfall: 6.85 inches
Harvest Date: September 8, 2024
Treatments:

- Control - no humic acid applied
- Trt 1 - 2 L/ac liquid humic acid applied
- Trt 2 - 4 L/ac liquid humic acid applied

Crop quantity was determined by the use of a yield monitor; quality results were taken by obtaining samples from each plot, analysing them separately, compiling them and calculating the results for statistical validity.

Results:

Replicated plant counts were taken on June 14th. Paired randomized 3 ft. seed row strips replicated 3 times per treatment were observed and counted. The wheat seedlings were at the three-leaf stage. No obvious emergence differences appeared in the plant counts, so the data was not analyzed for significance.

Average Yield and Quality Results per Treatment

	Yield (bu/ac)		Protein (%)	
Control, no humic added	61.8	a	14.9	a
Treatment 1, 2 L/ac humic	57.2	a	15.5	a
Treatment 2, 4l/ac humic	60.2	a	15.1	a
p Value	0.1561	NS	0.7757	NS
CV (%)	6.3	%	7.81	%

No significant differences amongst any parameter or treatment.

Discussion and Conclusion:

The first year of humic acid application did not appear to create any significant difference in yield or quality on this trial's soil type. These results appear to indicate that in the short term there is no immediate economic advantage to applying humic acid. This is, of course, a single-year, single-site trial and much more work would have to be done to truly prove this conclusion is actually the case. Also, the humic acid was applied very early during the growing season of this trial, so there could be many factors from this timing that might have an impact on the results of humic usage. It might be valuable to continue to monitor yield and quality of crops from these strips in second and subsequent years to truly show an economic response to these applications, particularly if wheat is seeded a second consecutive time on these plots, as it appears to be the current plan.

A discussion of this nature of trial is also warranted at this point. With current spray, guidance and GPS technology being what we had for this trial, it was easy to conduct, while ensuring the plots and treatments were accurate to the plot divisions marked out at the edge of the trial. In addition, GRO has the equipment required to track yield, protein and bushel weight, so it is both efficient and economical to be able to create such data from this trial. So, with an efficient, organized cooperator who has the appropriate equipment, this appears to be an excellent method of taking trial concepts out into the field to demonstrate to area producers. This Plot2Farm trial was an excellent pilot project to indicate the efficacy of conducting large scale plots while ensuring GRO's high standard of quality work is maintained. With this in mind, it would be a good idea to consider more of these types of trials, and additional touring and promotion of this activity going forward.

In conclusion, this work seems to indicate that while these plots may lack accuracy with the variability in the soil in north central Alberta, these larger scale demonstration type projects are an interesting and practical means of conducting plot trials going forward.

Thanks need to be expressed to Punko Farms and Alberta Grains for their work and support of this trial, and Northstar, the supplier of the humic product.

MINIMIZING THE IMPACT OF APHANOMYCES ON FIELD PEAS IN NORTH CENTRAL ALBERTA

Background:

Responsible grain producers in north central Alberta continue to strive to improve their soil and minimize plant diseases through such practices as crop rotation. One of the best methods of increasing diversity in the field is to include pulses in that rotation. Over the years, field peas (Pisum sativum) have been found to be one of the best methods of maximizing that diversity, all the while improving soil tilth and, when properly inoculated, producing nitrogen for the current and future crops.

Recently, however, a devastating root disease known as Aphanomyces (Aphanomyces euteiches Drechs) has been causing significant damage to pea crops, making field peas a crop with significantly lower economic return. Yield reductions of up to 70% have been noted in wet years (Saskatchewan Pulse Growers). The current recommendations to minimize Aphanomyces in a field is to have a rotational space between field pea crops of at least eight years. This makes appropriate crop rotation much more difficult. While genetic resistance to Aphanomyces would be the ultimate means of reducing the disease's impact, that goal seems to be many years away yet. To provide an interim means of reducing the devastating impact of the disease and allow for a more frequent inclusion of peas in crop rotations, GRO conducted a literature review to investigate whether there were cultural means of reducing the presence and impact of this condition. This review revealed three practical cultural practices that have been shown in theoretical research to have reduced both the impact and presence of Aphanomyces:

- Deep tillage: disturbing the soil to a depth of 4 inches or more prior to seeding
- Compost: adding significant levels of compost (up to 10 tonne/acre)
- Overfertility: adding 25% or more above the recommended rates of phosphorous, potassium and sulphur, while ensuring proper inoculation for adequate nitrogen. This overfertility ensures that all plants have the nutrients they need to fight off the impact of Aphanomyces while permitting any excess to be available in subsequent years.

GRO decided to test out these cultural methods in north central Alberta, alone and in combination, and applied to RDAR to obtain financial support for this very necessary trial. We were most fortunate and grateful to have received support for this one-year, proof of concept, single-site trial.

Prior to approval of this trial, in the fall of 2023, GRO decided to search for an appropriate field with a consistent, endemic population of Aphanomyces, and proceeded to send soil samples to 20/20 Seed Labs to determine the presence of spores. The only consistently positive field was one of field pea stubble, so it was selected for the small plot trial when the project was approved, even though that did not represent the ideal field rotation.

Project Plan

As the literature review revealed three possible methods to potentially reduce the presence and impact of Aphanomyces (deep tillage, overfertility and compost), GRO decided to compare these three practices, alone and in combination, to an untreated plot, all in small, randomized replicated plot design. Data to be taken includes:

- Impact of Aphanomyces on roots and nodules in the growing season and after harvest
- Yield
- Seed Quality
- Aphanomyces presence

After the onset of this trial, we discovered a test that could actually determine the concentration of the disease in the soil. That test was added to the trial, so that it could potentially be determined if the various treatments or combinations of treatments had an impact on the concentration of Aphanomyces in the plots of each soil treatment.

Method:

7 x 1.4 meter plots were prepared and randomized through each of four replications with the following treatments:

Control: no added treatment beyond the base fertility, below:
Compost: the equivalent of 9 MT/Ac was added and incorporated into the plot
Additional fertility: 125% of recommended rate was side banded into the plot
Deep tillage: the plot was rototilled to a depth of 5-6 inches
Compost+Fertility: Treatments 2 and 3 were incorporated into treatment 5
Compost+Tillage: Treatments 2 and 4 were incorporated into treatment 6
Fertility+Tillage: Treatments 3 and 4 were incorporated into treatment 7
Compost+Fertility+Tillage: All three of treatments 2, 3, and 4 were incorporated into treatment 8.

Base fertility was 3.2–15.5–15.5–15.5–7.5 Mg @ 194 lbs/ac.

AAC Barrhead peas were seeded at the rate of 88 plants/m2, inoculated with Tag Team nitrogen fixing rhizobia to a depth of 1.5 inches on May 03, 2024.
Solo herbicide was applied at a rate of 325 ml/ac on June 11, 2024. The second application of herbicide involved was the use of Viper at a rate of 404 ml per acre on June 20, 2024.

Five plants from a non-harvested portion of each plot were shoveled out of the soil on July 2nd, and again after harvest. They were rated on a 1-5 scale for plant and root quality with 1 being undamaged and 5 basically being non-viable.

The plots were harvested on August 20th, with GRO's Zern combine, and processed. Soil samples were taken post-harvest and submitted for Aphanomyces DNA presence (Average CT) to AAFC in Lethbridge. AAFC performed a qPCR test, involving quantitative polymerase chain reaction to detect and quantify DNA from Aphanomyces (Copy#/UL).

Results and Soil Disease Concentration

Trt #	Trt Name	Plant Count		Height		Yield		Yield		TKW		Average CT		Copy#/UL	
		(plants/m^2)		(cm)		(kg/ha)		(bu/ac)		(g)		(#)		(#)	
1	Control	72	-	68	-	3365	-	50	-	244.1	-	29.5	b	334	-
2	Compost (9 mT/ac)	70	-	71	-	3598	-	54	-	250.5	-	35.8	a	8	-
3	Extra Fertility (125% of RR)	82	-	71	-	3533	-	53	-	253.7	-	34.6	ab	67	-
4	Deep Tillage (5-6" deep)	76	-	64	-	3519	-	52	-	248.0	-	32.5	ab	105	-
5	Compost + Extra Fertility	93	-	71	-	3649	-	54	-	252.0	-	32.0	ab	221	-
6	Compost + Deep Tillage	73	-	70	-	3344	-	50	-	254.6	-	30.7	ab	217	-
7	Extra Fertility _ Deep Tillage	69	-	69	-	3644	-	54	-	258.8	-	36.3	a	4	-
8	Compost + Extra Fertility + Tillage	72	-	69	-	3562	-	53	-	252.2	-	32.9	ab	126	-
LSD P=.05		**14.45**		**4.54**		**322.5**		**4.92**		**10.373**		**4.027**		**246.69**	
Standard Deviation		**9.83**		**3.08**		**219.31**		**3.35**		**7.054**		**2.739**		**167.76**	
CV		**13.22**		**4.47**		**6.22**		**6.39**		**2.8**		**8.29**		**124.18**	

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

Mean comparison performed only when AOV Treatment P(F) is significant at mean comparison OSL.

MINIMIZING THE IMPACE OT APHANOMYCES ON FIELD PEAS IN NORTH CENTRAL ALBERTA CONT'D

Results:
Major parameters observed for significant differences included: Yield, presence of Aphanomyces in plot, concentration of Aphanomyces DNA in the soil, midseason damage and nodules, and post harvest damage and nodules.

Yield:
While no significant yield difference was determined from plot harvest, there does appear to be a trend with this single, replicated trial, and it is likely that more plots of a similar nature would indicate an improvement in yield with these treatments. It is also interesting to note that all three treatments participated in those higher numerical values.

Presence of Active Aphanomyces: There was significant difference noted in the presence trial, with a figure of less than 30 definitely indicating active Aphanomyces, 30-32 suggesting the possibility of Aphanomyces, and no currently active pathogen with a figure above 32. Unsurprisingly, the control indicated that positive presence, and two treatments, the compost only plots, and the fertility-tillage plots, clearly and significantly indicated a difference with no active Aphanomyces left in the soil at the end of the season. It is interesting to note all three of the treatments also participated in plots with a clear difference from the control.

Concentration of Aphanomyces DNA

One of the difficulties with a single trial in a single site year is the difficulty in knowing whether large differences are due to outlier impacts or actual indications of significant differences. This is the case in the presence and concentration of Aphanomyces DNA in the soil of these plots. Although the numbers for that concentration in the column (Copy#UL) appear to be significantly different, they are suspicious from a standpoint of outlier effects. Further study is required before we can definitively say there is more live and expired Aphanomyces DNA in the post-trial control plot than the others.

Plant Health ratings

		June 1st Rating				Post Harvest Rating		
Trt #	Trt Name	Plant Health (1-5)		Nodules/ Plant		Plant Health (1-5)		Nodules/ Plant
1	Control	2.2	-	10	bc	4.6	a	As the plant roots were removed after harvest, no nodules were present. This is likely due to the fact that the nodules began to decompose into the soil as the plants matured.
2	Compost (9 mT/ac)	1.6	-	13	a	3.9	ab	
3	Extra Fertility (125% of RR)	1.1	-	11	ab	3.9	ab	
4	Deep Tillage (5-6" deep)	1.8	-	11	ab	4.3	ab	
5	Compost + Extra Fertility	1.9	-	6	c	4.4	ab	
6	Compost + Deep Tillage	2.1	-	11	ab	2.6	c	
7	Extra Fertility _ Deep Tillage	1.4	-	12	ab	3	bc	
8	Compost + Extra Fertility + Tillage	1.8	-	9	bc	4.2	ab	
LSD P=.05		**0.686**		**2.74**		**0.942**		
Standard Deviation		**0.466**		**1.86**		**0.641**		
CV		**26.99**		**18.01**		**16.66**		

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

Mean comparison performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Plant Health Considerations throughout the Growing Season:

Five plants from the non-harvested area of each plot were taken four weeks after planting and again after harvest. They were analysed in both instances on a one to five plant health visual scale, with one being in ideal health and five being basically non-viable. Rhizobium root nodules were also counted per plant.

Again, with this single-site, single-year proof of concept trial, it is premature to draw too many conclusions, but it is interesting to note that the worst value in most cases was found in the control plot, sometimes significantly so. The plant health rating number for the control plots had the lowest numerical value at both timings. These plots were also rated as having among the lowest number of nodules per plant in both timings. It is also interesting to note that there did not appear to be one single production practice that appears to consistently produce the healthiest plants or the most nodules. Neither did the combination of all production practices appear to produce the best result. More study on more plots in more areas is therefore required before any conclusions can be drawn on the best cultural practices to minimize the impact of Aphanomyces on peas.

Conclusion:
Based on harvested results, plant health and soil tests, there may be some potential for these cultural means of reducing Aphanomyces concentration in the soil, possibly leading to higher yields despite its presence and reduction in the need for long-term rotations. More work with more ARA's in a larger, comprehensive trial is in order to help producers determine the best cultural treatment, or combination of treatments, that will enable them to re-introduce field peas more regularly into their rotations.

Summary Statement:
Continued research of cultural means of Aphanomyces control show promise in minimizing the impact of Aphanomyces on the crop, until true genetic resistance to the disease is readily available.

Economics: While it is too early yet to determine specific economics on yield improvement with different cultural techniques to minimize yield loss due to Aphanomyces, it is obvious that if any of these treatments work, there will be improved bottom lines for pulse producers, using some or all these potentially protective activities.

Acknowledgement:
GRO gratefully acknowledges the support of Results Driven Agricultural Research (RDAR) in their financial and advisory support of this trial.

RDAR
Results Driven Agriculture Research

WESTLOCK COMMUNITY FOUNDATION INNOVATIVE CROPPING IN NORTH CENTRAL ALBERTA

Background:

GRO has long been trialing options to maximize crop returns using innovative species and methods in order to find ones which would provide good economic returns in North central Alberta. Over the years we have tried a number of innovative crops and intercropping combinations. We continued this trial in 2024 with the help and support of the Westlock Community Foundation. In 2024 the following innovative crops were tried on a field fertilized with 70 lbs of actual N:

- Finola Seed Hemp (131plants per m2)
- Mung Beans (131 plants per m2)
- Chickpeas (44 plants per m2)
- Soybeans (131 plants per m2)

GRO also continues to try intercropping to determine which combination of pulse and oilseed crop is the best local combination. In 2024, the Westlock Community Foundation trial had the following intercropping combinations seeded:

- Peas: AAC Barrhead yellow pea (42 plants per m2) in combination with AAC Synergy Polish Canola (2.5 lb/ac)
- Blue Lupin: Boregine, (42 plants per m2) in combination with Yellow Mustard (2.5 lb/ac)
- White Lupin: Dieta, (42 plants per m2) in combination with Brown Mustard (2.5 lb/ac)
- Lentils: CDC Impulse CL (66 plants per m2) small reds in combination with CDC Kernan Flax (20 lb.ac)

All plots were seeded on June 7th at their appropriate depth, generally around ¾ to 1 inch, and all pulse crops were inoculated with appropriate Rhizobium species. This late seeding date was not conducive for longer season crops to mature, even if they were harvested in mid-October after a fairly long, open fall. Consequently, the yield on the lupins, chickpeas and soybeans was relatively minimal. The field was a clean one, however, so there was little difficulty in weed control with such a mixed plot, and any hand weeding required was minimal.

Results:

What we did discover from these plots in 2024 included:

1. One of the most interesting results obtained was the forage quantity seen from a genetically seed bred soybean crop. While it was planned to be harvested for seed, so the forage volume and quality was not taken, many noted how extensive the plant growth was, and how they would likely make excellent forage. As the crop did not actually produce seed in these plots, it is likely GRO will pursue planting soybean more for forages, both alone and as an intercrop, in the future. Soybeans specifically bred as a forage producer may also warrant further study.

2. Other innovative pulse crops, such as mung bean and chickpea, did not generate significant interest, either from a seed or forage production perspective. Until the genetics in these crops change adequately to make them sufficiently early or produce more forage, it is unlikely GRO will pursue them any further.

3. Lupins have potential but still need development for local seed production. Past plot results on both white and blue lupins have been much more favorable, and earlier seeding would allow for their full potential to be expressed, particularly in light of their tolerance of field pea impacting Aphanomyces. It is expected that GRO will continue to work with lupins, both as a solo crop and as an intercrop, to determine the best economic return.

4. Hemp for seed really shows a strong possibility for economic production in north central Alberta, can be harvested with standard field equipment, and produces sufficient adequate return. With current market price at about 75 cents a pound, and this trial's yield of about 800 lbs/acre, the hemp plots would have

netted roughly $525 over seed and fertility costs. We have found that, in general, plot returns are about 30% higher than field returns, but even so, this crop does have some promise if prices such as these hold.

5. Flax in its intercrop grew well and produced an adequate return on its own, which will continue to encourage GRO to continue its trialing and pursue a paid flax regional variety trial. In combination with the lentil companion crop, the combination netted $535 over seed and fertilizer; on its own, flax as a solo crop would have garnered roughly $450. New intercrops with flax also need to be considered.

Discussion:

For intercropping to be successful, crops of similar maturity, vigor and standability need to be considered. GRO still has not yet discovered an ideal intercrop for local conditions, but will continue to try intercropping combinations, including a recently recommended triple combination of flax, oats and fababeans, which appears to have had successful results elsewhere. Surprising alternative uses also need to be investigated, such as the forage quality and quantity of soybean, using minimal inputs. The impact on the soil of successful intercrops will help determine the ideal combination for the local area, its soil and its weather conditions.

Further work:

- Continue trialing lupin crops, both in solo seeding and in intercropping trials.
- Create plots designed to evaluate soybeans as a forage crop.
- Test flax varieties for best local adaptation and intercropping.

Acknowledgements:

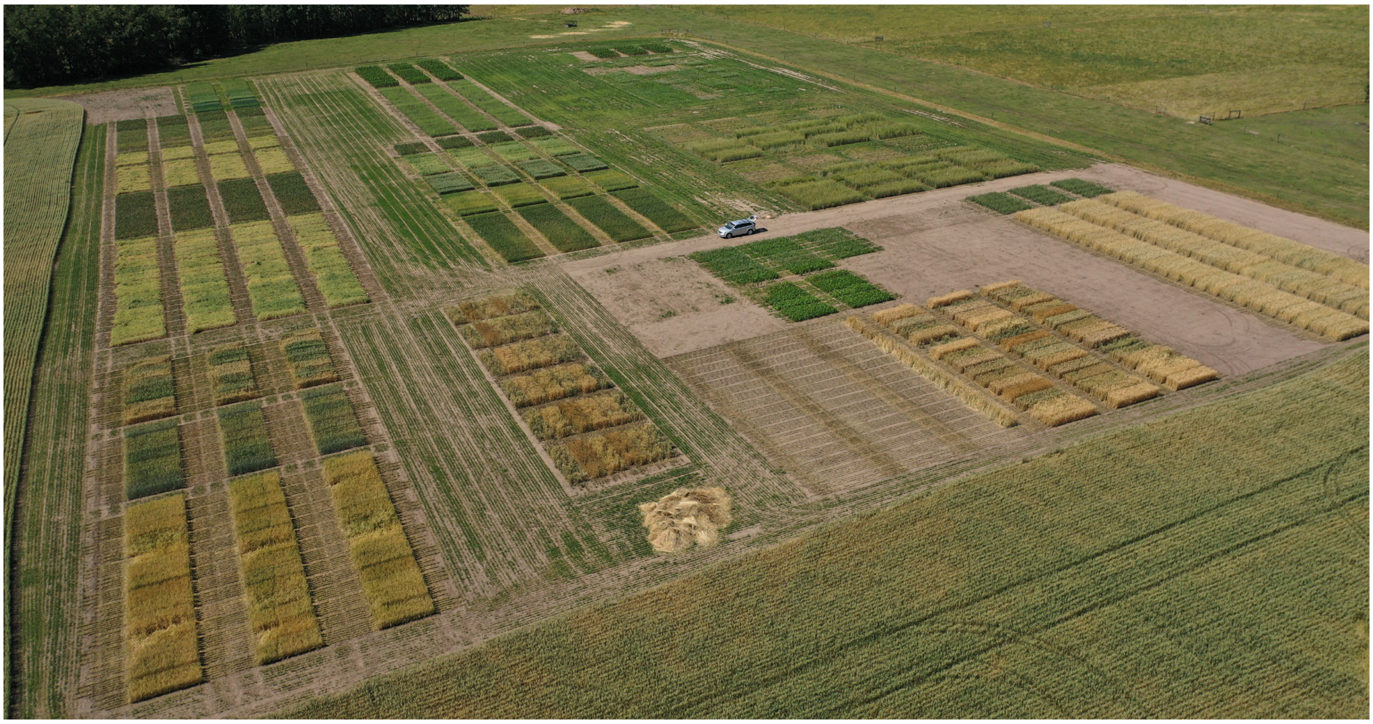
GRO would like to gratefully acknowledge the support of the Westlock Community Foundation for their financial support of this trial, the donation of land for it by Randy Pidsadowski, and Lupin Platform and all the suppliers of seed for this trial.

Westlock Community Foundation

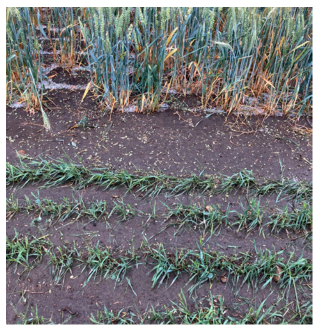
LUPIN PLATFORM INC

GRO
FORAGE AND PULSE SITE

Co-operator: Ken Anderson (NW 32-59-2-W5)



The GRO Forage/Silage and pulse site was set up on the same quarter as the Anderson Seed Growers home yard, right off Highway 18 between Westlock and Barrhead. Unfortunately, a bad hailstorm hit in late July, causing significant damage and leading to data loss and lower forage/silage and crop quality.



SILAGE RVT TRIALS - BARLEY, OATS, TRITICALE, AND WHEAT

In 2024, the GRO established the site for the Regional Silage Variety Trials. The trials included 12 entries of barley, 6 entries of oats, 3 entries of wheat, and 2 entries of triticale. Barley and oat plots were seeded with the aim of achieving 28 plants per square foot, while wheat and triticale plots targeted 33 and 35 plants per square foot, respectively. Up until July 23, the plots exhibited promising growth. Fertilizer was applied based on soil test recommendation to achieve the optimal silage yield target for the region.

Following a severe hailstorm that caused considerable damage to the trial site, the funders decided to terminate the project due to the disruption. Consequently, data from the GRO site for 2024 is not available. We advise consulting the Alberta Seed Guide (Page 107) for the relevant silage tables. We look forward to working together in the 2025 growing season.

Acknowledgment:

GRO would like to acknowledge all the funders for providing financial support for conducting these trials.
Results Driven Agriculture Research, Alberta Seed Processors, Alberta British Columbia Seed Growers, Alberta Beef, and the Seed Companies who paid annual testing fees.

PERENNIAL CEREAL/LEGUME - YR 3

This dual-purpose research study, initiated in 2022, focused on both grain production and forage, with plots seeded at Gateway Research Organization and five other research organizations across Alberta, including the University of Alberta's Breton plots, PCBFA in Fairview, MARA in Fort Vermilion, and BRRG in Forestburg. Fieldwork began in 2023 (the first production year) and concluded in the summer of 2024 (the second production year).

The research extensively examined the potential of perennial cereal-legume intercropping systems to provide both high-quality forage and grain yield. Key focus areas included forage productivity and quality, ecosystem functions such as nitrogen fixation by legumes and its transfer to perennial grain yields, as well as the effects of the cropping system on soil properties and overall soil health. By investigating these dual-purpose objectives, the study aims to enhance sustainable agricultural practices, improve long-term productivity, and promote soil health across diverse agroecosystems in Alberta.

Objectives

In 2024, during the final year of this project, the study concentrated on exploring the productivity and ecological advantages of intercropping perennial cereal grains (PCGC) with legumes. The primary goals were:

- To evaluate and comprehensively assess the annual productivity of both forage and grain in intercropping systems, comparing two seeding methods: alternate row seeding and same row seeding.
- To assess the ecosystem services provided by intercropping legumes and PCGC, particularly focusing on nitrogen fixation.
- To examine improvements in soil health by analyzing key indicators such as chemical, physical, and biological properties resulting from the intercropping of legumes with PCGCs.

These objectives were aimed at determining the potential of intercropping systems to enhance agricultural productivity and promote environmental sustainability.

Methodology

The GRO site was seeded in 2022 after previously being in chemical fallow. The experiment followed a randomized complete block design with four replications, using small plots measuring 10 meters by 1.37 meters.

Seeding was conducted with a 6-row Fabro Plot Drill, which featured C-shank openers spaced 23 cm apart and included side banding for precise seed placement.

Fieldwork completed in 2024 on the PCGC project included:

- Bi-weekly NDVI, soil moisture, soil compaction measurements, and temperature
- 15N application for nitrogen fixation measurements in early spring
- Plant tissue analyses on the perennial cereals
- Soil mineral nitrate sampling (sent to CARA soil health lab for analyses)
- Forage and grain yield estimation (dual-purpose utilization)

Strategy

ACE-1 is a variety of perennial rye developed in Western Canada and has low pre-harvest sprouting tendencies and good winter survivability (Acharya et al., 2003). Kernza is a variety of perennial wheat developed in the USA (Culman et al. 2013). Both ACE-1 and Kernza were used as PCGCs in this project.

This project was carried out with a factorial design (2 x 4 x 2 x 2 with 4 replications) consisting of the following treatment factors:

1. Perennial cereal grain crops (PCGC, 2 species/cultivars)
- ACE-1 rye
- Kernza wheat

2. Intercrops with legumes (4):
- Monoculture cereal (PCGC only)
- Alfalfa
- White clover
- Sainfoin

3. Seeding methods (2):
- Same row seeding (mixed method)
- Alternate row seeding

4. Utilization (2):
- Utilization 1: Spring forage harvest + fall combines harvest for grain
- Utilization 2: Summer combines harvest for grain + fall forage harvest

In 2022, this experiment was initiated. The trial was seeded on June 20, 2022. The ground was rather dry, and the soil temperature was 20 degrees Celsius at the seeding time. Therefore, the seeding depth for the cereals was ¾ of an inch, while for the legumes was ¼ of an inch.

The lab recommended no fertilizer at seeding time for growing forage crops. However, to provide a lift at the start, we put 9.26-0-0-10.57 @ 108 lbs/ac at seeding.

Results and Discussion

In 2024, The perennial rye (ACE-1) did not survive the extreme winter conditions of 2023 at the GRO site. Soil temperatures dropped to -15°C without sufficient snow cover, which would have otherwise provided insulation. As a result, ACE-1 experienced significant winterkill, with approximately 99% of the plants perishing and only a few surviving.

Spring Forage – Fall Combine (Utilization 1): The plots were harvested on July 12, 2024. Unfortunately, the short growing season prevented us from using them for dual purposes. While we were able to take two silage cuts in 2023, we managed only one in 2024 due to hail damage and moisture stress later in the season.

As previously stated, the ACE-1 was unable to survive in the trial. Consequently, the data presented in the table reflect measurements taken either from the legume species present in the experiment or from weeds. Therefore, the table's information should not be considered a reliable source for ACE-1 performance.

Throughout the study, perennial wheat (Kernza) consistently demonstrated superior forage yields. The yield outcomes closely followed the same pattern observed in 2023.

The highest production levels were observed in systems where perennial wheat was planted in the same row with sainfoin. Additionally, in the alternative-row system, the combination of perennial wheat and alfalfa outperformed all other treatments.

These findings highlight the significant role that sainfoin and alfalfa play in enhancing perennial wheat forage production potential.

PERENNIAL CEREAL/LEGUME - YR 3 CONT'D

Trt#	Seeding Method	Trt Name *	Yield @ 65% Moisture (tons/ac)		CP		ADF		NDF		TDN		Ca		P		K		Mg	
					% of Dry Matter															
1	Same Row	PW Mono	8.2	bc	9.2	ab	37.5	-	58.7	a	54.1	abc	0.4	d	0.3	-	1.6	-	0.1	b
2		PW - Alfalfa	9.4	ab	10.2	ab	36.6	-	56.8	a	54.9	abc	0.5	d	0.3	-	1.6	-	0.1	b
3		PW - White Clover	8.5	b	8.3	b	39.4	-	58.8	a	53.7	bc	0.4	d	0.3	-	1.6	-	0.2	ab
4		PW - Sainfoin	10.4	a	8.3	b	39.0	-	58.4	a	54.1	abc	0.4	d	0.3	-	1.6	-	0.2	ab
5		PR Mono	1.3	e	12.2	a	37.8	-	46.3	c	56.4	abc	1.0	ab	0.3	-	1.6	-	0.3	a
6		PR - Alfalfa	2.9	e	12.3	a	37.4	-	47.0	c	55.3	abc	1.0	ab	0.3	-	1.6	-	0.2	ab
7		PR - White Clover	2.0	e	13.0	a	34.2	-	47.5	c	57.0	a	0.8	bc	0.3	-	1.7	-	0.1	ab
8		PR - Sainfoin	2.9	e	11.5	ab	35.7	-	49.7	c	56.6	ab	0.8	bc	0.3	-	1.6	-	0.2	ab
9	Alternate Row	PW Mono	6.8	c	8.2	b	38.3	-	58.6	a	53.3	c	0.4	d	0.3	-	1.4	-	0.2	ab
10		PW - Alfalfa	9.3	ab	11.4	ab	36.8	-	51.3	bc	53.9	bc	0.9	bc	0.3	-	1.5	-	0.2	ab
11		PW - White Clover	8.3	bc	7.9	b	38.6	-	58.7	a	54.2	abc	0.4	d	0.3	-	1.5	-	0.2	ab
12		PW - Sainfoin	5.1	d		ab	37.1	-	55.2	ab	54.7	abc	0.6	cd	0.3	-	1.4	-	0.1	ab
13		PR Mono	2.1	e	12.1	a	36.0	-	49.1	c	55.6	abc	0.9	b	0.3	-	1.7	-	0.2	ab
14		PR - Alfalfa	7.9	bc	12.9	a	37.5	-	46.7	c	54.0	bc	1.2	a	0.3	-	1.59	-	0.2	ab
15		PR - White Clover	2.2	e	12.2	a	35.8	-	49.5	c	54.7	abc	0.8	bc	0.3	-	1.8	-	0.2	ab
16		PR - Sainfoin	2.8	e	11.5	ab	37.1	-	47.3	c	55.0	abc	1.0	ab	0.3	-	1.51	-	0.2	ab
LSD P=.05 (% mean diff)			1.1876 (22%)		2.2302 (21%)		3.1427 (9%)		3.9976 (8%)		1.7736 (4%		0.1848 (26%)		0.0281 (11%)		0.1929 (13%)		0.0822 (47%)	
Standard Deviation			0.8339		1.5659		2.207		2.807		1.2453		0.1298		0.0198		0.1355		0.0577	
CV			14.84		14.7		5.94		5.35		2.27		18.1		7.47		8.56		32.87	

* PW= Perennial Wheat; PR = Perennial Rye

Other acronyms used in the tables: CP- Crude Protein; ADF – Acid Detergent Fibre; NDF - Natural Detergent Fibre; TDN – Total Digestible Nutrient; Ca – Calcium; P – Phosphorous; K – Potassium; Mg – Magnesium

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

Spring Combine – Fall Forage (Utilization 2):

The research site encountered a severe hailstorm on July 24, 2024, which had a notable impact on the grain portion of the trial. The storm caused extensive stem breakage, leading to premature drying of the kernels that had already formed before the damage occurred. Consequently, the grain yield data from this trial was not considered representative or reliable due to the adverse weather conditions.

In 2024, the grain block was harvested on August 23, 2024. The combination of perennial wheat and alfalfa produced the highest yield, reaching 761.5 kg per hectare when perennial wheat and legumes were planted together in the same row. This was a significant improvement compared to planting perennial wheat alone (669.0 kg/ha) or mixing it with other legumes.

However, when planted in alternating rows, the story changed. The yield of perennial wheat mixed with alfalfa dropped significantly to 178.5 kg/ha because the alfalfa outcompeted the wheat for space (this combination produced a lot of forage but less grain). On the other hand, perennial wheat grown alone in alternating rows (571.8 kg/ha) and the combination with white clover (569.0 kg/ha) had much better grain yields.

Perennial Cereal/Legume Trial - Grain Block - 2024

Trt #	Seeding Method	Entry Name*	Yield (kg/ha) @ 13.5% moisture		CP		ADF		NDF		TDN	
					% of Dry Matter							
1	Same Row	PW Mono	669	b	15.4	b	12	-	25.5	-	71.4	-
2		PW - Alfalfa	761.5	a	14.4	b	13	-	27.6	-	70.5	-
3		PW - White Clover	683.8	b	15.7	ab	11.7	-	24.7	-	71.6	-
4		PW - Sainfoin	578	c	15.1	b	11.6	-	25.4	-	71.8	-
5		PR Mono										
6		PR - Alfalfa										
7		PR - White Clover										
8		PR - Sainfoin										
9	Alternate Row	PW Mono	571.8	c	16.6	ab	10.6	-	23.1	-	72.7	-
10		PW - Alfalfa	178.5	e	17.6	a	11.4	-	23.4	-	72.1	-
11		PW - White Clover	569	c	16.4	ab	11.1	-	24.9	-	72	-
12		PW - Sainfoin	362.8	d	16.6	ab	10	-	23	-	73	-
13		PR Mono										
14		PR - Alfalfa										
15		PR - White Clover										
16		PR - Sainfoin										
LSD P=.05			38.04 (14%)		1.433 (9%)		1.7192 (16%)		2.8650 (12%)		1.7431 (3%)	
Standard Deviation			26.71		0.975		1.1691		1.9483		1.1854	
CV			9.77		6.11		10.25		7.89		1.65	

* PW = Perennial Wheat; PR = Perennial Rye

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

PERENNIAL CEREAL/LEGUME - YR 3 CONT'D

The results of nitrogen fixation and soil health improvements from this cropping system are still being studied. However, the benefits to the ecosystem were clear in the intercropping systems, especially with legumes like alfalfa and clover, which play an important role in fixing nitrogen in the soil. Overall, these findings highlight the trade-offs between yield, quality, and resilience in perennial cropping systems. Perennial wheat has shown to be a good fit for areas with tough winters, providing higher forage yields and better adaptability.

Acknowledgment:

The current project is funded by RDAR (Results Driven Agriculture Research). We would like to express our sincere appreciation to Cosmas Ugwu, Ph.D. Scholar at the University of Alberta, for his invaluable contribution in analyzing the collected data.

RDAR
Results Driven Agriculture Research

APR 2024
COSMOS HELPING WITH PLOT PREPARATION

August 2023
plot left to combine

August 2023
regrowth after 1st silage

DEEP ROOTED COVER CROP TRIAL - YR 3

Abstract:

In recent years, producers in Alberta have experienced extreme weather events (excess rainfall and/or drought conditions) and are now recognizing that climate variability will continue to be a challenge to their farming operations. Producers have thus expressed a need to build more resilient soils. Cover crops have been suggested as a solution to improve soil water holding and drainage capacity. Most studies have shown that the extent to which cover crops improve soil properties depends on their ability to produce high below-ground biomass. Spring-seeded cover crops offer the advantage of a full growing season, and species selection is imperative for optimizing below-ground biomass production. Deep-rooted cover crops can also improve soil permeability and infiltration. The objectives of this study are to determine the impact of two 2-year crop rotations (4 years total) of deep-rooted cover crop mixtures (first and third year, respectively) and field crops (second and fourth years, respectively) on 1) soil temperatures before seeding of the main crop, 2) soil water holding and drainage capacity. The impact of deep-rooted cover crops mixtures composed solely of brassicas versus mixtures composed of brassicas along with cool-season and warm-season crops on such properties will also be measured. Cover crop mixes have been selected based on rooting depth, and ability to produce high below-ground biomass under climatic conditions in Alberta.

Background:

In the past few years, producers in Alberta have experienced extreme weather events (excess rainfall and/or drought conditions) and are now recognizing that climate variability is going to be a big challenge for them in the years to come. In the Peace region, soils developed primarily from lacustrine or glaciolacustrine deposits and are characterized by finer textures (clay and silt loams). Under excess rainfall, these soils are particularly susceptible to ponding. Cover crops (CC) have been suggested to improve both soil water holding and drainage capacity (Basche et al. 2016) and may offer a solution for producers that have finer texture soils.

Blanco-Canqui et al. (2020) conducted a review of the literature on the impacts of CCs on soil physical properties and concluded that CCs increased wet aggregate stability by an average of 16% across 27 studies, macro-porosity by an average of 1.5% across 8 studies, and water infiltration by 62% across 17 studies. The scale of the benefits from CCs is often related to the total amount of below-ground biomass produced (Bowman et al. 2000). However, measuring below-ground biomass is difficult in the field, and most authors have relied on above-ground biomass for determining the impact on soil water movement. For example, Martinez-Feria et al. (2016) found that rye CCs had 21 mm of transpiration per 1000 kg/ha of biomass production.

In Alberta, as with most of the Canadian Prairies, the climate is characterized by a short growing season, which often leads to insufficient biomass production for fall-seeded cover crops (<1000 kg/ha) (NPARA 2019). Thus, there is a need to establish strong research on the benefits of spring-seeded cover crops, which regularly yield >2000 kg/ha (NPARA 2019), on soil properties. Cover crop mixtures of cool (C3) and warm (C4) season crops have been suggested to maximize biomass production under both cool and warm conditions (Chu et al. 2017; Snapp et al. 2005). Mixes containing fibrous root systems from grasses and legumes also have a higher surface area than tap roots and further promote soil aggregation and water infiltration (Blanco-Canqui et al. 2020).

Species selection is of critical importance in Alberta. The North Peace Applied Research Association (North Star, AB) has been growing a variety of cool and warm season CCs since 2012 and has listed corn, proso millet, German millet, and Japanese millet as excellent warm season choices for grasses in mixtures (NPARA 2019). Deep-rooted CCs, such as oilseed radish, chicory, sunflower, and sweet clover have also done well in the Peace region (NPARA 2019) and have been suggested to improve soil water infiltration in finer textured soils (Bowman et al. 2000; Chen and Weil 2009; Chen and Weil 2011). Most of the research on deep-rooted CCs has been conducted on brassicas, where seeding rates vary considerably across studies (1 to 5 kg/ha) (Chen and Weil 2009; Chen and Weil 2011; Halde and Entz 2016; Marshall et al. 2016; Murrell et al. 2017). Thus, there is also a need to assess which brassica seeding rates are best suited for mixtures.

DEEP ROOTED COVER CROP TRIAL - YR 3 CONT'D

Objectives:

1. To determine the impact of two 2-year crop rotations (4 years total) of deep-rooted cover crop mixtures (first and third year, respectively) and field crops (second and fourth years, respectively) on soil water infiltration.

2. To determine the impact of two 2-year crop rotations (4 years total) of deep-rooted cover crop mixtures (first and third year, respectively) and field crops (second and fourth years, respectively) on soil temperatures before spring seeding of the main field crop.

3. To determine the impact of two 2-year crop rotations (4 years total) of deep-rooted cover crop mixtures (first and third year, respectively) and field crops (second and fourth years, respectively) on soil organic matter.

4. To examine the impact of deep-rooted cover crops mixtures composed solely of brassicas, as well as mixtures of brassicas with cool and warm season crops on soil properties. Brassica seeding rates will be evaluated in all cover crop mixes.

5. To investigate the forage value of deep-rooted cover crops mixtures composed solely of brassicas, as well as mixtures of brassicas with cool and warm season crops on main crop yield (years 2 and 4, respectively).

6. To establish the cost-benefit analysis of introducing rotations with deep-rooted cover crops mixtures composed solely of brassicas, as well as mixtures of brassicas with cool and warm season crops on main crop yield (years 2 and 4, respectively).

Strategy:

Create a cropping system composed of two years:

- Year 1 (2022 & 2024): Deep-rooted cover crops
  - Brassicas
  - Cool seasoned
  - Warm seasoned
  - Fallow
- Year 2 (2023 & 2025)- Field crops, sown perpendicular to the direction of the cover crops planted the year prior
  - Wheat
  - Canola
  - Pea
  - Fallow

Take soil samples and have them tested for

- Soil water holding capacity
- Permanent wilting point
- Field capacity
- Bulk density
- Soil organic matter

Before seeding, both saturated (double ring) and unsaturated (mini disk) infiltration tests were conducted at the site. The same plots from 2022 and 2023 were used.

Agronomics:
Seeding Date: June 10, 2024
Fertilizer:
Spring side banded: 18.3-2.1-28.5-4.3 @ 200 lbs/ac
36.6 lbs/ac actual N; 4.2 lbs/ac actual P; 57 lbs/ac actual K; 8.6 lbs/ac actual S
Pesticide:
Glyphosate + Heat @ 270 g ae/ac + 10.5 g/ac on June 07
*roguing 3-4 times
Rainfall recorded from June 1 to September 5, 2024: 192.8 mm
Harvest Date: September 9, 2024

Treatments Yr 1 & 3 (2024)

		Seeding rate lbs/ac											
1	Deep-rooted cover crop species	2	3	4	5	6	7	8	9	10	11	12	13
Fallow	Daikon Radish	1.6	3.2	4.8	1.6	3.2	4.8	1.6	3.2	4.8	1.6	3.2	4.8
	Forage Brassica	1.6	3.2	4.8	1.6	3.2	4.8	1.6	3.2	4.8	1.6	3.2	4.8
	Forage Turnip	1.6	3.2	4.8	1.6	3.2	4.8	1.6	3.2	4.8	1.6	3.2	4.8
	Oat				22.4	22.4	22.4						
	Japanese millet				2.7	2.7	2.7						
	Sweet clover				3.4	3.4	3.4						
	Chicory				1.3	1.3	1.3						
	Field pea				11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
	Sunflower				1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	Spring triticale							22.4	22.4	22.4			
	Red Proso millet							2.7	2.7	2.7			
	Berseem clover							3.4	3.4	3.4			
	Brown midrib corn										22.4	22.4	22.4
	Annual ryegrass										2.7	2.7	2.7
	Hairy vetch										3.4	3.4	3.4

Treatments Yr 2 & 4 (2025)
Perpendicular seeding to the direction in which deep-rooted cover crop mixes were sown
Canola, Wheat, Pea, Fallow (no crop)

DEEP ROOTED COVER CROP TRIAL - YR 3 CONT'D

Results and Discussion:

Seeding was carried out under slightly wet conditions. The site's high clay content contributed to the formation of a soil crust, caused by the pressure exerted by the seeder’s packer wheel, which significantly delayed germination. Even two weeks after seeding, no plant growth was observed. However, rainfall in late June provided enough moisture to break the crust, ultimately triggering germination and allowing the plants to emerge.

Later in the season, the trial was impacted by hail damage, though only the first three to four plots in each row were affected. The remaining plots continued as expected, and the final harvest was completed on September 9th. Following the harvest, samples were sent to the laboratory for feed analysis.

Because the trial faced extreme weather conditions, the data showed a high level of variability (CV), making it less reliable. As a result, we decided not to include this year's data in the final report.

However, 2025 marks the final year of the study, during which we will collect a large number of soil samples. We are eager to see how the soil has changed over the past four years since the trial began in 2022 when we collected the baseline soil samples. By the end of this study, we expect to gain valuable insights into how deep-rooted cover crops influence soil structure and their impact on field crops in the following growing season.

Acknowledgment:

This project is supported by funding from Results Driven Agriculture Research (RDAR). We are grateful to the North Peace Applied Research Association for taking the lead in executing this project across all sites.

RDAR
Results Driven Agriculture Research

NPARA
NORTH PEACE APPLIED RESEARCH ASSOCIATION

August 2023

POLYCULTURE FORAGE YIELDS & QUALITY WITH AND WITHOUT RHIZOBIUM INOCULANTS

Introduction:

Forage producers in the area have been investigating using a combination of a number of annual crop species maximize crop quality and quantity, and to improve soil health. One concern that exists is proper inoculation of a wide variety of nitrogen fixing species with a single rhizobium species. GRO was able to conduct a four plot, three rep trial to study differences in weight with the treatments. Covers and Co. have for many years been blending locally adapted mixes of various types of forage species, aimed at different timings of growth and seeding.

The four treatments were:

- A mix designed to grow in the warmest part of the growing season, inoculated with a rhizobium designed to facilitate nitrogen fixation for multiple species of plants
- The warm season mix without inoculation
- A mix designed to grow throughout the full season, inoculated with a species of rhizobium designed to facilitate nitrogen fixation for multiple species of plants
- The full season mix without inoculation.

Plot Activity:

All plots and reps were seeded on the same day, June 10, at rates recommended by the seed supplier. Those plots which were to be inoculated were treated prior to seeding. Due to the wide diversity of species in the two blends, chemical weed control was not conducted.

Full Season Blend:	Warm Season Blend:
Forage Oats 16%	Forage Oats 16%
Forage Barley 10%	Forage Barley 10.5%
Spring Triticale 10%	
Soft White Wheat 15%	Soft White Wheat 8%
Italian Rye Grass 5%	Italian Rye Grass 5%
Forage Peas 24%	Forage Peas 32%
Hairy Vetch 2.5%	Hairy Vetch 3.5%
Daikon Radish 1%	
German Millet 3%	German Millet 5%
Sorghum Sudan Grass 5%	Sorghum Sudan Grass 12%
Purple Top Turnip 2.5%	Purple Top Turnip 1%
Flax 1%	Flax 1%
Sunflower 2%	Sunflower 2%
Buckwheat 2%	Buckwheat 2%
Fenugreek 1%	Fenugreek 2%

Results and Discussion:

Unfortunately, the hailstorm in late July, 2024, caused an end to any statistically significant data collection and analysis of this trial. These plots did show outstanding growth during the short period of normal growth, and then again after the storm. Regrowth samples were taken, dried and weighed in September, but statistical analysis of these replicated samples would likely produce results that are not truly valid and could be called into question. Suffice it to say, though, that with the rapid growth both before and after the hail, there is reason to revisit these plots and try these trials again in 2025.

POLYCULTURE FORAGE YIELDS & QUALITY WITH AND WITHOUT RHIZOBIUM INOCULANTS CONT'D

In the meantime, both full season and warm season blends could be considered for future plots, and plans should also be made to include the available multi-species inoculant, although the only true legumes in these plots were peas, vetches and fenugreek. Root samples could be taken to actually view the root nodulation of these legumes. Finding nodulation on vetches may not be indicative of the effectiveness of these multi-species inoculants, due to the potential presence of native vetch rhizobium, but if the plants are able to fix nitrogen, the source of the inoculation might be unimportant. Regardless, there is a great deal of interest in these multispecies blends and further study is warranted.

Seeding was carried out under slightly wet conditions. The site's high clay content contributed to the formation of a soil crust, caused by the pressure exerted by the seeder’s packer wheel, which significantly delayed germination. Even two weeks after seeding, no plant growth was observed. However, rainfall in late June provided enough moisture to break the crust, ultimately triggering germination and allowing the plants to emerge.

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WHEAT LEAF DISEASE SURVEY

Part 1: Wheat Disease Survey in North Central Alberta

This report was written and contributed by:

AAFC Prairie Biovigilance Network (PBN) Wheat Leaf Disease Survey – 2024
Report to the Gateway Research Organization (GRO)
T.K. Turkington, AAFC Lacombe and J. Byer, Gateway Research Organization
January 2025

Introduction:

Prairie plant pathologists have a long history of annual surveying that dates back over 100 years. Sometimes surveying doesn't get the respect it deserves, but it is a critical aspect of the biovigilance continuum, providing key insights into what is happening and implications of these observations, which ultimately shapes research to develop appropriate management tools. Knowing your enemy provides insight into where it is, what impact it is having, and is it changing.

1. Looking at alternative effective sources of disease resistance or the need to pyramid resistance genes in the new varieties they are developing for farmers;
2. Developing a better understanding of changed or new pathogens also assists in developing management strategies that complement the use of resistant varieties; and
3. Looking at further research and recommendations to manage the risk of fungicide resistance to ensure their long-term effectiveness.

In 2024 the AAFC Prairie Biovigilance Network (PBN) enlisted the support of Gateway Research Organization (GRO) to assist with the 2024 AAFC PBN wheat leaf disease survey. The goal of this survey is to create awareness regarding the prevalence, variability and impact of leaf diseases across the Prairies. The PBN wheat leaf spot survey is not meant to replace important annual surveying by wheat pathologists and extension staff, but rather to complement these activities and to expand the area of coverage each year.

The AAFC PBN was developed to address concerns related to surveying of wheat diseases in the Prairie region as well as general insect and weed issues. Support for survey activities ebbs and flows, but access to wheat samples is critical for subsequent work in relation to studying pathogen variation and any potential shifts in virulence, etc. As researchers we need to stay up-to-date on the diseases and pests of concern so that we can focus research efforts with regard to cultural management, the development of resistant varieties, identification and evaluation of current and potential sources of resistance, to provide ongoing assessments for the potential appearance of fungicide insensitive pathogen strains, and to know which pests to focus our efforts on. In addition, this information is important for the development of appropriate extension materials by extension staff from government and producer groups.

Materials and Methods for the 2024 PBN wheat leaf spot survey

A survey to document leaf diseases of wheat was conducted in 61 Prairie fields across Alberta, Saskatchewan and Manitoba in late July/August 2024. Leaf collections were done by volunteer producers, extension/industry staff and researchers at the late milk to soft dough stage. Gateway Research Organization staff participated in the Alberta component of the PBN wheat leaf disease survey.

Collaborators were each sent a kit with survey instructions and materials to collect five flag leaves randomly at each of five sampling sites along a "diamond-shaped" sampling pattern, for a total of 25 leaves per field. In addition to the sampling kit, a questionnaire was included to collect information on cropping practices related to rotation, fungicide use, variety, etc. The leaf samples and completed questionnaires were returned to AAFC Lacombe for rating, assessment of causal agents, and tabulation of questionnaire results.

WHEAT LEAF DISEASE SURVEY CONT'D

Leaf samples were rated for the total wheat leaf complex comprised of tan spot (*Pyrenophora tritici-repentis*), the septoria complex (*Zymoseptoria tritici* and *Parastagonospora nodorum*); spot blotch (*Bipolaris sorokiniana*) and physiological leaf spotting but were also checked for the presence of leaf rust (*Puccinia triticina*) and stripe rust (*Puccinia striiformis*). Each leaf was rated for percentage leaf area diseased (PLAD) and then averages were calculated for each field. Other issues such as bacterial leaf streak was also noted and rated if present. Representative leaf samples from each field were placed in moist chambers and incubated for up to 48-72 hours to promote pathogen sporulation. Causal agents and other saprophytic fungi were identified based on fruiting structures and/or spore morphology.

Results and Discussion

In total, samples from 61 wheat fields were sent back for rating and tabulation of cropping information. Samples from 23 fields were submitted from Alberta, 31 fields from Saskatchewan, and seven fields from Manitoba. Overall, the average PLAD was 7.9%, with values of 4.7%, 10.5%, and 7.0% for AB, SK, and MB, respectively (Table 1). Identification of causal agents indicated that symptoms in the 61 fields were associated mainly with tan spot (20.2%), followed by the septoria complex (10.1%) and spot blotch (2.3%). The most common fungus observed in all fields was the saprophyte *Alternaria* spp., which was present on 89.8% of the leaf tissues tested; *Epicoccum* spp. were associated with about 28.2% of the leaves tested, also. Saprophytes don't cause damage to leaf tissue but infect after the leaf has already been damaged due to a pathogen, heat stress, drought, hail damage, or physiological leaf spotting. No symptoms of rust or BLS were observed on the collected leaf samples in 2024.

GRO collaborators were able to survey and collect flag leaves from seven fields in the area NW of Edmonton, Alberta. The average PLAD for GRO samples was 2.7%, which was lower than the overall averages for AB, SK, and MB (Table 1). The minimum and maximum average PLAD per field was 0.3 to 8.2, respectively. Differences between provinces likely reflected overall moisture levels, especially in late June and throughout July of 2024. The lower PLAD levels for GRO collected samples likely reflected drier weather conditions during the same period.

In 2024, fields were classified as to the number of wheat crops planted previously from 2020-2023 (Table 2). For some fields specific numbers were not available and were coded as =<three years and =>1 year (Table 2). There was no consistent trend of increasing leaf spot severity as the number of previous wheat crops increased from zero to three, with the highest average levels of disease being where either no wheat crops occurred, or where two-three wheat crops occurred during the previous four years (Table 2). Fields were also classified as to the number of non-host crops planted prior to wheat being grown in 2024 (Table 3). Non-host crops for wheat in relation to leaf diseases include canola, pulses, barley, forage legumes, summer fallow, etc. Complete rotation information was available for all four previous years for 52 crops in total. PLAD was 14.7% in fields planted to wheat on wheat, and 6.2%, 7.4%, and 7.5%, respectively, with one, two, or three years of non-host crops prior to wheat being grown in 2024 (Table 3). There were seven and two fields that had ranges of >=four years, or =>one year, and PLAD ratings were 8.3% and 2.6%, respectively. The trends observed for the number of non-host crops preceding the 2024 wheat crop illustrate the potential role of avoiding wheat on wheat rotations in reducing leaf spot risk and impact.

Fields were also classified according to whether leaf samples were collected from fungicide-sprayed areas versus samples collected from fields that were not sprayed or where samples were collected from unsprayed strips (Table 4). There appeared to be a slight reduction in leaf spot severity in samples collected from fungicide-sprayed areas (6.4%) versus non-sprayed fields/areas (9.7%) (Table 4).

Given that as of 2013 leaf spots are no longer a priority one disease for the Prairie Recommending Committee for Wheat, Rye and Triticale, candidate lines proposed and approved for registration no longer have leaf spot ratings assigned. Thus, it is not possible to categorize the varieties used in the survey according to leaf spot resistance rating. Instead, ratings will be given for individual varieties (Table 5). The most common varieties grown were AAC Wheatland (10), AAC Viewfield (six), and AAC Starbuck and Hockley (three fields each), with each of the remaining varieties planted in one to two fields (Table 6). For three fields, the variety information was not available, while one and five fields didn't have variety indicated, but did have class, i.e. HRSW and CWRS, respectively. Varieties with the highest levels of leaf disease (>10% PLAD) were AAC Alida, AAC Hodge, Brigade, Accelerate, AAC Spitfire, and AC Andrew (Table 6).

Once again, we would like to sincerely thank collaborating farmers and GRO staff, for participating in our survey. For further information, please contact us at the email addresses below.

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Acknowledgements

The authors would like to acknowledge the support of participating farmers and the assistance of staff from GRO, the Saskatchewan Ministry of Agriculture, and crop consultants. The current report is part of the AAFC Prairie Biovigilance Network (PBN) and A-base funding from AAFC is graciously acknowledged. We would also like to thank technicians Sasha Chisholm and Jackie Busaan, and summer students Selena Delahunty and Jayden Leroy of AAFC Lacombe for their assistance with kit assembly and shipment, and leaf ratings and culturing.

Table 1. Prairie Biovigilance Network (PBN) wheat leaf disease survey results for Alberta, Saskatchewan and Manitoba, 2024.

		Percent leaf area affected (PLAD)[a]			Average percentage of leaves with the causal agents of tan spot, the septoria complex, spot blotch, and saprophytes (*Epicoccum* spp. and *Alternaria* spp.)				
Province	Number of fields	Average	Minimum	Maximum	Tan spot	Septoria complex	Spot blotch	*Epicoccum* spp.	*Alternaria* spp.
AB	23	4.7	0.2	33.5	14.8	14.8	4.3	42.6	89.6
GRO (b)	7	2.8	0.3	8.2	5.7	11.4	0.0	37.1	80.0
MB	7	7.0	2.8	14.8	40.0	5.7	0.0	8.6	80.0
SK	31	10.5	0.1	78.5	19.8	7.6	1.3	21.9	92.3
Overall	61	7.9	0.1	78.5	20.2	10.1	2.3	28.2	89.8

[a] Based on a combination of tan spot, septoria complex, spot blotch, and physiological leaf spotting.

[b] GRO = Overall Gateway Research Organization (GRO) collaborator results, Alberta, 2024.

WHEAT LEAF DISEASE SURVEY CONT'D

Table 2. Prairie Biovigilance Network (PBN) 2024 wheat leaf disease survey results based on the number of wheat crops previously grown from 2020-2023.

Number of wheat crops from 2020-2023	Number of fields	Average percent leaf area affected (PLAD)[a]
0	7	8.3
1	29	7.4
2	18	9.2
3	2	9.2
=<3	2	2.6
=>1	3	6.8

[a] Based on a combination of tan spot, septoria complex, spot blotch, and physiological leaf spotting.

Table 3. Prairie Biovigilance Network (PBN) 2024 wheat leaf disease survey results based on number of years of non-host crops grown prior to the 2024 wheat crop.

Number of years of non-host crops prior to the 2024 wheat crop	Number of fields	Average percent leaf area affected (PLAD)[a]
0	8	14.7
1	20	6.2
2	12	7.4
3	12	7.5
=>4	7	8.3
=>1	2	2.6

[a] Based on a combination of tan spot, septoria complex, spot blotch, and physiological leaf spotting.

Table 4. Prairie Biovigilance Network (PBN) 2024 wheat leaf disease survey results based on whether samples were collected from fungicide sprayed or unsprayed fields.

Fungicide applied in areas where leaf samples were collected[a]	Number of fields	Average percent leaf area affected (PLAD)[b]
Unknown	1	1.4
No	30	9.7
Yes	30	6.4

[a] Unknown = incomplete spray information. The sprayed category also includes samples collected from unsprayed areas within fungicide-sprayed fields.

[b] Based on a combination of tan spot, septoria complex, spot blotch, and physiological leaf spotting.

Table 5. Prairie Biovigilance Network (PBN) 2024 wheat leaf disease survey and varieties grown.

Variety	Number of fields	Average percent leaf area affected (PLAD)[a]
AAC Elie	2	0.6
AAC Viewfield	6	2.7
Accelerate	1	14.8
CDC Defy	1	3.9
CDC Go	1	1.2
CWRS*	5	5.4
HRSW**	1	1.4
Transcend	1	0.1
AAC Wheatland	10	9.7
AAC Starbuck	4	4.1
AAC Stronghold	2	4.9
AAC Wheatland	2	4.5
AAC Hodge	3	28.2
AAC Paramount	1	0.2
AAC Brandon	3	3.0
Parata	1	9.1
AAC Grainland	1	2.0
CDC Precision	2	3.8
AAC Spitfire	1	11.7
AAC Alida	2	53.4
Brigade	1	18.0
AAC Hockley	4	3.3
AAC Penhold	1	0.3
AAC Connery	1	6.6
AC Andrew	1	10.8
Unknown*	3	1.7

* CWRS = Canadian Western Red Spring; ** HRSW = Hard Red Spring Wheat; *** Unknown = no information provided.

[a]Based on a combination of tan spot, septoria complex, spot blotch, and physiological leaf spotting.

WHEAT LEAF DISEASE SURVEY CONT'D

Part 2: Wheat Disease Survey in North Central Alberta

A seed fungal scan was the second wheat disease survey that GRO was fortunate to participate in. This **seed fungal scan** consisted of taking a random harvested wheat seed sample, submitting them to BASF, who in turn had SGS conduct a fungal spore scan. Three samples of seed from the GRO area were analyzed in detail for the presence of fungal spores. The percentage of spore colonies obtained from lab growth of these seed samples are as follows:

Spore Type	Average Percentage of Presence per Sample
Alternaria Leaf Spot	61.3
Aspergillus	0.0
Cladosporium	1.8
Root Rot: Cochliobolus sativus	0.7
Epicoccum	8.5
Fusarium avenaceum	1.7
Fusarium culmorum	0.0
Fusarium graminiarum	0.7
Fusarium poae	8.2
Fusarium sporotrichloides	0.5
Net Blotch: Pyrenophora	0.0
Penicillium	0.0
Septoria Leaf and Glume Blotch	1.2

These numbers indicate the percentage number of spores obtained per seed from the samples. If a seed produces more than one spore colony of a type, they are both counted, possibly resulting in a percentage over 100 in some cases, which has an impact on these numbers.

Fungal Spore types:

Leaf Spot caused by Alternaria species can have a major impact on the factories of the plant, its leaves if conditions are moist enough for its spread late in the season and damage is already present. Major infestations of Alternaria on susceptible varieties can cause significant reductions in yield.

Cladosporium is one causative agent for black sooty head mold, which can cause seed damage in particularly moist fall situations. Its presence in all samples is not a huge concern, particularly if it has a protective impact against powdery mildew.

Cochliobolus sativus is the fungus that causes root rot, and it is an indication of the need to either use varieties tolerant to the rot or to use protective seed treatments.

Epicoccum is an interesting fungus, with little impact on the wheat plant, but may instead have a protective factor against other fungi. Its strong presence in the local wheat samples may actually prove to be a positive factor for local wheat crops.

The **fusarium c**omplex of fungi may be the most concerning of the positive samples. The most damaging of the fusariums, graminearum, is present in low levels of the wheat samples sent in, but its presence indicates a need to be wary of fungal diseases and their local spread.

The **septoria complex** of fungi are responsible for leaf and glume blotch. While their presence has been known for a while, the current level indicates it is still present but not by itself in high enough concentrations for local wheat producers to use this as the sole reason to consider the use of protectants to maximize yield, but rather one may use the varietal susceptibility as a means of selection.

Conclusion:

While fungal concentrations on seed, as determined by testing of the samples submitted to GRO, do not generally appear to be high, if conditions are ideal for the propagation of the diseases, producers still need to be wary of yield damaging impacts. The presence of these diseases indicates that their spread is possible, despite an adequate field rotation. Prevention by variety selection is the first tool in the toolbox to consider minimizing the impact of these conditions.

COMPOST BLENDS FOR REGENERATIVE AGRICULTURE IN CENTRAL ALBERTA

This is year three of a three-year compost trial, a collaboration with Dr. Derek Mackenzie of the University of Alberta, Colby Hansen of Uphill Farms in Westlock County and GRO. It is an attempt to determine how to use compost and other soil amendments economically to augment or replace synthetic fertilizer. In 2024, inoculated faba beans were planted to determine how nitrogen fixing plants produce with the organic soil amendments rather than only synthetic fertilizers.

Agronomics:
Seeded: May 8, 2024 **Soil Temp:** 11 C **Soil Moisture:** Adequate
Application rates: each blend @ 10MT/ha scaled to a plot size of 40 m2 x 3 – 120 m2 (0.012 ha) per treatment.
Soil amendments used:

- *Compost: 10 MT/ha*
- *Biochar: 0.825 MT/ha*
- *Wood Ash: 2.5 MT/ha*
- *Gypsum: 0.8 MT/ha*
- *Synthetic Fertilizer*: 1.37N-6.5P-27.08K-14.7S-7.2 Mg at 276.96 lbs/ac

Precipitation: May 1 - Sept 30: 258.1 mm
Herbicide: Solo @ 325 mL./ac June 11 **Dessicant:** 1.5L Reglone in 20 gal/ac water on Sept 19
Harvested: Oct 9, 2024

Results:
In the first two years of this trial, it appeared synthetic fertilizers were clearly required to maximize yield. This year however, plots with only synthetic fertilizer were not significantly better than those with a combination of compost, biochar and wood ash, possibly indicating that there is sufficient readily available nutrients in the soil amendments such that synthetic augmentation may not be necessary. This might lead to consideration that innovative or polyculture crops might be well suited to fields enhanced by a natural or combination of natural soil additions, and that synthetic fertilizers might not be needed in some cases.

Trt	Entry	Height (cm)		Yield (@ 16% Moisture) (kg/ha)		Yield (@ 16% Moisture) (bu/ac)	
1	Control	62	c	2412	f	36	f
2	Synthetic Fertilizer	86	a	3959	cd	59	cd
3	Compost	68	c	3457	de	51	de
4	Compost + Synthetic	84	a	4113	bc	61	bc
5	Compost + Biochar	67	c	3316	e	49	e
6	Compost + Biochar + Synthetic	64	c	3270	e	49	e
7	Compost + Wood Ash	63	c	3073	e	46	e
8	Compost + Wood Ash + Synthetic	81	ab	4768	a	71	a
9	Compost + Wood Ash + Biochar	83	a	4525	ab	67	ab
10	Compost + Wood Ash + Biochar + Synthetic	66	c	3233	e	48	e
11	Compost + Wood Ash + Gypsum	73	bc	3102	e	46	e
12	Compost + Wood Ash + Gypsum + Biochar	71	c	3422	de	51	de
13	Compost + Wood Ash + Gypsum + Biochar + Synthetic	73	bc	3758	cde	56	cde
LSD P=.05		**7.01**		**444.31**		**6.51**	
Standard Deviation		**4.16**		**263.66**		**3.86**	
CV		**5.75**		**7.39**		**7.28**	

Means followed by the same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparison performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Compost Trial Economic Analysis, Contributed by Dr. Derek Mackenzie

What follows is a back of the envelope estimate that was generated with the aid of a large language model:

The cost comparison between synthetic fertilizer and compost application reveals that synthetic fertilizer is significantly more economical, costing approximately $175 per hectare compared to $1000 per hectare for 9 tons of compost and 1 ton of biochar. However, applying 9 tons of compost and 1 ton of biochar per hectare annually may significantly enhance soil carbon sequestration.

In this scenario, compost with 45% organic carbon content, contributes approximately 4.0 tons of carbon per hectare per year, considering its gradual mineralization and stabilization in soil. Biochar, which contains 75% carbon and is highly recalcitrant, adds an additional 0.5 tons of stable carbon per hectare per year. Together, these amendments result in a total annual carbon storage of approximately 4.5 tons per hectare, equivalent to 16.3 tons CO_2e (carbon dioxide equivalent) per hectare.

With carbon credit prices ranging from $20 to $50 per ton of CO_2e, this practice could generate $326 to $815 per hectare in carbon credits annually. We estimate that at $50 per ton CO_2e these practices, along with increased yield, will have ROI equivalent to using synthetic fertilizer alone. Although compost and biochar are more expensive due to higher material, transportation, and application costs, this treatment offers long-term benefits such as enhanced soil structure, increased organic matter, and improved nutrient retention.

These advantages plus increased yield and carbon credits will make the ROI on compost use more positive and equivalent to synthetics alone. The inclusion of biochar notably increases the long-term carbon retention due to its resistance to decomposition, offering a durable strategy for enhancing soil health, mitigating greenhouse gas emissions, and supporting sustainable agriculture. This demonstrates a significant economic incentive for adopting sustainable soil amendments alongside their benefits for soil health and productivity.

It was found through biochemical soil analysis, however, that adding biochar, ash, and gypsum tends to increase biochemical markers, particularly amino acids and basal respiration. So, adding these soil amendments have been shown to increase soil microbial health. In addition, compost, ash and gypsum were found to have the highest microbial biodiversity. Further results to be examined include greenhouses gas emissions and carbon sequestration potential for these various soil amendments and their combinations. It is believed that combinations with compost will have higher respiration, but also higher carbon sequestration, leading to higher net carbon sequestration in soils.

Additional carbon and greenhouse gas data was collected from soil tests that have not yet been analyzed at the time of printing of this report.

Conclusion:

While work still needs to be done to create a recipe or series of recommendations based on soil types and quality, there appears to be the possibility of a combination of soil amendments and crops that might capture carbon, produce economic crops, make use of organic soil amendments and improve soil health. Until this ultimate combination of conditions is discovered and thoroughly vetted, it is noted that there is still much work to be done to accomplish these goals.

GRO
HEIFER PASTURE

SE 23-61-26-W5

Nearly fifty years ago the Pembina Forage Association, GRO's predecessor, began managing a pasture for demonstration purposes. Beginning with water and mineral placement and forage production, the pasture has seen numerous demonstrations and trials attempting to answer local producer questions. Various types of beef animals (steers, heifers, pairs) have been grazed under a variety of management systems. This work was the beginning of what is now Gateway Research Organization and we are proud to continue working on these questions. Thank you to everyone who has kept this work moving forward, from the pasture managers to the patrons, from the summer students to the board.We look forward to seeing what the future holds at 'the pasture'.

HEIFER PASTURE 2024

The Gateway Research Organization has long managed a quarter section as a pasture. Over the decades, different pasture improvements have been attempted, from various legume seeding methods to a number of pasture systems.

In 2024, GRO decided to take further steps in pasture management. In addition to the pasture rejuvenation trial, described elsewhere in this report, GRO decided to try to subdivide the larger three-acre paddocks into three smaller sections each to ensure all the areas are intensively grazed. This occurred in all pastures except for the mob grazing and continuous grazing paddock, both of which were maintained as they have been for a number of years. There was one more paddock that was not grazed at all, but rather it was split up into a number of strips where a variety of forage rejuvenation procedures were attempted from the very uninvasive fertility treatment to a few strips that were rototilled and seeded in different ways to determine the best way to reestablish forage production on local soils.

This left thirteen paddocks to be divided into three single acre strip each to be grazed by nearly one hundred heifers and bulls. With the two days of mob grazing added into the rotation, this led to a rotation of roughly 41 days on average. The heifers quickly got used to the daily moves involved in this new system. The theory behind this daily move system is that the small paddocks encourage better utilization of all forages in each paddock rather than spotty usage of preferred species. This practice did, however, entail daily trips to the pasture and regular trips to move the electric fences, so was the improved utilization actually worth that travel and personnel time? For the GRO pasture in 2024, it is difficult to determine, due to the fact that we cannot simply compare the labour bill for each year and come up with a cost per animal unit. Many factors come into play, including:

- A solar pumping system was installed in 2024, which allowed for less time required to ensure sufficient water. In 2023, a gas pump was used and the pasture manager or someone had to stay at the pasture the whole time to turn the pump on, make sure it was pumping sufficient water and to turn it off when the water tank was filled. This practice usually took about two hours every few days. The continuously available solar pump only needed to be checked on to ensure it was working and refilling the water tanks when there was a need. This reduced the water labour bill considerably.
- One less paddock was used in 2024 than in 2023. With the need to test a variety of methods to improve the pasture being required, paddock 12 was taken out of the grazing cycle to be used for rejuvenation trials, so the actual acres were reduced in 2024. There was ten acres less that year than in 2023, so this needs to be taken into consideration when calculating the cattle grazing days per acre.
- Slightly lower numbers of heifers were present in the rotational grazing herd, from 100 in 2023 to 96 in 2024. This difference in numbers is also taken into consideration in the utilization calculations.
- Differing weather conditions. While both grazing seasons had periods of extreme heat and some moisture, they occurred at different times, and that had a major impact on forage production each year. The early dry period of 2023 may have had a greater negative impact on the pasture than the heat in 2024, but that cannot easily be calculated.
- Differing amounts of post-season residue. While it is true that plant matter left over has value in future years, if it is not calculated on a paddock-by-paddock basis in the fall, there will be some impact of this material in subsequent years which should be included in calculations. This was not completed in the fall of 2023.

Given all these considerations, the rough results are as follows:
- 2023: 100 heifers grazing 141 days, with an average daily gain of 1.58 lbs/day
- 2024: 96 heifers grazing 121 days, with an average daily gain of 1.14 lbs/day

With the daily moves in 2024, one would have to consider the labour would be higher for pasture management in that year. Again, with the very different weather in the two years the rough calculation comparisons of these two systems cannot be considered particularly valid, especially with this being the first year of the

HEIFER PASTURE 2024

change. Further studies in subsequent years will need to be calculated to help determine if this more intensive procedure is worth the work.

Going forward:

One major drawback of the current set up at the heifer pasture is the difficulty in collecting data on growth with different grazing systems. Weighing the heifers on a regular basis through the current platform scale set up is time consuming and could have a major negative impact on the gain for that day. With the possibility of the purchase of an in-pasture, self-service, mineral attractant auto-scale, the amount and ease of collecting rate of gain data throughout the grazing season should be greatly increased in 2025, and GRO can use information from its heifer pasture and any rotation to a much greater capacity.

Additionally, moving forward plants counts will be taken over the next couple of years to monitor the effects of the various grazing systems and the rejunvenation demonstration strips. Soil sampling will continue to occur in various locations across the pasture to monitor soil health. Having a more complete understanding of the current plant inventory and the associated soil interactions should assist in determining the overall effectiveness and cost-benefit of each practice.

HEIFER PASTURE REJUVENATION DEMONSTRATION

GRO and its predecessor, the Pembina Forage Association, has been managing a pasture for nearly its full fifty years of existence. Most of the demonstration activities on the pasture dealt with water and mineral placement or pasture paddock design. Over the years, a number of efforts were made to upgrade the nearly native pasture through uninvasive means, such as broadcast seeding over existing pasture, using mineral with legume seed mixed in it and other ways to be uninvasive yet attempt to add species to the trial. These methods have met with variable success, so it was determined to try more means of pasture rejuvenation.

One of sixteen paddocks from the quarter section of the heifer pasture was selected and removed from the 2024 rotation. Several different procedures of pasture rejuvenation were performed to demonstrate future improvement and forage yield increases and compare it to a control, which had no action taken. The methods included:

- Fall 2023 (December 2023) drone broadcast frost seeding rejuvenation blend (6.5 lbs/acre) to augment existing species and get worked in by frost action over the winter
- Spring (April 2024) drone broadcast seeding rejuvenation blend (6.5 lbs/acre) to augment existing species to compare with frost seeding
- Rototill three times, Valmar broadcast seed (20 lbs/acre) on June 28, 2024, and harrowed following with rejuvenation blend and grass seed to replace current stand
- Rototill twice, Brillion seed rejuvenation blend and grass seed (20 lbs/acre) and grass seed to replace current stand on June 26, 2024
- Direct seed rejuvenation blend (20 lbs/acre) to augment existing stand, seeded August 1, 2024
- Soil aeration on August 2, 2024, followed by Valmar broadcast rejuvenation blend (20 lbs/acre) to augment existing grass stand, followed by harrow incorporation
- Valmar broadcast rejuvenation blend (20 lbs/acre) over existing stand and harrowed afterward, broadcasted on August 2, 2024
- Wood ash application (2 tonne/acre) broadcasted on June 28, 2024
- Gypsum (recycled drywall) application (1 tonne/acre) broadcasted on June 28, 2024
- Hydrated lime application (2 tonne/acre) broadcasted on June 28, 2024
- Crushed lime application (2 tonne/acre) broadcasted on June 28, 2024
- Agricultural lime (1 tonne/acre) broadcasted on June 28, 2024
- Synthetic fertilizer blend (387.57 lbs/acre of a 18.3-2.1-28.5-4.3 blend) broadcasted on June 28, 2024. Actual N applied, 70.9 lbs, P 8.1lbs, K 110.5 lbs, S 16.7 lbs
- Humalite (207.2 lbs/acre) broadcasted on June 28, 2024
- Control plot, no action taken

Rejuvenation blend:

Pounds/ac	Percentage	Species
1	24.4%	Hairy Vetch - Hungvillosa
0.5	12.2%	Cicer Milkvetch
0.5	12.2%	Alfalfa - Imperial Select Blend
0.4	9.8%	Red Clover
0.4	9.8%	Plantain
0.36	8.8%	Yellow Blossom Sweet Clover
0.33	8.1%	White Clover - Bombus
0.2	4.9%	Chicory
0.2	4.9%	Balansa Clover
0.2	4.9%	Birdsfoot Trefoil

HEIFER PASTURE REJUVENATION DEMONSTRATION CONT'D

Visual observations were conducted in the summer of 2024. What we saw included:

- Plots 1 and 2 appeared to be slow to have new seed germinate, establish and grow
- Plots 3 and 4 had a large flush of weeds, including and especially creeping thistle, while there was some germination of new species
- Plots 5, 6, and 7 also appeared to have a slow start to the seeded species
- Plots 8-12 appeared to have some increased grass growth
- Plot 13 had some obvious increase in grass growth
- Plot 14 seemed to have a thicker, greener appearance than the control

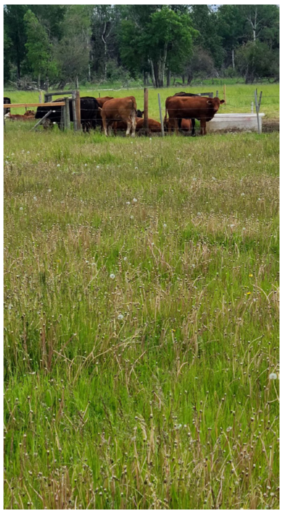
More comprehensive, replicated observations will be conducted in the spring of 2025 for:

- Plant establishment on the reseeded plots (Plots 1 through 7)
- Total plant material replicated samples taken on all plots
- Quality analysis on composite samples for each plot
- Invasive species selective weed control conducted on at least half of plots 3 and 4
- Economic analysis of all plot treatments, including estimated equipment expenses had they been utilized over the entire field

GRO has been able to try only a small sampling of potential pasture rejuvenation methods. Others that could have been tried, had we been able to work them into our small strip trials included:

- Spring drone seeded followed by immediate grazing to have improved seed to soil contact
- Mixing small seeds with mineral to have them pass through the cow and seed in that method
- Quad broadcast seed grass and rejuvenation mix followed by grazing

These additional methods may be attempted and observed in subsequent years. For now, GRO will observe the methods tried to help ranchers come to conclusions as to which way of rejuvenating pastures might work best for them. As more data is collected, GRO will also be able to determine which method might be best for the heifer pasture, and more extensive use of the best method(s) will be attempted.


GREENER PASTURES
RANCHING

GENOMIC TRIAL

Background:

Ranchers in north central Alberta have long been attempting to determine the most successful means of predicting the long-term reproductive success of their heifers. They keep track of their parentage, select bulls for herd productivity and look at phenotypic factors as means of indicating the best calving and mothering potential. To help find a method that would improve this predictability, GRO has partnered with the University of Alberta, Livestock Gentec, heifer pasture patrons and local ranchers to conduct a large scale, multi-year study to determine if tissue and genetic sampling will be a more reliable method of predicting herd heifer success.

Method:

On GRO's usual pasture take out day, small samples of ear tissue were taken from each heifer there, then sent to the university Livestock Gentec lab for a variety of genetic testing. Participation in this trial was also opened up to area ranchers who wanted to try genomic herd analysis for a reduced fee.

Results:

Hybrid vigor score: Heifers with higher hybrid vigor score are associated with greater lifetime productivity, but purebred cattle are likely to bring the fastest change in genetic hybridity when introduced into a herd. The hybrid vigor index scores of the heifers tested ranged from .83 down to purebreds at 0 hybrid vigor. There was an average hybrid vigour of the heifers tested of .39. Traces of up to thirteen breeds were determined to be present through the genetic analysis of the heifers on pasture. It should be noted the primary purpose of these heifers at the pasture was not solely to be selected as replacement heifers. If the initial intent was to have all the entries to be considered as replacements, the hybrid vigor, and all the scores, may have been different.

Feeder Profit Index: Feeder profit index is based on terminal traits of performance, feed efficiency and carcass traits. This helps to determine the animals with the greatest potential to produce feeder cattle progeny with improved economic net return. The heifers tested produced an indication of net improvements from + $29.17 to -$23.95, with an average of $.32.

The **Replacement Heifer Profit Index** can help with selecting daughters which have the higher genetic potential for fertility, longevity and superior maternal characteristics. This index can also help select heifers that will stay longer in the herd and produce more calves over a lifetime. The heifers tested for GRO in 2024 had indexes ranging from +85.31 down to a -5.88, with an average of + 36.94.

Conclusion:

GRO appears to have a good start to testing genomics as a means of herd improvement. The sampling was easy to do with the rest of the pasture takeout activities, and the handling of the samples was not difficult to conduct. Previous genetic testing involved hair sampling, which was much harder to successfully accomplish than these small tissue samples. The analysis did not take a lot of time, and the reports were easy to understand. There is a continued need for cooperators to report to GRO and Livestock Gentec regarding performance, calving success and herd retention. This will not only help demonstrate the success of the genetic predictions, but it will also verify the local impact of this form of testing.

UNIVERSITY OF ALBERTA

livestock gentec

INTENSIVE BALE GRAZING

Background:
Winter Bale grazing has been shown to be an effective, rapid method to improve soil quality and pasture growth. It also has been determined that a more concentrated form of bale grazing might be the most effective means of ensuring that improvement. This demonstration was conducted to determine whether the soil microbial population also had a similar rapid improvement.

In the winter of 2023-24, intensive bale grazing was conducted on some problematic pasture in the Westlock area. 40 cow-calf pairs bale grazed a 4 acre paddock from the beginning of November, 2023, to the third week of March, 2024. Roughly 200 large round bales were grazed in this area for that period. Bales were generally placed 30 feet apart. In May, sampling was conducted to see if there was a rapid change in the physical and microbial population of the soil, compared to a neighboring ungrazed area. The following differences were noted, and while not replicated over several sampling sites but rather taken over the area as a whole, are nonetheless interesting, and when taken as an entirety could be indicative of rapid, beneficial changes to the pasture soil.

Results:

Potential Physical Changes:

Characteristic	Grazed area	Ungrazed area
Organic Matter	7.20%	6.10%
Phosphorous (Bray analysis)	51	31
Potassium	435 ppm	238 ppm
Nitrogen	150 ppm	61 ppm
Sulphur	10 ppm	9 ppm
pH	5.7	5.8

Most all the standard physical characteristics and nutrients appear to favor the bale grazed area, with the application of those nutrients in cattle waste products and organic matter from the bales themselves. This generally looks like a rapid, positive means to improve degraded pasture, but for most producers, it can only improve a small area at a time. If the pH from these samples were a solid, replicated number that we could rely on however, it would be a cautionary indicator of a downside of bale grazing, that all the uric acid applied to a small area might drop the pH to a number low enough to have a negative impact on legumes such as alfalfa (pH 5.5).

Potential Microbial Changes

Characteristic	Grazed Area	Ungrazed Area
Total bacteria	11732	7420
Active Carbon	1060	1009
CO2 Respiration	108 ppm	108 ppm
General Fungi -soil	2389	1390
Pseudomonas	2543	40
General bacteria	2044	2063
Anaerobes -soil	299	269
Actinomycetes	2424	1893
Total gram negatives	5258	2241
Rhizobium – soik	567	123
Gram positives – soil	2007	1223
Biological Quality Rating	5	5
Total microbial activity - soil	14536	9420
Trichoderma - soil	113	341
Nitrogen Fixers - soil	2148	2078

Conclusions:
These microbial results seem to indicate a jump in bacteria, fungi, and total microbial activity with recent, intensive bale grazing. Pastures are therefore more likely healthy and will take advantage of the extra nutrients, and indeed will produce more with enhanced soil rhizobium fixing even more nitrogen. This also seems to be clear in the various microbial populations and ratios, as shown in the following two tables. This agrees with data previously determined in our demonstrations and others, and has been shown to last a number of years. Producers need to consider this method of improving soil and find a way to maximize this means of efficiently using this method of winter feeding.

Economics:
When used carefully, bale grazing can producer an economic return. This method of enhancing soil is generally free, especially the nitrogen content from urine, commonly a lost product when expelled on a feedlot or wintering area. Other nutrients are also added to the soil. This and other results indicate bale crazing can be an efficient means of maximizing waste products to use all of them.

INTENSIVE BALE GRAZING CONT'D

Ungrazed Paddock

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

VitTellus Bio

Report Number: C24344-10013
Account Number: 03091

To: GATEWAY RESEARCH ORG.
BOX 5865
WESTLOCK, AB T7P 2P6

For: Ungrazed Paddock

Attn: SANDEEP NAIN
780-349-2012
Reported Date:2024-12-16
Printed Date:2025-03-26

VitTellus Bio Soil Health Report

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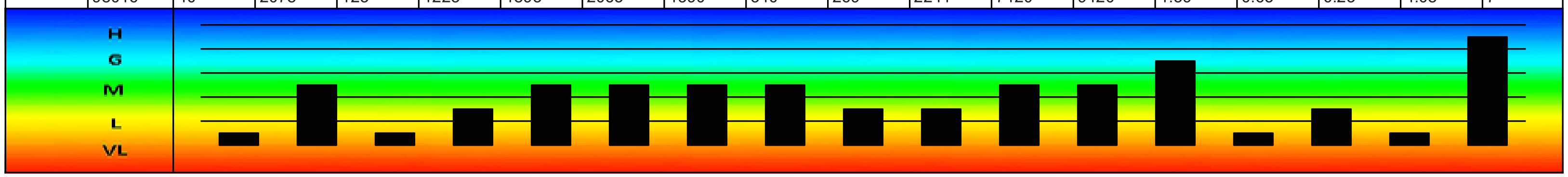
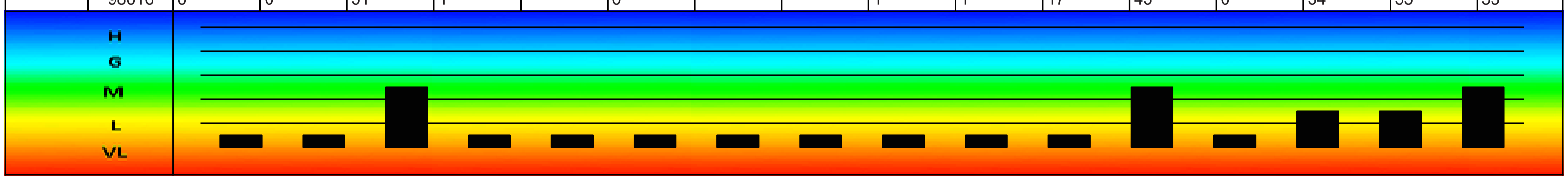
Sample ID	Lab Number	Pseudomonas Population	Nitrogen Fixers	Rhizobium Related	Gram Positive	Actinomycetes	General Bacteria	General Fungi	Trichoderma	Anaerobe	Total-Gram negatives	Total-Bacteria	Total microbial activity	Gram+: Gram-	Gram+: Actinomycetes	Fungi: Bacteria r	Fungi: Trichoderma	Aerobe: Anaerobe
	98016	40	2078	123	1223	1893	2063	1390	340	269	2241	7420	9420	1.39	0.65	0.23	4.08	7



VL=Very Low, L=Low, M=Medium, G=Good, H=High

Sample ID	Lab Number	Soil Health Index___ Pseudomonas Population	Soil Health Index__ Total Gram negatives	Soil Health Index___ Gram Positive	Soil Health Index___ Gram+: Gram-	Soil Health Index___ Fungi: Bacteria	pH___ Total Gram negatives	pH___ Fungi: Bacteria	OM___ Fungi: Bacteria	PERP___ Pseudomonas Population	CEC___ Total Gram negatives	CEC___ Total microbial activity	CEC___ Total Fungi	KMg___ Total Gram negatives	B___ Rhizobium Related	Overall biological index	Overall microbial sustainability index
	98016	0	0	51	1		0			1	1	17	43	0	34	35	53



The results of this report relate to the sample submitted and analyzed. All results are released based on acceptable QC data. No guarantee or warranty concerning crop performance is made by A & L.

Results Authorized By: [signature] **Beth Wood, Agronomist**

A&L Canada Laboratories Inc. is accredited by the Standards Council of Canada for specific tests as listed on www.scc.ca and by the Canadian Association for Laboratory Accreditation as listed on www.cala.ca

Grazed Paddock

Report Number: C24344-10013
Account Number:

To: GATEWAY RESEARCH ORG.
BOX 5865
WESTLOCK, AB T7P 2P6

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

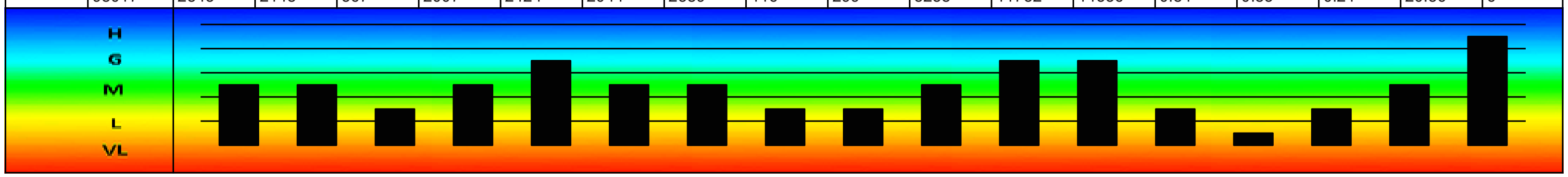
For: Bale Grazed Paddock

Reported Date:2024-12-16

VitTellus Bio Soil Health Report

Page: 2 / 2

Sample ID	Lab Number	Pseudomonas Population	Nitrogen Fixers	Rhizobium Related	Gram Positive	Actinomycetes	General Bacteria	General Fungi	Trichoderma	Anaerobe	Total-Gram negatives	Total-Bacteria	Total microbial activity	Gram+: Gram-	Gram+: Actinomycetes	Fungi: Bacteria r	Fungi: Trichoderma	Aerobe: Anaerobe
	98017	2543	2148	567	2007	2424	2044	2389	116	299	5258	11732	14536	0.84	0.83	0.21	20.56	6



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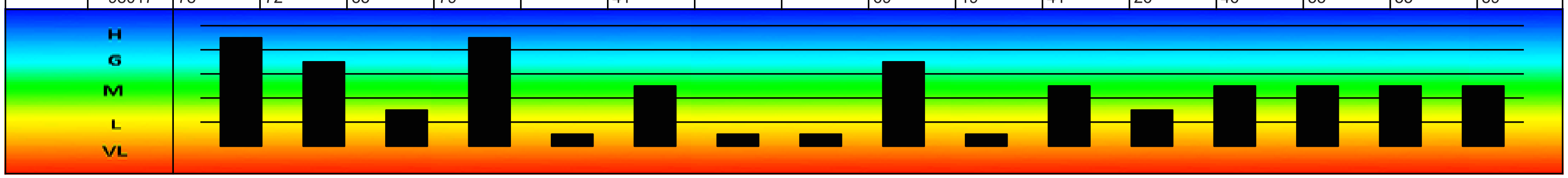
Sample ID	Lab Number	Soil Health Index___ Pseudomonas Population	Soil Health Index__ Total Gram negatives	Soil Health Index___ Gram Positive	Soil Health Index___ Gram+: Gram-	Soil Health Index___ Fungi: Bacteria	pH___ Total Gram negatives	pH___ Fungi: Bacteria	OM___ Fungi: Bacteria	PERP___ Pseudomonas Population	CEC___ Total Gram negatives	CEC___ Total microbial activity	CEC___ Total Fungi	KMg___ Total Gram negatives	B___ Rhizobium Related	Overall biological index	Overall microbial sustainability index
	98017	78	72	35	79		41			69	19	41	26	46	53	55	59



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2024 GRO EQUIPMENT AND INFRASTRUCTURE UPGRADES

The world of agriculture is changing and GRO makes every effort to keep pace with these innovations. With our ability to successfully conduct private research, and with a special Forage and Applied Resesearch Association capital grant program administered by Alberta Agriculture and Irrigation with delivery and administrative assistance from Applied Research and Extension Council of Alberta (ARECA), GRO is able to keep its coffers sufficiently funded to be able to purchase the occasional piece of new equipment, or to buy efficient, premium used plot-sized machinery. In 2024, GRO was able to purchase the following new equipment, with more to come in 2025:

Plot swather: It was also found there were times it was necessary to swath canola plots prior to harvest, especially with varieties of differing management packages seeded in close proximity, and often plots were difficult to separate due to extensive growth. A high-quality used swather designed to harvest individual plots was found in Manitoba and delivered to GRO over the summer. It was utilized extensively this fall, and we are pleased with the results. This swather adds versatility to our canola harvest options, and there is a possibility of it being utilized on crops other than just canola.

Hydraulic soil sampler in an SUV:
GRO takes hundreds of soil samples annually throughout the year, whether it is to determine the fertilizer blend for annual plots, to show the impact of organic additives, or to examine the value of bale grazing. Also, some soils are very hard and getting good samples to a proper depth has been difficult. In the fall of 2024, it was discovered that a 1999 Yukon, specially equipped to take soil samples with a hydraulic probe was available. GRO purchased the SUV and some of the extensive equipment available for its proper utilization. The front passenger seat is removed from this vehicle and replaced with a hydraulic soil probe, allowing a technician to take samples without even having to leave the truck, saving time and increasing efficiency. Technicians were trained on this unit and it was used extensively this fall, all with very positive results. GRO sees this unit becoming an integral part of their operations going forward.

Office Upgrades:
Those who have visited the GRO shop in the past will notice that there have been a few changes. Over the fall and winter a number of upgrades have been made to the office portion of the shop.

- A heat pump unit was installed to help with keeping the space a more consistent temperature, particularly in the winter when our cinder block walls and old windows can be quite cold. This unit should also provide some cooling in the summer as an added bonus.
- The paint was refreshed giving everything a lift.
- An office wall added to increase the usability of the downstairs space.
- New flooring has been added so that chairs can roll, and it is easier to keep clean.
- New stairs and railing have been installed (that meet code!).

We have received some captial funding from the Government of Alberta to assist with these costs and will be accessing their surplus with the hopes of further improving the space to host our board and general meetings with some 'new' chairs and a large table, and creating a display space at the front door.

Summary: GRO has been fortunate to find quality used equipment to efficiently expand its fleet. Our RDAR capital grant and the net income garnered from our contract research program has helped us be a leader in the work we do as an applied research association. GRO will continue to make appropriate, timely and frugal equipment purchases going forward to meet future research challenges. While it is difficult to precisely determine the economic advantages these new pieces of equipment, the efficiencies gained by better, more effective soil sampling, getting command of canola harvest timing, and being able to mechanically seed corn in a variety of row spacings will accrue obvious benefits.

Alberta


212
310







Gateway Research Organization

50 YEARS

Celebrating June 6, 2025

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