Lakeland Agricultural Research Association

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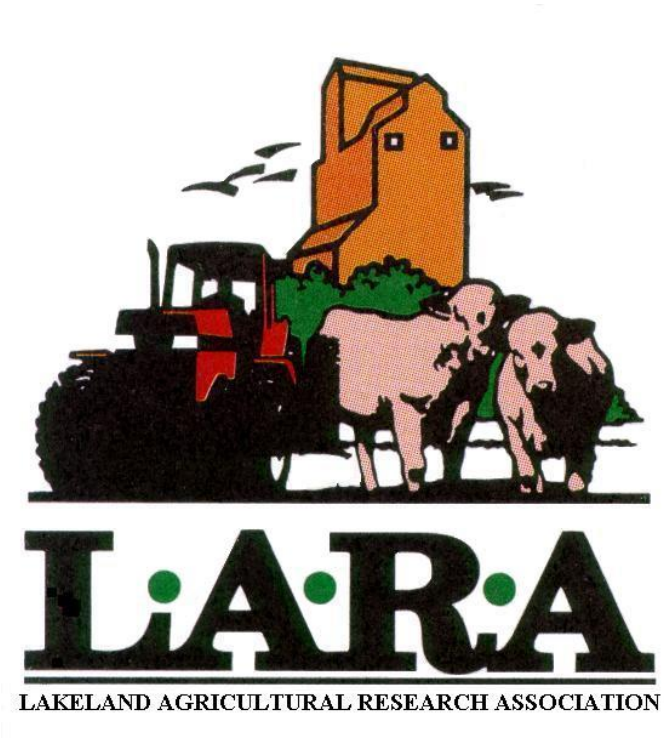
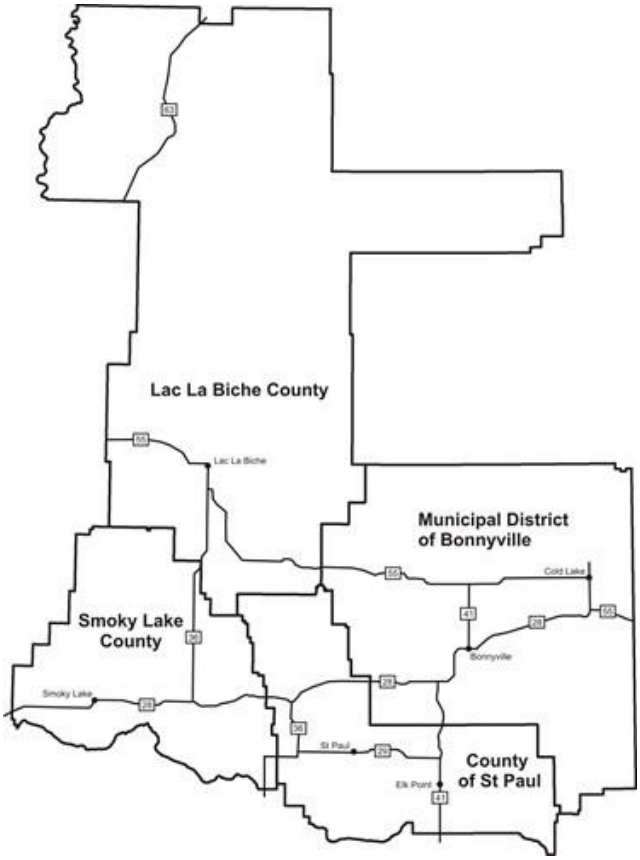


Vision Statement:
To be a leader in applied research and extension in Alberta

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

What is the Lakeland Agricultural Research Association?

Lakeland Agricultural Research Association (LARA) is an applied agricultural research association that serves the MD of Bonnyville, County of St. Paul, Lac La Biche County and Smoky Lake County. We are a member of the Agricultural Research and Extension Council of Alberta (ARECA). Our goal is to conduct applied research, demonstrations and extension programs that provide valuable and unbiased information to local producers.



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

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

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Message from the Chairman

Welcome to 2018 and what looks like to be another interesting year.

This past year was once more marked by the tenacity and determination of our local farmers, having to finish last years harvest before being able to seed this years.

Our research team were faced with the same obstacles, excessive early moisture meant delaying or even having to cancel some plots in some municipal areas but for the most part they were very successful.

On a brighter note, cattle producers saw prices get stronger throughout the year which translated into a great fall run.

To our managers Alyssa, Kellie and Dustin your dedication to our organization is truly remarkable, from the small plot research to the extensive workshops held throughout the year in all municipalities. Job well done.

To the board of directors, past and present, thanks for being so committed to seeing L.A.R.A succeed into the future.

Lastly, I would like to recognize our municipal partners MD of Bonnyville, Lac La Biche County, County of St Paul and the County of Smoky Lake. Without your financial contributions and guidance, we could not deliver our programs.

Sincerely

Louis Dechaine

Forage and Livestock Program Report

It's hard to believe another year has come and gone so quickly and I will be entering my sixth year here with LARA. Wow, time flies when you are having fun. Over the past five years, there have been many challenges but also many opportunities and I have learned a great deal since starting in the spring of 2013.

If 2016 was a tough year, 2017 was an interesting one across the province. Starting with an excessively wet spring delaying harvest of remaining 2016 crops and further delaying seeding to the excessive moisture during haying season to early frosts and another late harvest. Although fewer acres are remaining in the fields this fall than in 2016, the impact of two consecutive years is enormous.

The heavy rains have caused concern for forage crops, particularly hay, as many crops could not be baled without some rainfall. Despite these worries, feed tests have been coming in comparable to previous years, although in some cases molds are higher.

With the high moisture during the growing season, the forage trials, both perennial and annual, did very well at LARA this year. This was the second year of the Perennial Forage Trial and we harvested the legume trials in August to great success. This trial will provide farmers with regional based variety information across the province. In addition to the Perennial Forage Trial, we seeded perennial forage demonstration plots showcasing various legume and grass varieties that are new and emerging for producers.

A huge thank you to everyone who participated in the research and extension programs at LARA and to the exceptional staff, hard-working board of directors and local producers. I am looking forward to another successful year at LARA in 2018.

Alyssa Krone P.Ag.
Manager, Forage and Livestock Program

Cropping Program Report

As the year continues to fly by, it is difficult to believe that I am already half-way through my first year as a full-time employee of LARA. Together with Alyssa and the summer staff, there were crop seeded in Fort Kent, Lac La Biche, St. Paul and Smoky Lake.

Beginning the season with an unusually wet spring, there were challenges when it came to seeding. However, the excessive moisture, once seeded, several crops thrived. Amidst ideal growing conditions for crops, weeds and diseases were much more carefully monitored. The RVT wheat, barley, oats and triticale put up some very impressive yields. This year, we also got the opportunity to grow some alternative crops such as quinoa and industrial hemp that drew a lot of attention. Even though both crops did alright in their first year at LARA, there is some work that needs to be put in for better understanding of maintenance in order to produce better results. This year, LARA also conducted surveys for blackleg in canola, wheat midge and bertha armyworm. Fortunately, all the results taken from these surveys this year were an improvement from last year.

I wish to thank LARA for the opportunity to work with them as each day I learn something new and am very grateful for that. I would also like to thank my colleagues at the office and throughout the industry for their assistance with all the trials.

Dustin Roth
Cropping Program Coordinator

AESA Program Report

2017 saw the completion of my eighth year of working at LARA. This past year went by in a flash as it was extremely busy with events and workshops. There was a never-ending list of things to do and speakers to organize. There was a great variety of workshops this year from holistic management to beavers to water related topics, safety and mental health.

I was able to take part in a few workshops held by Cows and Fish regarding riparian restoration and health assessments, as well as a Street to Stream workshop. I attended at the University of Alberta for an Applied Soil Physics course this fall. I was also able to attend the Western Canada Grazing and Soil conference in December in Edmonton. All of these learning opportunities are always appreciated and valued. I also attended a two-day workshop to learn how to create pond levelers and exclusion fence to coexist with beavers in the landscape.

I am very fortunate to be able to do a job that I love, interacting with a variety of people and constantly learning something new. I truly do feel fortunate to be able to help educate our youth on agriculture, wetlands, riparian areas and ecosystems.

I want to thank those of you who have come out to our events and shown interest in environmental stewardship.

Cheers to a great 2018!

Kellie Nichiporik P. Ag.
Environmental Program Manager

ARECA and its nine member associations have an important place in rural Alberta. Lakeland Agricultural Research Association is a valuable member of the provincial team. I thank LARA's representative to ARECA, Roger Harbord for his support of provincial initiatives.

Raising the Bar on RVTs ARECA was pleased to focus attention on Regional Variety Trials again in 2017. We held two excellent training days, one in April and one in July. (LARA hosted one of the Training Days in 2016). Thank you to Alberta Agriculture and Forestry (AAF), Agriculture and Agri-Food Canada and the University of Alberta for their support of this project. A special shout out to Kristine Polziehn who was a resource for our members for 2016 and 2017.

This summer a significant number of **Pest Monitoring** activates were carried out by LARA and other associations. The 171 canola black leg surveys and 287 site visits for insect pest monitoring are important contributions to Alberta's pest surveillance. Pest monitoring expands our impact well beyond our membership. Pest monitoring is a team effort that involves public employees (federal and provincial), municipal agriculture service boards, the scientific community, and not for profit groups like us. Together we create a pest monitoring and surveillance system that is the envy of many provinces.

ARECA and its members were quick to respond to **Operation Pollinator** in 2017. This shows how well we are connected to producers, and can quickly deliver initiatives that have support from the greater community. This project creates the opportunity to connect with those outside of the agriculture community on a common topic. The ability of our associations to mobilize collaborators and get the seed in the ground in such a timely fashion says a lot about our community engagement and the nature of ARECA members.

This year, ARECA and its members launched the **Carbon Pasture Management** project. It is exciting to see ARECA step into the arena and become a conduit for information and engagement on the value of pasture and grazing lands for carbon capture and storage. There is a lot of discussion about the public goods and services (water quality, carbon capture, biodiversity, and habitat) provided by well managed grazing lands. This initiative puts our associations in a place to give valuable input, provide collaborators, and communicate about farming to the general public. I look forward to seeing how this evolves in 2018 and beyond. LARA Manager, Alyssa Krone sits on the Steering Committee for this project.

Congratulations to former ARECA Chair, Ian Murray for being awarded Alberta Beef Producer's Environmental Stewardship Award in 2017. You can all be proud that Ian was your representative at the provincial level in 2015 and 2016.

Thanks for your support in 2017. LARA makes the provincial team stronger.

Janette McDonald
Executive Director, ARECA

2017 Board of Directors

Chairman:	Louis Dechaine
St. Paul County Rep:	Cliff Martin Frank Sloan (alternate)
Lac La Biche County Rep:	Wanda Austin MJ Siebold (alternate)
MD of Bonnyville Rep:	Don Sinclair David Fox (alternate)
Smoky Lake County Rep:	Ron Bobocel Randy Orichowski (alternate)
Producer Reps:	Murray Scott – MD of Bonnyville Harold Ross – MD of Bonnyville Louis Dechaine – County of St. Paul Carl Agnemark – County of St. Paul Richard Creelman – Lac La Biche County Roger Harbord – Lac La Biche County Charlie Leskiw – County of Smoky Lake Barb Shapka – County of Smoky Lake
Lakeland Forage Association Rep:	Luc Tellier Chairman, LFA

2017 Staff

Manager and Forage and Livestock Program:	Alyssa Krone
Cropping Program:	Dustin Roth
Environmental Program:	Kellie Nichiporik
Administration/Horticulture:	Charlene Rachynski
Full Time Staff:	Vic Sadlowski
Summer Staff:	Thomas Weinmeier Amanda Mathiot Danika Locke
LFA Pasture Managers:	Bob and Wanda Austin

Acknowledgements

The success of LARA's programs is a testament to the support and partnerships we have with a number of organizations and individuals within our operational area. LARA would like to thank the following contributors and partners in making 2016 another successful year.

Alberta Agriculture and Forestry (AF)
Agricultural Opportunity Fund (AOF)
Agriculture and Agri-Food Canada (AAFC)

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

Industry and Producer Commissions
Alberta Beef Producers
Alberta Pulse Growers Commission
Alberta Wheat Commission
Alberta Barley Producers Commission
Alberta Canola Producers Commission
Canola Council of Canada

Associations & Societies
North Peace Applied Research Association
McKenzie Applied Research Association
Gateway Research Organization
Battle River Research Group
Grey Wooded Forage Association
West-Central Forage Association
Foothills Forage and Grazing Association
Peace County Beef and Forage Association
Chinook Applied Research Association
Agricultural Research and Extension Council of Alberta
Bonnyville Agricultural Society
Alberta Lake Management Society
Beaver River Watershed Alliance
Moose Lake Watershed Society

Agri-Businesses & Collaborators
AFSC Insurance
Agland St. Paul
Canadian Seed Growers Association, AB
Western Committee on Crop Pests
UFA – St. Paul and Vermilion
St. Paul Municipal Seed Cleaning Plant
FP Genetics
Crop Production Services
Cows and Fish
Bonnyville Veterinary Clinic
Bonnyville Municipal Seed Cleaning Pl.
Association of AB Seed Cleaning Plants
Caouette & Sons
Townend Films
Mistol Seeds

Producers
Todd Brosniak
Guy Brousseau
Evan Chalut
Meghan and Patrick Elsen
Barb and Doug Shapka
Luc Tellier
Todd Tesolin
Charlie Leskiw

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

Lakeland Agricultural Research Association Projects and Activities – 2017

Research and Demonstration Projects

Cropping Program

Regional Variety Trials – Cereals
- -CWRS Wheat
- -CPRS Wheat
- -GP & SWS Wheat
- -Oats
- -Barley
- -Triticale

Regional Variety Trials – Pulses
- -Green Field Peas
- -Yellow Field Peas

Canola Performance Trial
Winter Wheat Variety Trial
Oat Variety Trial
Blackleg Survey
Pest Monitoring
- -Bertha Armyworm
- -Diamondback Moths
- -Wheat Midge

Forage and Livestock Program

Regional Silage Trials
- -Oats
- -Barley
- -Triticale
- -Pea-Cereal Mixture

Perennial Forage Project
- -Grasses
- -Legumes
- -Grass/Legume Mixture

Forage Establishment Trial
Higher Legume Pasture Project
Northern Range Enhancement Project
- -Heifer Project

Environmental Program

Canada Thistle Stem Mining Weevils

Demonstrations

Cover Crops for Livestock
Industrial Hemp
Corn Varieties
Canola Seeding Rates
Solar Watering System
Riparian Health Assessments
Surface Water Quality Sampling

Extension Activities

Workshops and Seminars

Cattlemen's Clinics (2)
Winter Watering Systems
Cattle Marketing Workshops (2)
Septic Sense: Solutions for Rural Living
Moose Lake Watershed Society AGM
Farmer Appreciation Night
Transition Planning Workshops (2)
Managing Cropping Challenges of 2016
Grain Marketing and Understanding Canada's Grading System (2)
Holistic Management Course with Kelly Sidoryk
Annual General Meeting and Research Update
Water Treatment System Workshop
Beavers in our Landscape: A Workshop
SafeTALK
Farm Safety Day
Alberta Verified Beef Production + Tools to Build Your Cow Herd
Harvest Management
Nutrient Planning and Cover Crops
Managing Diseases in Pulses
Working Well Workshops (2)
Wind and Solar: Negotiating Renewable Energy Leases
Generating Electricity from the Sun
Soils Workshop with Dr. Jill Clapperton
Making a Profit Grass Farming
Summer Field Days (3)
Farm Safety and Rural Emergency Preparedness
Holistic Management Open Gate Day
Brush Control and Pasture Managing
Livestock Traceability
Industrial Hemp Crop Walk

Education Events

Inside Education Showcase
Shoreline Cleanup
Lakeland Regional Career Expo
Classroom Agriculture Program
Walking with Moose

A Short Explanation of Various Statistical Terms Used in this Report

Least Significant Difference (LSD):

- Once the data from a test plot has been collected it can be used to calculate the Least Significant Difference (LSD). The LSD tells if one variety (or bushel weight, etc.) is significantly different than the other varieties in a test plot (same environment and soil conditions).

- Example: The LSD for a test plot has been calculated to be 2 bu/acre. If a test variety Ava differs from the other varieties by more than 2 bu/acre then there is a significant yield difference. We can say one variety yields higher than another. If the varieties are within 2 bu/acre then we cannot say the varieties yield differently.

Yield Grouping:

- Once the LSD is determined, each variety is assigned a yield grouping letter (A, B, C, etc.). By using yield grouping letters we can easily determine which varieties are significantly different. Varieties that share a letter will **NOT** be significantly different, but varieties that **DO NOT** share a letter **WILL** be considered significantly different.

- Example: In this example Bob, and Cora are **not** considered to be significantly different from Ava because they share the Yield Grouping letter A…but David, Evan, Frank and Gary **are** considered to be significantly different from Ava, because they do not have Yield Grouping letter A and therefore, it could be said that Ava has a higher yield than David, Evan, Frank and Gary.

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

Coefficient of Variability (CV):

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

Bushel Calculation

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

Smoky Lake County Ag Service Board 2017

The 2017 growing season was a wet one! Producers in our area faced challenges seeding into muddy fields, as many fields required floating. The amount of unseeded acres was at an all-time high, with even later seeded fields experiencing flooding.

With all the rain and the wind, it made it challenging to complete the 600 roadside spraying miles that was required. The west end of the county received the majority of the herbicide applications with spot spraying being completed from Highway 855 east.

We were fortunate enough to have 2 summer students join us to help complete spot spraying and weed inspections on private land. They helped us bring education and awareness to the public about noxious and prohibited noxious weeds.

Our crop surveying program kept us busy with an extra survey being completed on behalf of Agri-food Canada. We completed a weed sample survey, which looks a t herbicide resistant weeds. This year's grasshopper survey saw higher numbers in the east part of the county and low numbers in the west. We had 3 trap locations set up for monitoring Bertha Army Worms and the numbers were fairly low across the county. We had 1 location set up to trap Swede midge on behalf of Agri-food Canada.

As for crop diseases, we found more Clubroot positive fields. We urge producers to seed a Clubroot resistant variety, **even if you think you do not have Clubroot**. We are also strongly recommending that canola varieties be rotated with other resistant varieties and not to grow the same variety over and over again. Of course lengthen rotations as much as economically possible, as well to help prevent and keep the disease pressure down. Blackleg made a wide spread appearance this year with many canola fields showing symptoms. For more information on agricultural pests and diseases please contact our office (780) 656-3730, as we are always happy to help!

We hope 2018 will be a prosperous year!

Tori Cherniawsky
Agricultural Fieldman
Smoky Lake County

M.D. OF BONNYVILLE A YEAR IN REVIEW

Another year has come and gone and we now look forward to the warming of temperatures and the sweet smells of our agricultural crops growing in the fields. Although, with a slow wet start making getting into our fields more difficult and with plenty of moisture throughout the growing season, our crops fared well with both grade and yield.

Looking back on the 2017 season we are reporting two additional fields testing positive for clubroot making our total now four within our Municipal Boundaries, however; with our infestation levels lower than our neighbors to the south, this provides us with an opportunity to refine our best management practices in managing the spread.

Bertha armyworms and Lygus were not concerning numbers in 2017 and we are predicting low numbers for 2018 growing season as well. We may want to keep an eye out for grasshoppers, some areas on the east side of the MD have them on our radar for the 2018 season. Fusarium Head Blight is rearing its head in cereals in the south so let us remember to purchase clean seed and use a fungicide seed treatment that is registered for control of seed-borne Fusarium. We are combating some Canada thistle in environmentally sensitive areas with biological control using Canada Thistle Stem Mining Weevils.

Water levels were a big challenge for us in 2017 – with the heavy rain came high waters, lots of flooding from lakeshore residents to agricultural crops and pasture. We assisted Alberta Environment keeping the Moose Lake weir free of floating reeds from the outflow while the MD transportation department supplied sand bags to help keep homes dry. Beaver dam removal from high creeks were definitely a priority for us this year with extra resources being used to allow the water to flow.

The coyote and wolf reduction program were temporarily suspended in 2017 but reinstated in January. We are pleased to say we are still rat free and will continue to help keep them out of Alberta.

Wishing all producers a successful upcoming growing season.

Matt Janz and Janice Boden

Lac La Biche County Agriculture Review 2017

- Canada Thistle was the most prevalent weed. Over 1,000 total weed inspections were completed. Twenty-seven Individual spot treatments were completed. Five different weed species were found, they include Canada Thistle, Oxeye Daisy, White Cockle, Tall Buttercup and Common Tansy in order of prevalence.
- Clubroot was found within Lac La Biche County. Techniques for mitigation are currently being discussed.
- Grasshopper surveys: Roadside testing completed at 11 separate locations, 55 plots tested total with a total of 782 grasshoppers found for an average of 14 grasshoppers per square meter. Field tests were slightly lower, again 11 sites surveyed with 55 individual plots which gave a total of 601 grasshoppers total for an average of 11 grasshoppers per square meter. No remarkable distinctions between sites, not crop specific. Most prevalent species was the Migratory grasshopper accounting for all but 6 individual grasshoppers, 4 being of the Packards variety and 2 being identified as "other" 29 Community Garden plots utilized.
- $4315.20 revenue from tree seedling sales; 1,335 seedlings sold. Any unclaimed trees were planted in compensation of the trees collected through the County's annual Christmas Tree Recycling Program.
- VSI funding approved via Lac La Biche County (ASB) for 2018 at a 60\40 level. The County provides 60% while participants cover the remainder.
- 6,600 acres + of vegetation mowed in County ditches. Rich Lake area was shoulder sprayed as per rotational obligation. Approximately 720 km total roadside spraying took place.
- Agricultural rental equipment generated $3,388 in 2017
- $4,646.60 generated through chemical sales. Trillion P was most popular (11 sales) followed by Round up and Vantage plus Max (9 sales each).
- Predator Control coyote program allows for 1080p pellets to be distributed to local producers as well as neck snares. No 1080p pellets were issued in 2017.
- Wolf Incentive pilot project recently introduced. Two wolves claimed with recommendation to run program in 2018.
- Agricultural Appreciation Day held in June 2017, 107 producers RSVP'd.
- April 2017 Farm Safety presentation on grain bin, PTO, and tractor safety was presented by the Agricultural Services department during Safety Days to County school children.
- New tractor Massey Ferguson model 5770L for new mower (Series 4 Schulte)
- Assisted with community cleanup
- Environmental Services Clerk, ASB Chair and two ASB members-at-large attended the 2017 Provincial ASB Conference
- Agriculture Operator and Environmental Services Manager attended the NE Regional ASB Conference in Flat Lake
- Agriculture Operator attended IST (In Service Training) in Grande Prairie

County of St. Paul Agricultural Service Board 2017

The County of St. Paul appreciates working with LARA as we try and help agriculture flourish in our County and in our region. LARA is an integral part of how the County strives to serve our producers and find innovation in agriculture.

This year was a bad year for finding clubroot in the County of St. Paul. This year 30 new fields were found bringing our total confirmed cases to 35 over the past 4 years. The legal land locations of the positive fields can be found on our website. It is important for every land owner to take measures to protect their land from the spread of clubroot. Currently when we find plants that look like they have clubroot we confirm it with a lab test. If the test comes back positive the County will issue a Pest Notice imposing a 1 in 4 year rotation of canola on that field. We plan to check every field again next year and this usually happens from June to August.

We spray our road allowances to keep weeds and brush to a minimum. This is done so we are not contributing to any weed seed banks and to keep sight lines clear for drivers. We also mow our roadways to control vegetation. This year we added a new mower and tractor to increase our ability to keep our roadways clear. This mowing takes place from June to September. By mowing grass and brush we also reduce our fire hazard.

This year we also helped several of our ratepayers clear their own fence lines of brush and rocks. Our backsloping program provides $500-2500 per half mile to compensate land owners who clear brush and rocks from our road allowance while they work on improving their field for agriculture. When using this program please note that an inspection must take place before any work is done.

There were also lots of water issues this spring and summer. With the increase in moisture came an increase in beaver related problems. The County has several tools we can use to help you with any water issue. Please contact our staff and we can usually figure out how to best handle your problem. We can use dynamite to remove beaver dams if the situation warrants it. This is done for a cost recovery fee of $200/dam that we remove.

Our Coyote/Wolf Reduction Incentive Program is running this year again from Nov – March. This is the seventh year the County is running the program to try and reduce the coyote numbers over calving season. Please call the County ASB for more details or if you are thinking about using the program.

Our dog control unit (ambulance) could be seen driving around the County dealing with dog complaints. When we find a stray dog we will post it on the St Paul Animal Shelter's lost and found page. Dogs must remain on your property at all times or we may end up picking them up.

Thank you to all or our producers for making this a great place to live and work! If you have any concerns please give us a call.

Keith Kornelsen
Agricultural Fieldman
County of St. Paul

Cropping Program

The producer's resource for pulses, oilseeds and cereals

The total crop production in Alberta has increased over the past five years and will continue to increase in the future. Much of this can be attributed to increased yields, which has been achieved through continuing research into crop agronomics (new varieties, best management practices etc).

With increased competition for land and high input costs, producers are looking to optimize production and maximize profits on their acres. LARA strives to help producer make the most of limited resources by improving agronomic practices, utilizing new technology and understanding the value of production.

The goals of this program are to:

- Aid producers in crop and variety selection
- Increase crop diversity through crop selection and variety selection
- Determine and demonstrate the viability of specialty crops in the Lakeland
- Demonstrate current and emerging agronomic practices
- Improve on-farm agronomic practices
- Address local agronomic concerns through demonstration and extension

Regional Variety Trials

Partners: Alberta Agriculture and Forestry
St. Paul Municipal Seed Cleaning Plant
County of St. Paul
Lac La Biche County
MD of Bonnyville
Agricultural Research and Extension Council of Alberta
Agriculture and Agri-Food Canada
Crop Production Services
FP Genetics
Guy Brousseau
Todd Brosniak

Objectives:

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

Background:

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

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

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

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

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

Methods:

The cereal plots for the Regional Variety Trials were seeded at the LARA Fort Kent Research Site (NE25-61-5-W4) and in the County of St. Paul (SE15-59-9-W4). Agronomic information about the RVTs grown by LARA in 2017 are listed in Table 1. The trials were seeded using the LARA five-row Fabro zero-till small plot seeder. The plots were 1.15m x 6m in area with a 9" row spacing. All trials were seeded to a randomized complete block design with four replicates for pulses and three replications for cereals to reduce error.

Soil samples were taken in spring prior to seeding to check soil fertility and a blend fertilizer was side-banded at seeding for optimum yields. Pre-seeding burn-off and in-crop herbicides were utilized for weed control. Notes on lodging and height were taken during the growing season. The plots were harvested using a Wintersteiger small plot combine and information on yield, bushel weight, 1000 kernel weight and protein were recorded.

Although the varieties in the trials are set by the ABCGAC and seed companies, there is opportunity for local input. If you would like to add a variety to any of the RVT trials grown by LARA next year, please contact the LARA office.

Lodging is rated on a scale of 1-9 where 1 is perfectly erect and 9 is completely flat.

Table 1. Regional Variety Trial Agronomic Information, 2017.

Test	Site	# of Varieties	Seeding Date	Seeding Rate	Fertility	Harvest Date	Rain (mm)
Barley	Fort Kent	14	18-May-17	270 pl/m2	275.7 lbs/acre 33-5-6-5	28-Sep-17	231.4
Barley	St. Paul	14	22-May-17	270 pl/m2	257.7 lbs/acre 33-5-6-5	2-Oct-17	274.9
CPSR Wheat	Fort Kent	12	18-May-17	330 pl/m2	275.7 lbs/acre 33-5-6-5	6-Oct-17	231.4
CPSR Wheat	St. Paul	12	22-May-17	330 pl/m2	257.7 lbs/acre 33-5-6-5	10-Oct-17	274.9
CWSP Wheat	Fort Kent	11	18-May-17	3300 pl/m2	275.7 lbs/acre 33-5-6-5	6-Oct-17	231.4
CWSP Wheat	St. Paul	11	22-May-17	330 pl/m2	257.7 lbs/acre 33-5-6-5	10-Oct-17	274.9
CWRS Wheat	Fort Kent	20	18-May-17	330 pl/m2	275.7 lbs/acre 33-5-6-5	6-Oct-17	231.4
CWRS Wheat	St. Paul	20	22-May-17	330 pl/m2	257.7 lbs/acre 33-5-6-5	10-Oct-17	274.9
Oats	Fort Kent	10	19-May-17	300 pl/m2	275.7 lbs/acre 33-5-6-5	5-Oct-17	231.4
Oats	Lac La Biche	10	23-May-17	300pl/m2	257.7 lbs/acre 33-5-6-5	16-Oct-17	274.9
Triticale	Fort Kent	2	18-May-17	310 pl/m2	275.7 lbs/acre 33-5-6-5	5-Oct-17	231.4
Winter Wheat	Fort Kent	2	29-Aug-16	330 pl/m2	275.7 lbs/acre 33-5-6-5	27-Sep-17	231.4
Green Peas	St. Paul	6	11-May-17	88 pl/m2	50 lbs/acre 11-52-0-0	N/A	274.9
Yellow Peas	St. Paul	10	11-May-17	88pl/m2	50 lbs/acre 11-52-0-0	N/A	274.9

Barley

The RVT barley trials were established at two locations, one in the County of St. Paul (SE15-59-9-W4) and one at the LARA Fort Kent Research Site (NE25-61-5-W4). Similar to previous years, all varieties had an overall higher yield at the St. Paul site likely as a results of differences in soil structure and quality as well as the environmental conditions between the locations during the growing season, particularly moisture. Rainfall at the Fort Kent site was 231.4 mm while the rainfall at the St. Paul site was higher at 274.9 mm. The yield data for Fort Kent and St. Paul are shown in table 2 and table 3, respectively.

An experimental and not yet registered variety, TR13606, yielded very well at both locations and is showing promise for Northeastern Alberta. This is the second year this variety has been grown in the regional variety trials and it yielded in the top 6 varieties at both locations in 2016. TR13606 was the highest yielding variety in Fort Kent this year at 125 bu/ac, which was significantly higher than the CDC Fraser at 117 bu/ac. At the St. Paul site, TR13606 yielded the second highest at 149 bu/ac and this was not significantly lower than the top yielding variety, CDC Austenson, at 157 bu/ac. TR13606 has potential as a malting barley for the craft brewing market due to its high extracts. It is a rough awned variety that does particularly well in the black soil zones. CDC Austenson is a very commonly grown variety in the area and, therefore, it is good to see it yielding high in the reginoal variety trials in St. Paul.

Claymore was the third highest yielding variety at both location with a yield of 110 bu/ac in Fort Kent and 139 bu/ac at the St. Paul site. Claymore is very similar to Xena and Champion, emerges early to mid-season and has medium length kernels.

Overall, all the RVT Barley did very well this year will all the moisture and we hope to have continuing success in 2018.

Table 2. Barley Fort Kent, 2017.

Variety	Yield (bu/ac)		Yield % AC Metcalfe	TWT (lbs/bu)	1000 k (g)	Height (cm)
TR13606	125	a	158	284.7	43.4	85
CDC FRASER	117	ab	148	282.2	43.6	82
CLAYMORE	110	abc	139	266.2	46.4	74
CDC GOLDSTAR	109	abc	138	284.8	40.2	79
ALTORADO	104	a-d	132	278.4	41.3	85
AAC SYNERGY	100	a-e	127	280.9	42.4	77
TR14928	100	a-e	127	279.4	44.1	70
LOWE	100	a-e	127	264.7	40.1	70
AAC CONNECT	91	b-e	115	266.9	44.8	75
CHAMPION	84	cde	106	277.3	45.7	75
AAC AUSTENSON	81	cde	103	280.2	38.3	80
AC METCALFE	79	cde	100	265.0	37.8	78
CDC ASCENT	75	de	95	344.4	40.8	74
OREANA	72	e	91	269.5	58.5	65
CV = 11.76						

Table 3. Barley St. Paul, 2017.

Variety	Yield (bu/ac)		Yield % AC Metcalfe	TWT (lbs/bu)	1000 k (g)	Height (cm)
AAC AUSTENSON	157	a	154	307.5	51.0	91
TR13606	149	a	146	307.4	49.2	79
CLAYMORE	139	ab	136	311.2	47.4	90
ALTORADO	138	ab	135	314.0	51.5	78
AAC SYNERGY	136	ab	133	304.4	50.0	83
CHAMPION	136	ab	133	304.6	50.0	87
CDC GOLDSTAR	136	ab	133	286.7	43.8	75
AAC CONNECT	135	ab	132	384.0	44.3	92
CDC FRASER	135	ab	132	315.5	47.5	84
LOWE	129	ab	126	309.4	52.0	82
OREANA	126	ab	124	310.9	50.3	83
TR14928	119	ab	117	299.8	45.2	84
AC METCALFE	102	b	100	308.0	51.8	73
CDC ASCENT	98	b	96	291.3	49.2	80
CV = 12.2						

CPSR & CCHNR Wheat

Canada Prairie Spring Red wheat (CPSR) and Canada Northern Hard Red wheat (CCNHR) were established in both Fort Kent (NE25-61-5-W4) and St. Paul (SE15-59-9-W4) in 2018 and the results are illustrated in table 4 and table 5, respectively. A couple varieties that had exceptional yields in St. Paul are AAC Crossfield at 104 bu/ac, which was significantly higher than AAC Entice at 98 bu/ac. At the Fort Kent location, SY Ronwyn, HY2003 and AAC Crossfield were the highest yielding varieties at 86 bu/ac.

Table 4. CPSR & CCHNR Wheat Fort Kent, 2017.

Variety	Yield (bu/ac)		Yield % AC BARRIE	Yield % CARBERRY	TWT (lbs/bu)	1000 k (g)	Height (cm)	Protein (%)
SY ROWYN	86	a	119	143	361.0	36.4	83	14.6
HY2003 VB	86	a	119	143	386.7	38.1	80	14.8
AAC CROSSFIELD	86	a	119	143	370.7	41.6	75	14.3
AAC PENHOLD	82	a	114	137	381.1	35.8	84	14.1
BW968	82	a	114	137	365.6	36.9	75	13.8
ELGIN ND	80	ab	111	133	371.8	36.6	84	13.8
CDC TERRAIN	73	bc	101	122	354.2	34.3	71	13.9
AC BARRIE	72	bcd	100	120	383.2	34.3	88	14.4
AC FOREMOST	72	bcd	100	120	389.0	38.4	92	14.2
AAC ENTICE	71	cd	99	118	378.1	33.8	77	15.0
AAC CONCORD	64	de	89	107	365.9	38.7	90	14.8
CARBERRY	60	e	83	100	381.1	43.0	77	14.3
CV = 5.2								

Table 5. CPSR & CCHNR Wheat St. Paul, 2017.

Variety	Yield (bu/ac)		Yield % AC BARRIE	Yield % CARBERRY	TWT (lbs/bu)	1000 (g)	Height (cm)	Protein (%)
AAC CROSSFIELD	104	a	217	155	373.8	44.5	89	14.9
AAC ENTICE	98	ab	205	147	374.6	50.8	83	15.3
HY2003 VB	97	ab	202	145	382.0	43.7	98	14.4
CDC TERRAIN	94	bc	196	140	371.7	46.0	91	15.1
ELGIN ND	87	cd	181	130	381.8	45.0	100	14.2
AC FOREMOST	84	d	175	125	388.8	57.8	83	16.1
BW968	81	de	169	121	379.4	45.7	88	13.5
AAC CONCORD	76	ef	158	113	374.7	45.4	88	15.1
SY ROWYN	73	fg	152	109	377.7	41.4	60	15.7
AAC PENHOLD	71	fg	148	106	372.2	52.5	96	14.4
CARBERRY	67	g	140	100	374.8	46.8	87	16.5
AC BARRIE	48	h	100	72	370.1	49.4	95	15.7
CV = 5.38								

CWSP & CWSWS Wheat

The CWSP & CWSWS wheat was grown in the same locations as the CPSR & CCHNR wheat in Fort Kent and St. Paul with the results summarized in table 6 and table 7, respectively. AAC Indus was the top yielding variety at both locations with a yield of 107 bu/ac in Fort Kent and 126 bu/ac in St. Paul. The yield in St. Paul was significantly higher than the next variety, KWS Sparrow, at 120 bu/ac. AAC Indus is a soft white spring wheat variety adapted for irrigated production in Southern Alberta as well as dryland production across the western prairie-provinces. The variety fits traditional soft white milling markets and works well for ethanol, and the straw strength makes it a great fit for silage production.

KWS Charing was another high yielding variety at 103 bu/ac in Fort Kent and 119 bu/ac at the St. Paul site. This variety is a very short, strong-strawed special purpose wheat with exceptionally high grain yields and late maturity. Notably, the two check varieties, AC Barrie and Carberry, yielded the lowest at both sites this year.

Table 6. CWSP & CWSWS Wheat Fort Kent, 2017.

Variety	Yield (bu/ac)		Yield % AC BARRIE	Yield % CARBERRY	TWT (lbs/bu)	1000 k (g)	Height (cm)	Protein (%)
AAC INDUS	107	a	155	173	371.0	38.3	99	12.5
KWS CHARING	103	a	149	166	355.9	36.5	81	13.4
AAC AWESOME	91	b	132	147	367.0	38.5	91	12.8
AC ANDREW	90	b	130	145	361.7	35.9	87	15.4
KWS SPARROW	90	b	130	145	350.8	34.2	75	13.9
AAC PARAMOUNT	86	bc	125	139	358.6	32.2	92	13.5
AC SADASH	85	bc	123	137	358.2	32.2	86	13.5
KWS ALDERON	82	bc	119	132	313.7	33.2	87	11.7
PASTEUR	79	c	114	127	376.4	36.1	83	14.8
AC BARRIE	69	d	100	111	390.3	40.8	94	12.3
CARBERRY	62	d	90	100	381.9	38.4	87	12.2
CV = 6.8								

Table 7. CWSP & CWSWS Wheat St. Paul, 2017.

Variety	Yield (bu/ac)		Yield % AC BARRIE	Yield % CARBERRY	TWT (lbs/bu)	1000 k (g)	Height (cm)	Protein (%)
AAC INDUS	126	a	252	221	368.8	42.8	80	12.1
KWS SPARROW	120	ab	240	211	382.6	46.9	90	12.3
KWS CHARING	119	abc	238	209	361.1	42.2	81	12.7
AC SADASH	113	bcd	226	198	381.5	47.4	97	12.2
AAC AWESOME	112	bcd	224	196	380.1	45.4	91	12.0
KWS ALDERON	110	cd	220	193	369.6	44.1	90	11.6
AAC PARAMOUNT	106	de	212	186	372.0	39.0	95	13.9
AC ANDREW	100	e	200	175	354.8	44.0	79	17.0
PASTEUR	98	e	196	172	389.9	41.7	94	16.0
CARBERRY	57	f	114	100	380.2	46.2	92	11.3
AC BARRIE	50	f	100	88	381.1	46.2	100	12.5
CV = 5.49								

CWRS & CWHWS Wheat

Canada Western Red Spring wheat (CWRS) and Canada Western Hard White Spring wheat (CWHWS) were two other classes of wheat grown in Fort Kent (NE25-61-5-W4) and in St. Paul (SE15-59-9-W4) in 2018. The results from Fort Kent and St. Paul are shown in table 8 and table 9, respectively.

Table 8. CWRS & CWHWS Wheat Fort Kent, 2017.

Variety	Yield (bu/ac)		Yield % AC BARRIE	Yield % CARBERRY	TWT (lbs/bu)	1000 k (g)	Height (cm)	Protein (%)
AAC CAMERON	82	a	132	144	381.8	41.5	89	15.1
AAC JATHARIA VB	80	ab	129	140	391.7	40.4	87	14.4
SY SLATE	79	abc	127	139	379.8	37.0	90	15.0
BW488	78	a-d	126	137	380.6	37.5	83	14.2
BW5007	76	a-e	122	132	381.7	38.5	94	14.8
BW5005	74	a-f	119	130	379.8	36.3	84	14.8
CDC LANDMARK VB	73	b-g	118	128	384.1	37.8	77	14.3
CDC HUGHES	71	c-h	115	125	381.0	37.8	79	14.9
BW1011	70	d-i	113	123	382.3	42.0	84	15.0
AAC VIEWFIELD	68	e-j	110	119	385.0	36.1	76	14.6
CDC GO	68	e-j	110	119	371.9	39.6	82	13.7
BW980	66	f-j	106	116	378.5	37.4	90	15.0
STETTLER	65	g-k	105	114	382.4	40.6	93	14.6
CDC BRADWELL	65	g-k	105	114	382.1	37.2	81	14.4
AAC REDBERRY	64	h-k	103	112	383.4	34.6	83	14.2
AC BARRIE	62	ijk	100	109	379.1	40.2	87	14.3
HW388	61	jk	98	107	382.4	31.2	81	14.3
PT250	58	k	94	102	382.3	37.3	80	15.2
CARBERRY	57	k	92	100	375.6	36.0	73	14.8
PARATA	57	k	92	100	380.8	34.2	81	13.9
CV = 7.2								

A couple of the varieties that stuck out at both locations were AAC Cameron and CDC Landmark VB. At the St. Paul site, AAC Cameron yielded 80 bu/ac and in Fort Kent it yielded 82 bu/ac where it was the highest yielding variety. CDC Landmark VB was one of the highest yielding varieties in St. Paul at 87 bu/ac and among the top eight highest yielding varieties in Fort Kent at 74 bu/ac.

Similar to previous years, the St. Paul site had an overall higher yield in the trial than the Fort Kent site. Interestingly, AAC Cameron was high in yield and relatively similar in yield between the two locations and this variety is showing promise in Northeastern Alberta. AAC Cameron is known for early maturity and higher tolerance to wheat midge. It is often compared to Carberry in the CWRS wheat class and is available through Canterra Seeds.

A couple varieties that were notably weak this year are AC Barrie and CDC Bradwell. AC Barrie yielded only 48 bu/ac in St. Paul and 62 bu/ac in Fort Kent. The average stand height in St. Paul was 92 cm and 84 cm in Fort Kent. Average protein in Fort Kent was 14.6% and in St. Paul was 16.6%.

Table 9. CWRS & CWHWS Wheat St. Paul, 2017.

Variety	Yield (bu/ac)		Yield % AC BARRIE	Yield % CARBERRY	TWT (lbs/bu)	1000 k (g)	Height (cm)	Protein (%)
BW980	89	a	193	133	380.3	45.1	83	15.6
CDC LANDMARK VB	87	ab	189	130	385.9	46.1	92	15.0
BW488	86	ab	187	128	370.9	48.0	82	14.5
BW5005	86	ab	187	128	380.5	43.2	90	15.5
AAC CAMERON	80	abc	174	119	383.0	46.8	98	15.7
AAC JATHARIA VB	79	bc	172	118	382.1	43.0	93	15.4
AAC VIEWFIELD	76	cd	165	113	382.7	41.8	84	15.5
CDC GO	75	cde	163	112	382.5	46.7	85	15.2
CDC HUGHES	75	cde	163	112	382.0	42.6	96	16.0
SY SLATE	74	cde	161	110	374.7	44.2	84	16.6
HW388	71	c-f	154	106	384.3	40.2	82	15.1
BW1011	69	def	150	103	375.9	44.9	97	15.6
BW5007	67	def	146	100	381.4	46.1	91	15.0
CARBERRY	67	ef	146	100	375.8	47.0	95	13.9
PARATA	66	ef	143	99	381.2	52.3	83	15.3
AAC REDBERRY	66	ef	143	99	385.6	35.8	95	15.1
STETTLER	65	ef	141	97	380.3	42.8	82	16.1
PT250	65	f	141	97	383.9	43.4	92	16.3
CDC BRADWELL	64	f	139	96	382.6	49.0	101	14.7
AC BARRIE	46	g	100	69	373.5	42.2	88	15.2
CV = 7.37								

Oats

The RVT oats were seeded in Fort Kent (NE25-61-5-W4) and Lac La Biche (NE32-63-12-W4) and the results are shown in table 10 and table 11, respectively. The overall yields were higher in Fort Kent with some varieties being very similar between the two counties. Kyron and Akina were two varieties that stood out in both counties with Kyron having a 38% higher yield in Fort Kent.

Unfortunately, due to deer, there was some damage to the oats in Lac La Biche caused by them bedding down in the trial and picking off heads from multiple plots. Therefore, the overall yields are less in Lac La Biche as well as a significantly greater CV, indicating greater variance within the trial.

Table 10. Oats Fort Kent, 2017.

Variety	Yield (bu/ac)		Yield % CDC Dancer	TWT (lbs/bu)	1000 k (g)	Height (cm)
KYRON	180	a	134	232.6	39.6	113
AKINA	177	a	132	220.7	37.9	112
AC MORGAN	176	a	131	239.2	39.6	113
KARA	175	a	131	236.1	40.0	112
OT3085	161	abc	120	238.8	42.0	125
ORE 3542 M	159	abc	119	223.0	38.0	111
ORE 3541 M	147	bc	110	235.3	39.3	110
CDC RUFFIAN	146	bc	109	226.5	34.2	109
CDC DANCER	134	c	100	226.7	34.0	114
POMONA	131	c	98	245.7	39.2	116
CV = 7						

Table 11. Oats St. Paul, 2017.

Variety	Yield (bu/ac)		Yield % CDC Dancer	TWT (lbs/bu)	1000 k (g)	Height (cm)
OT3085	113	a	140	246.2	45.96	106.33
AKINA	108	ab	133	230.9	45.92	104.67
KYRON	108	ab	133	239.1	41.4	88.33
KARA	106	ab	131	243.6	43.56	95.00
ORE 3542 M	106	ab	131	259.4	41.76	89.67
AC MORGAN	91	ab	112	244.1	44.44	89.00
POMONA	81	ab	100	243.5	42.04	102.00
CDC DANCER	81	ab	100	245.6	46.64	90.33
ORE 3541 M	75	ab	93	248.1	71.04	100.33
CDC RUFFIAN	50	b	62	235.80	46.24	97.00
CV = 22.61						

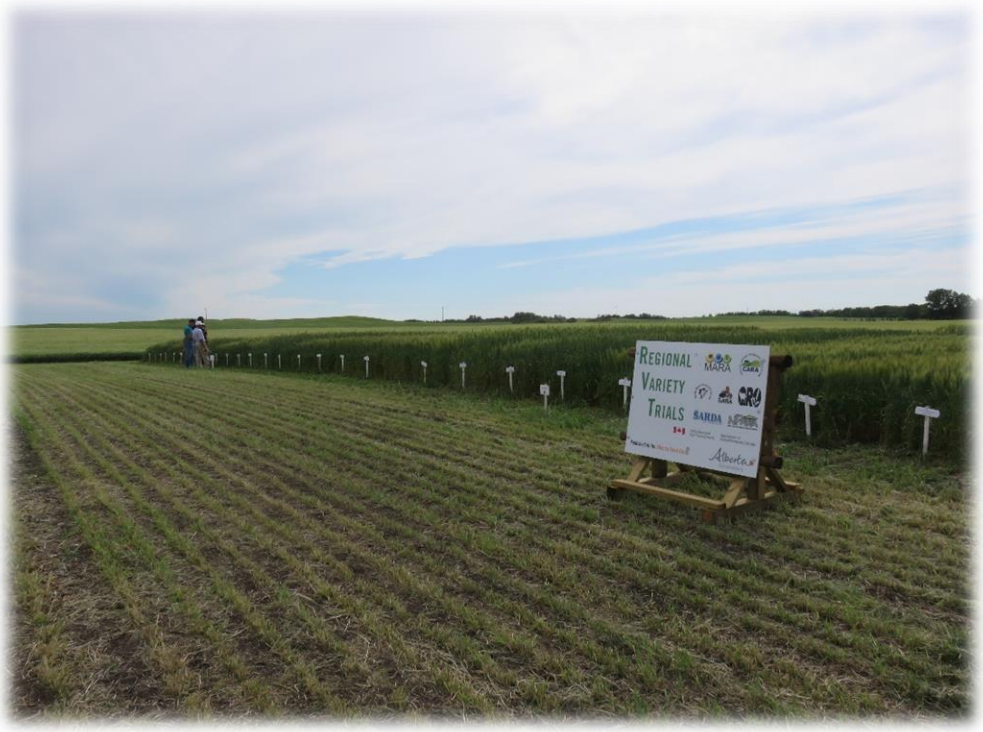
Triticale

The triticale trial was seeded in both Fort Kent (NE25-61-5-W4) and St. Paul (SE19-59-9-W4). However, due to harvest error, only the Fort Kent trial was harvested and the results are illustrated in table 12. Similar to previous years, the trial yielded very well and showed no lodging in any of the varieties established in 2018. Although there were no significant differences in yield, the highest yielding variety was AAC Delight at 113 bu/ac followed by Brevis at 107 bu/ac.

New in 2018, we did protein tests on both varieties of triticale grown in Fort Kent. Overall, the protein content was lower than that seen in the wheat trials with AAC Delight at 11.1% and Brevis at 10.5%.

Table 12. Triticale Fort Kent, 2017.

Variety	Yield (bu/ac)		Yield % Brevis	TWT (lbs/bu)	1000 k (g)	Height (cm)	Protein (%)
AAC DELIGHT	113	a	95	356.1	61.8	104	11.1
BREVIS	107	a	100	378.5	46.5	91	10.5
CV = 9.2							



Canola Performance Trial

Partners: Canola Council of Canada
Alberta Canola Producers Commission
Saskatchewan Canola Development Commission
Manitoba Canola Growers Association
County of St. Paul
St. Paul Municipal Seed Cleaning Plant

Objectives:

1. To detail agronomic characteristics of new varieties and proven varieties in a specific geographic area.
2. To provide information on new varieties to local producers.

Background:

The canola performance trials (CPT) represent the next generation in variety evaluations for Western Canadian canola growers. The three Prairie canola grower groups – Alberta Canola Producers Commission, Saskatchewan Canola Development Commission and the Manitoba Canola Growers Association – fund the program. The Canola Council of Canada delivers the program on their behalf. Trial provide relevant and unbiased performance data that reflects actual production practices, and comparative data on leading varieties and newly introduced varieties.

The CPT system includes both small plot and large field scale trials that included 10 small plot trials and 45 field scale trials in 2017. The trials included conventional harvest systems as well as straight cut systems and a clubroot-resistant variety trial. The full results from the 2017 trials is available online at www.canolaperformancetrials.ca.

The small-plot trials for the CPT were re-introduced this year and included 22 different varieties of canola with various herbicide resistance. Yield differences seen in the trial should be due to genetic differences only, not due to weeds, disease or insect pressure.

Method:

The trial was seeded on May 29, 2017 on the land behind the St. Paul Municipal Seed Cleaning Plant in a randomized complete block design (RCBD) with four replicates to reduce error. Prior to seeding, soil tests were taken and a blend fertilizer (33-5-6-5) was side-banded at the time of seeding. The trial was seeded using the LARA five-row Fabro zero-till small plot drill and the individual plots measured 1.15 m x 6.5 m in area.

The trial was hand-sprayed on June 29, 2017 at the 3-4 leaf stage and the trial was harvested late on October 20, 2017. Due to the excessive moisture, dry-down of the trial was very slow causing the late harvest at a higher moisture percentage than desired above 13%. The bagged samples were air dried to 10% moisture before processing.

Results:

The results of the CPT trial grown in St. Paul are summarized in table 1. The average yield in the trial was not exceptional at 37 bu/ac, with the highest yielding canola variety was L252 at 45 bu/ac followed closely

by 6074 RR at 42 bu/ac. Most of the varieties yielded below 40 bu/ac, likely as a result of the slow dry-down in October and the late harvest at higher than desired moisture.

The two liberty link varieties did quite well, with both yielding in the top five varieties in the trial and both above 40 bu/ac. The three Clearfield varieties yielded lower than the liberty link varieties with all three yielding below 40 bu/ac.

Table 1. Canola Performance Trial St. Paul Results, 2017.

Variety	Category	Yield bu/ac	TWT (g)	1000 k (g)	Height (cm)
L252	LL	45	325.2	4.1	108
6074 RR	RR	42	307.3	4.6	119
DL1634 RR	RR	41	316.2	4.6	123
L241C	LL	40	311.5	4.5	108
6076 RR	RR	40	304.1	5.4	119
V12-1	RR	39	310.8	4.4	114
45H33	RR	39	299.5	4.0	124
74-44 BL	RR	38	314.5	4.0	110
SY1487	RR	38	312.0	5.1	122
46H75	CL	37	294.1	4.2	122
CS2200 CL	CL	37	299.3	4.3	114
PV 581 GC	RR	36	301.3	4.2	123
PV 540 G	RR	36	301.1	4.0	118
45M35	RR	36	319.8	4.2	119
5545 CL	CL	36	306.4	4.7	114
CS2000	RR	34	298.1	4.6	109
DL1512 RR	RR	33	301.0	5.8	120
CS2100	RR	33	318.8	4.1	121
6080 RR	RR	33	301.5	4.8	126
PV 200 CL	CL	33	310.4	4.8	111
5440	LL	32	313.2	4.1	108
DL1630 RR	RR	32	307.3	5.2	127
Average		**37**	**307.9**	**4.5**	**117**

Local Oat Variety Trial

Partners: Todd Tessolin
Lac La Biche County

Objectives:

1. To detail agronomic characteristics of proven varieties of oats in a specific geographic region of Alberta.
2. To provide regional data on oat varieties to local producers.
3. To produce long-term data for local producers.

Background:

The Regional Variety Trials (RVTs) have been used as a means of testing superior varieties under different environmental conditions over the past 25 years at LARA. One of the goals of the RVTs is to help researchers and producers identify varieties that are suitable for each particular environment. Multi-location trials often show genotype x environment interaction due to differential response of genotype to different environmental conditions. Information on the genotype x environment response obtained through RVT's may be helpful in identifying and selecting high-yielding varieties in specific or broad adaptations to their environmental conditions.

One drawback of the RVT trials is that the majority of the varieties tested are not yet available for producers to purchase and grow on their own operations. Oftentimes, the varieties are tested prior to registration and seed will not become available until two or three years after the trial is completed.

Although the RVT's remain an important source of regional information on new and emerging varieties, in order to provide local producers with information on varieties that are readily available, LARA started the Local Oat Variety Trial in Lac La Biche County this year. Eight oat varieties were selected based on previous trials grown at LARA and on local producer input and established in 2017.

Method:

Eight oat varieties were seeded on May 23, 2017 in a randomized complete block design (RCBD) with three replicates in Lac La Biche County (NE32-58-9-W4) Prior to seeding, a soil test was taken in the spring and a blend fertilizer was side-banded during seeding (33-5-6-5 @ 275.7 lbs/ac). The trial was seeded using the LARA five-row Fabro zero-till small plot drill and the seeded plots measured 1.15m x 6.6 m in area. Row spacing was 9" and the trial was seeded to a depth of 0.5" to 1". With the high moisture at the site in May, the trial did not have to be planted deep to reach good moisture.

A pre-seed burn-off was done three days before seeding for control of weeds present at the site and one in-crop herbicide application was done. The trial had to be hand weeded once during the growing season for volunteer canola. Notes on lodging and height were taken during the growing season and the trial was harvested on October 16, 2017.

Lodging is rated on a scale of 1-9 where 1 is perfectly erect and 9 is completely flat.

Results:

The yield results of the trial are summarized in table 1. Unfortunately, due to feeding from deer late in the season, the yield results were highly variable within each variety. The highest yielding variety was the older variety commonly grown for silage and greenfeed production, Jordan at 121 bu/ac. This was significantly higher than CDC SO-1, which was the next highest yielding variety at 113 bu/ac. The acres of CDC SO-1 in the Lakeland has been increasing over the last five years and is becoming a popular brown oat variety across Alberta.

The well-established forage oat variety, CDC Baler, yielded the poorest in grain production at 96 bu/ac. CDC Baler was developed as a forage oat variety so it is not surprising that grain yields did not exceed expectations. However, there has always be questions from local producer on how varieties developed for forage would yield in comparison with more dual purpose varieties. CDC Baler was utilized as the check variety in this trial.

No lodging was observed in the trial.

Table 1. Local Oat Variety Trial Lac La Biche, 2017.

Variety	Yield (bu/ac)		Yield % CDC Baler	TWT (lbs/bu)	1000 k (g)	Height (cm)
Jordan	121	a	126	225.9	53.0	98
CDC SO-1	113	b	118	209.4	51.2	99
AC Mustang	107	c	111	247.5	41.5	89
Juniper	105	c	109	240.1	42.6	97
Foothills	104	c	108	251.9	36.8	91
Waldern	103	c	107	238.4	53.2	98
AC Morgan	98	d	102	245.0	44.4	93
CDC Baler	96	d	100	249.0	43.1	92
CV = 15.62						

In 2018, LARA will be establishing another local oat variety trial and, additionally, we will be seeding local variety trials for wheat and barley as well. In order to provide the best information to local producers on the varieties they want to see, we are always looking for variety suggestions. If you are growing a variety of cereals in 2018 and would like to see it compared to other common cereals grains grown in the Lakeland, contact the LARA office at 780.826.7260.

Demonstrations:
Industrial Hemp Varieties

Partners: InnoTech Alberta
MD of Bonnyville

Objectives:

1. To assess the growth and establishment of multiple industrial hemp varieties in Northeastern Alberta.

Background:

Varying prices in major commodity crops often prompts farmers to diversify their cropping options by including new and emerging crops in their rotations. One of these crops in industrial hemp, which has shown significant increase in acreage nationally at about 25 percent per year in Canada.

Originally from Central Asia, industrial hemp has been in Canada since the early 17th century where it was grown for food and fiber. However, due to high tetrahydrocannabinol (THC) levels, the crop was banned in 1983 until 1994 when Health Canada began to grant licenses on an experimental basis.

Hemp is well adapted to the Canadian provinces and can survive dry conditions better than most crops due to a well-developed root system. As well, later in development, hemp can withstand frost temperatures much below those of other crops with no damage occurring to seed yield or germination.

Including hemp in rotation is useful following cereals as volunteer cereals are controlled more easily than volunteer broadleaf crops. Pre-seed weed control is the only approved method of weed control in hemp as there are no registered herbicides for the crop. Consequently, it is recommended to grow the crop on the cleanest field possible. In terms of fertility, similar to canola, hemp is a high nutrient user, therefore, following legumes, perennial alfalfas or green manure fields can be beneficial.

To assess the growth and establishment of six industrial hemp varieties in the Lakeland, LARA established a small demonstration.

Method:

The six hemp varieties were seeded later than desired due to licensing and seed sourcing on June 27, 2017 using the LARA five-row zero-till small plot drill. The plot site was rototilled prior to seeding and a blend fertilizer of 33-5-6-5 was broadcast at 150 lbs/acre and harrowed for incorporation. The varieties were seeded at 25 lbs/acre to a depth of 1 to 2 cm.

The trial was hand weeded twice during the growing season. Plant counts were done to determine emergence and heights were conducted once in September. With the late seeding, the trial was not harvested for grain or fiber but wad destroyed as per Health Canada regulations.

The six varieties seeded were:

- *Silesia* – quick growing industrial hemp variety developed at InnoTech Alberta in Vegreville. Can reach heights of three meters in the relatively short growing season in Alberta. High resistance to pests, high competitiveness with weeds and requires very little crop protection.
- *Finola* – early maturing (in about 100 days), short stature industrial hemp variety most suited to seed and oil production.

- *Picolo* – short stature variety with moderate seed size designed for irrigated and northern production regions. Shorter than CFX-2.
- *CFX-2* – High yielding, moderate season of about 103+ days to maturity and best suited for dryland central and northern prairies.
- *X59* – high yielding with a moderate height and moderate growing season of about 100 days. Very low and stable THC levels, large seed and high oil and protein content. Can be direct harvested using conventional equipment.
- *CRS-1* – very large seeded, high yielding with a full season of about 110+ days to maturity. Slightly taller than CFX-2 and suited for dryland south and central prairies.

Results and Discussion:
The results of the plant count and heights taken in September and October of 2017 are illustrated in table 1. Emergence was good in all varieties with an average of 5.25 plants/m^2 on September 15, 2017. Hail damage occurred to the crops in early August, but recovery was quick.

Heights varied significantly between the different varieties and was apparent throughout the growing season. Finola was developed as a dwarf variety for seed production, while the taller varieties are more suitable for fiber and seed production. The tallest varieties were X59 and CRS-1.

Table 1. Plant Counts and Heights of Industrial Hemp Varieties, 2017.

Variety	Plant Counts 15-Sep-17	Plant Counts 21-Oct-17	Height (CM)
Silesia	4.3	4.6	124
Finola	4.3	4.7	98
Picolo	6.0	6.4	124
CFX-2	6.3	6.6	142
X59	5.3	5.3	156
CRS-1	5.3	5.6	157

The following photos were taken on August 22, 2017.

Silesia

Finola

Picolo

CFX2

X59

CRS-1

Demonstrations:
Alternative Crops: Quinoa

Partners: Northern Quinoa
MD of Bonnyville

Objectives:

1. To assess the growth and establishment of quinoa in Northeastern Alberta.
2. To assess the yield and quality of quinoa in Northeastern Alberta.

Background:

With fluctuations in prices of common commodity crops, producers are often looking for alternatives to include in their crop rotations that will still bring a profit. Quinoa (keen-wa), one of the world's most perfect foods, has been consumed for thousands of years in South America. Its small nutritious seeds resemble millet and is very versatile to a variety of cooking styles, inviting seasonings from mild to wild.

Quinoa thrives at high altitude conditions and adapts well to the growing conditions of the Canadian Prairies with hot days, cool nights, abundance of sunshine, clean air and gentle rains. Consequently, regions north of highway 16 are a prime candidate for growing Quinoa as higher temperatures can cause heat sterilization and reduce yields.

Land preparation is critical for quinoa establishment as the seedlings become stressed and perform poorly under heavy stubble and trash. Recommendations is to heavy harrow regardless of the previous years crop. A second consideration that needs to be made in site selection is residual herbicides. Quinoa is susceptible to multiple residual herbicides and should be seeded in a well drained field to reduce the risks of herbicide buildup. As well, since there are no registered herbicides for weed control in Quiona, the crop should not follow canola due to the increased risk of volunteers.

To assess the suitability of Quinoa in the Lakeland region of Alberta, LARA established two sites of Quinoa demonstrations.

Method:

The demonstration was seeded on May 19, 2017 at the Fort Kent Research Site (NE25-61-5-W4) with the LARA five-row zero-till small plot drill to individual plot sizes of 6.85 m^2. The site was rototilled prior to seeding to create an ideal seedbed for the crop and a soil sample was taken. At the time of seeding, a blend fertilizer (33-5-6-5) was side-banded at 257.7 lbs/acre based on the soil test. The demonstration was seeded at 10 lbs/acre to increase the ability of the crop to compete with weeds.

Results and Discussion:

The demonstration emerged well, but was hit with an early influx of flea beetles that caused significant damage to the crop before a pesticide was applied. The remaining crop flourished into June and July when it was hit by a newly identified but not yet classified stem-bore insect. This insect, although not yet identified, can be sprayed if caught early enough through frequent scouting. However, the demonstration was not sprayed at an early enough stage in the infestation and caused significant stunting of the crop at the late budding to early flowering stage. This stunting prevented further development of the flowers and the crop did not set seed.

Although the demonstration could not be harvested due to the insect issues that occurred during the growing season, the crop does look promising. Since the acres of Quinoa grown in Western Canada has only been on the rise over the last decade, more research needs to be conducted for agronomic and pest management issues. LARA is looking at establishing another couple of quinoa demonstration sites in 2018 to further look at the establishment and growth of this crop in Northeastern Alberta.

Quinoa in Fort Kent on July 25, 2017.

Demonstrations:
Winter Wheat Varieties

Partners: Rob Graf
Agriculture and Agri-Food Canada (AAFC)
MD of Bonnyville

Objectives:

1. To detail agronomic characteristics of new varieties and proven varieties in a specific geographic region of Alberta.
2. To provide information about new varieties to producers.

Background:

Including winter cereals in your annual rotation can have multiple benefits, particularly in tough years when seeding and harvest are drawn out. Two of the most common types of winter cereals grown in Alberta are winter triticale and winter wheat. Winter cereals can be dual purpose for use as a grazing crop as well as a grain crop due to the need of these crops to go through a cold period before moving into a reproductive stage. Consequently, spring seeding a winter cereal, can be an excellent source of fall grazing and can then be harvested for grain the following summer.

The acres of winter wheat have remained steady over the years, with a large part of the concern for producers being the potential for winter kill in winters with cold temperatures and very little snow. To asses the suitability of winter wheat in the Lakeland area, LARA has been growing a winter wheat variety trial for past ten years.

According to the Western Winter Wheat Initiative (2014), the top ten reasons to include winter wheat in your crop rotation are:

1. High yield potential means increased returns per acre as compared to other cereal crops.
2. Avoids seeding problems on late, wet springs; earlier harvest than spring wheat.
3. Increases timeliness and profitability of the entire rotation.
4. Increases the effectiveness and efficiency of crop protection products.
5. Helps manage herbicide resistance.
6. Uses early moisture in dry areas more efficiently than spring cereals.
7. Provides soil cover during the fall and winter, reducing the potential for soil loss due to water and wind.
8. Spring moisture is not lost from seeding operation.
9. Matures earlier than spring cereals, spreading out harvest operations and reducing the potential for grade losses due to early frost.
10. Provides an ecological tool to help manage common pests in wheat such as most grassy weeds, orange blossom wheat midge and wheat stem sawfly.

Method:

The trial was seeded on August 29th, 2016 in a randomized complete block design (RCBD) with three replicates to reduce error at the LARA Fort Kent Research Farm (NE25-61-5-W4). The LARA Fabro five-row

zero-till small plot drill was used for seeding to a depth of 1". The seed was sent pre-weighed from Agriculture and Agri-Food Canada and was treated. Individual plots measured 1.15 m by 6 m in area. Soil tests were taken prior to seeding and a blend fertilizer was side-banded at the time of seeding.

The site was sprayed once with Buctril M and Merango for in-crop weed control in early June. Unfortunately, due to the extremely wet conditions in May and June and water siting on the trial during these months, repetitions 1 and 2 could not be harvested but repetition 3 was harvested as a demonstration.

Results and Discussion:

The demonstration was harvested on September 27, 2017 and the results can be found in table 1. The highest yielding varieties were W526 and Radiant at 106 bu/ac, while CDC Buteo was the lowest yielding variety at 53 bu/ac.

Table 1. Winter Wheat Variety Demonstration Yield Results, 2017.

Variety	Yield (bu/ac)	1000 k (g)	TWT (g)	Protein (%)
W526	106	39.28	378.1	10.9
Radiant	106	40.64	379.5	10.9
W520	103	35.84	382	10.5
AAC Elevate	97	44.52	371.8	11.3
AAC Wildfire	91	39.68	371.7	11.5
CDC Chase	83	36.56	380.3	9.9
W522	82	39.32	381.8	10.3
AAC Gateway	80	39.12	370.2	10.4
AAC Icefield	79	36.04	382.6	11
CDC Buteo	53	37.72	383.7	10.3

Despite the issues with weather during the spring and summer, this was one of the highest yielding years for winter wheat. Although the data should not be used as a measure of how much each variety will yield, it can be used as a general comparison of how one variety will yield against another.

Pest Surveys

Partners

Agriculture Research and Extension Council of Alberta
Alberta Agriculture and Forestry
Lac La Biche County
County of St. Paul
MD of Bonnyville
Smoky Lake County
University of Alberta
Agriculture and Agri-Food Canada
Alberta Innovates Technology Futures
Alberta Research Council
AFSC Insurance
Western Committee on Crop Pests
Stats Branch/Crop Diversification

Objectives

1. To participate in a complete pest monitoring program for Alberta
2. To ensure the best, most current pest information is extended in a timely, appropriate manner for Northeast Alberta producers
3. To participate in a coordinated network of survey gatherers providing up-to-the-minute information for Alberta crop producers, media, industry, and professionals
4. Meet international trade demand

Introduction (Portions of this article are taken directly from the 'Alberta Pest Monitoring Network Manual')

The goal of IPM surveys is to develop an early warning system for field crop pests in Alberta that is easy to access, timely and informative. Some of pests surveyed in Alberta are bertha armyworm, diamondback moth, cabbage seedpod weevil, wheat midge, grasshoppers, wheat stem sawfly, cutworms, fusarium headblight, fusarium wilt, clubroot and blackleg. For pests that have a short amount of lead-time, the Prairie Pest Monitoring Network provides a dynamic web-based system that updates the risk information on a daily basis. As the surveying is done and the information entered, the pest risk map changse to reflect that information. Pest forecast maps are available for viewing at AAFRD's Ropin' the Web site. Being forewarned means that producers and agronomists can be watching for specific pests so that timely scouting and control operations can be carried out before crop losses occur. The dynamic nature and timeliness of the information available to the agriculture industry would be a valuable addition to enhance decision making for producers, industry agronomists and researchers.

LARA participated in the provincial pest surveys of diamondback moth, bertha army worm, cabbage seedpod weevil, and orange wheat blossom midge. The regional data that was collected is passed on to provincial authorities. The information collected is compiled and can be found on the Alberta Agriculture and Agri-Food website (click on 'information'). Producers can see if there is an outbreak in their area and take appropriate and timely actions to protect their crop.

Bertha Armyworm

Bertha armyworm is one of the most significant insect pest of canola in Canada. It occurs throughout Manitoba, Saskatchewan, Alberta and into the interior of BC. Severe infestation can occur throughout most of this area but are usually limited to the parkland area of the Prairies and the Peace River region of BC and Alberta. Infestation was severe in 2012, especially in the County of St. Paul. A lot of insecticide was applied in an effort to prevent losses, but some fields were still severely damaged by the worms. Infestations also seemed patchy, with fields just west of Highway 41 in the MD of Bonnyville seeing large armyworm numbers, while the fills at LARA only had a very few. Armyworms can overwinter in the soil, so it is likely that the mild winter 2011-2012 contributed in part to the outbreak in 2012.

In most years, populations are kept low by unfavorable weather condition such as cold winters and cool wet weather, and by parasites, predators and diseases. But when these natural regulators fail, population can increase dramatically, creating the potential for widespread damage to a variety of broad leaved crops. In extreme situations, infestations of more than 1000 larva per square metre have been reported while densities of 50 to 200 larvae per square metre may be common.

Infestations may be localized or spread over millions of acres. Widespread crop losses can be minimized with insecticides if the infestation is detected early. However, failure to detect infestations early may result in insufficient time to apply the chemicals before severe damage is done. Also, there may be temporary insecticide shortages if suppliers are not aware of the potential outbreak.

Bertha armyworm surveys were conducted in canola fields using pheromone traps. These traps were set up on the edge of the fields. The bertha armyworm adult is a moth, and the traps are designed to attract them. Moth counts were taken once a week. Moth numbers are correlated to armyworm numbers. The bertha armyworm traps were checked from June-August.

Diamondback Moth

Diamondback moth was introduced into North America from Europe about 150 years ago. It is now found throughout North America, wherever host plants are grown. Diamondback moth larvae feed on all plants in the mustard family (canola, mustard), cole crops (broccoli, cabbage) and on several greenhouse plants. In Western Canada, canola and mustard are primary targets.

Although the diamondback moth occurs each year throughout the Canadian prairies and north central United States, the severity of the infestation varies considerably from year to year. An infestation of diamondback moths cannot be predicted based on the previous years' population because very few, if any, pupae survive the long, cold Canadian winters. Instead, the severity of the infestation in any given year depends on two factors – overwintering population to the south and strong south winds to transport the moths north into Manitoba, central Saskatchewan and eastern Alberta in the spring.

In years when conditions are right for the moths – that is, when the moths arrive on the wind in large numbers in early May and summer temperatures are hot – diamondback moth infestations can cause millions of dollars of damage.

Diamondback surveys were conducted in canola fields using pheromone traps. These traps were set up on the edge of the fields and checked once a week and counts taken. Diamondback surveys took place from May-July.

Wheat Midge

The wheat midge (*Sitodiplosis mosellana*) is found in most areas around the world wherever wheat is grown. In recent years, significant damage to wheat crops has been reported in Alberta, Saskatchewan, Manitoba, and southern British Columbia.

Infestations of wheat midge can reduce crop yields and lower the grade of the harvested grain. Midge may exist at low population levels for several years before they become a significant problem. But if conditions become favourable, populations can reach epidemic proportions quickly. Producers inexperienced with wheat midge infestations often mistake the symptoms of damage and report that frost or drought was responsible for reduced wheat yields or grain quality.

Crop damage occurs during the larval stage. After hatching, the midge larvae feed on the developing wheat kernel, causing it to shrivel, crack and become deformed. As there are no visible, external changes in colour, size or shape of the affected wheat head, the damage to the crop is not readily apparent. Damage can only be detected by inspecting the developing seed within the glumes. Damage to wheat kernels will vary within a single head. A few kernels may be aborted entirely. Others will not fully develop and will be so small and light, they will pass through the combine with the chaff during harvest. Still others may be only slightly damaged. Some kernels may not be affected at all. Careful, regular monitoring of wheat fields between heading and flowering is necessary both to identify a wheat midge infestation and to take the appropriate action.

Research indicates that wheat heads are most susceptible to damage when egg laying occurs during heading. Kernel damage due to wheat midge declines by 15 to 25 fold between later stages of heading and early flowering or anthesis (first yellow anthers appear on wheat head). Therefore, fields should be inspected daily from the time wheat heads emerge from the boot leaf until anthers are visible on the heads.

The orange wheat blossom midge survey was conducted by LARA in fall and 10 soil samples were taken from the Lakeland area. About 10, 1" diameter soil samples, to a depth of 6 inches, were taken from each location and mixed and then sub-sampled. These subsamples were then sent to Brooks where they were tested for the cocoon of the orange wheat blossom midge.

This year, wheat midge levels were not high in the majority of the samples. However, one field in the County of St. Paul had high larval counts in the fall.

Verticilium wilt and Blackleg in Canola

In Alberta, canola fields are infected by the Blackleg disease caused by *Leptosphaeria maculans*, which can result in yield reductions from between 5 to 20% and is therefore one of the canola production constraints in Alberta. Farm cultural practices, in addition to utilizing Blackleg resistant varieties, have been shown to reduce the incidence of the disease. Tillage and crop rotation are two known method easy to use methods to reduce the incidence of the disease. Tillage helps in reducing blackleg by breaking up infected stubble to increase its decomposition, by burying the stubbles protects them from drying out on the soil surface, increasing their contact with and improving the environment for their decomposition. Because of the negative effects of tillage on soil and as tillage doesn't necessarily kill the spores, this

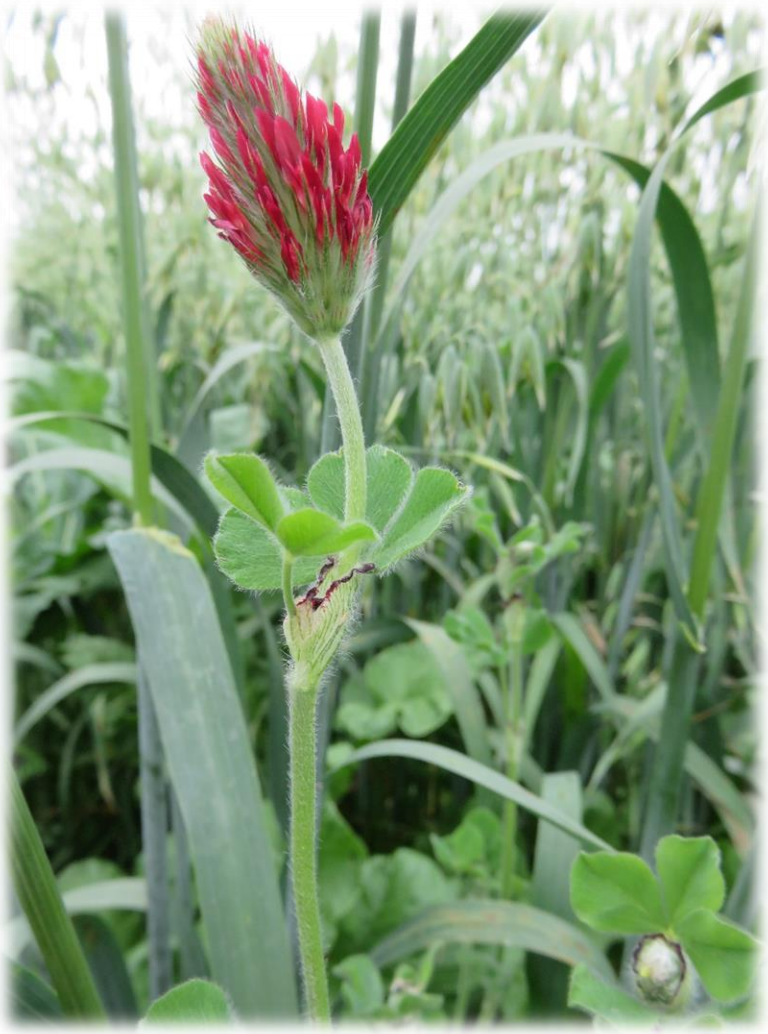
method is not commonly used. Lengthening the time between identical crops which serve as hosts will reduce the pathogen population as pathogen infecting one crop may not cause problem in another crop. Crop rotation has been shown as a more effective method of reducing pathogen population and consequently incidence of Blackleg.

Monitoring the severity and distribution of these diseases will help producers manage risk. In 2017, ARECA member associations and municipalities sampled canola fields across Alberta for these diseases. In total, 421 canola fields were surveyed for blackleg with 346 showing symptoms. 311 fields were sampled for *Sclerotinia*, 252 of those fields showed symptoms. The full results of the province-wide survey are available in the appendix of this report on page 99.

Comments

Pest surveys are very important to producers, and the province. With the information that is obtained, proper and accurate forecasting maps can be displayed to inform producers of possible outbreaks. These pest and diseases have a significant impact on crop production. It is important to know proper times of the year when scouting is effective and to know exactly what to look for when out in the fields. Also, crop rotations, varieties, and weather play a great role in determining possible outbreaks. The goal of pest surveys is to help prevent an outbreak from occurring through the collection of this data and to prepare producers so they can manage any possible outbreaks.

Forage and Livestock Program



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

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

The goals of this program are to:

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

Lakeland Forage Association

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

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

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

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

LFA would like to thank Bob and Wanda Austin who have been managing the Olympic Lake Lease for the past eight seasons and doing a great job.

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

Northern Range Enhancement Project

Partners: Lakeland Forage Association
Lac La Biche County
Bob and Wanda Austin

Objectives:

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

Background:

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

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

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

Every year approximately 15 patrons are given allotments for up to 30 heifers and one bull. The grazing season typically runs from mid-June to early-mid October.

In 2017, there was one project at the Olympic Lake Grazing Lease.

1. Heifer project

Heifer Project

Methods:

The heifers were weighed when they entered the pasture on June 1st, 2017. The bulls were pulled on August 2nd, 2017, allowing for a 60-day breeding period. At this time the heifers were weighed for a second time. The heifers were removed from the pasture on October 2nd, 2017 allowing for adequate grass carryover for the 2018 grazing season. The heifers were weighed for a third time at the time of take-out in October. Similar to previous years, the heifers were not pregnancy checked.

Results:

There was a total of 123 days in the grazing season at Olympic Lake Grazing Lease (table 1, figure 1). The average daily gain (ADG) over the grazing season was 1.23 lbs/day (table 2), which is higher than that seen in 2016 but lower than the ADG seen in other years of 2.00 lbs/day in 2014 and 1.71 lbs/day in 2013.

Table 1. Grazing rotation for the 2017 grazing season at Olympic Lake Grazing Lease.

Pasture Rotation - Olympic Lake 2016										
Paddock Name	*First Graze*					*Second/Third Graze*				
	Date In	Date Out	# of days	# of head		Date In	Date Out	# of days	# of head	
				heifers	bulls				heifers	bulls
Headquarters	Jun-1	Jun-2	1	329	11	Aug-1	Aug-2	1	388	13
S1 + C4	Jun-1	Jul-21	50	60	2	Sep-1	Sep-10	9	387	0
Pipeline	Jun-2	Jun-4	2	329	11	Jul-30	Aug-1	2	388	13
W5	Jun-4	Jun-11	7	329	11	Sep-10	Sep-14	4	387	0
W3	Jun-11	Jun-18	7	329	11	Sep-14	Sep-19	5	387	0
W1	Jun-18	Jun24	6	329	11	Sep-19	Sep-22	3	387	0
W4	Jun-24	Jun-28	4	329	9	Sep-22	Sep-24	2	387	0
W2	Jun-28	Jul-4	6	329	9	Sep-24	Sep-27	3	387	0
C2	Jul-4	Jul-13	9	329	11	Sep-27	Oct-1	4	387	0
C3	Jul-13	Jul-21	8	329	11					
C1	Jul-21	Jul-30	9	388	13					
E1	Aug-2	Aug-23	21	387	0					
Kerr Lake	Aug 23	Sep-1	9	387	0					
Headquarters						Oct-1	Oct-2	1	387	0
		Total:	**89**				**Total:**	**34**		

Table 2. Heifer data by herd for the 2017 grazing season.

Herd	2017 Heifer Weights - Average by Herd			Heifer Average Daily Gain (ADG)					
	June lbs	August lbs	October lbs	June 1 - August 2 lbs gained	62 days lbs/day	August 2 - October 2 lbs gained	61 days lbs/day	June 1 - October 2 lbs gained	123 days lbs/day
1	756	892	923	136	2.13	31	0.53	167	1.37
2	738	915	969	177	2.77	54	0.93	231	1.89
3	755	915	966	160	2.50	51	0.88	211	1.73
4	866	939	958	73	1.14	19	0.33	92	0.75
5	680	806	843	126	1.97	37	0.64	163	1.34
6	696	807	852	111	1.73	45	0.78	156	1.28
7	743	896	927	153	2.39	31	0.53	184	1.51
8	963	1042	1081	79	1.23	39	0.67	118	0.97
9	874	923	942	49	0.77	19	0.33	68	0.56
10	739	860	893	121	1.89	33	0.57	154	1.26
11	740	904	930	164	2.56	26	0.45	190	1.56
Average:	**777**	**900**	**935**	**123**	**1.92**	**35**	**0.60**	**158**	**1.29**

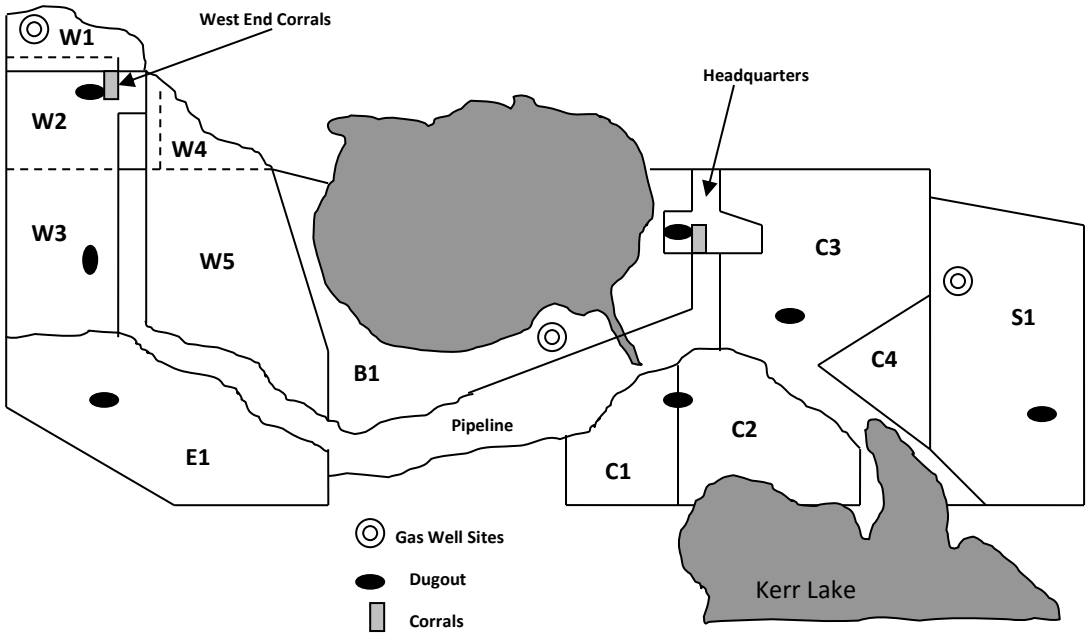


Figure 1. Map of the Northern Range Enhancement Project (NREP) pasture system.

Discussion:

There was a total of 11 patrons grazing cattle at Olympic Lake in 2017 with herd size ranging from 30 heifers and 1 bull to 60 heifers and 2 bulls in partnerships. All red or black angus heifer bulls were used for breeding between June 1st and August 2nd.

The average herd entry weight at 777 lbs was 53 lbs lighter than the entry weight of 830 lbs seen in 2016 which is likely the results of the breed and age of the heifers. The herd weight gain ranged from 68 lbs to 231 lbs over the grazing season with an average of 158 lbs, which is 17 lbs more than 2016. The average daily gain (ADG) decreased between August and September to 0.60 lbs/day from 1.92 lbs/day seen from June to August. This has consistently been seen throughout the years although the drop in ADG will vary.

The stocking rate at the Olympic Lake Lease has slowly declined since 2009, which has allowed for significant recovery and improvement of the pasture. The historical data for the pasture is summarized in table 3.

With the higher moisture content this grazing season, the heifers were removed later than in 2016 with lots of stockpiled grass carryover for the 2018 grazing season.

Table 3. Historical data from Olympic Lake Grazing Lease. 2003-2017.

Year	Grazing Season (days)	# of Head	Weight Gain	ADG	% Open
2017	123	388	158	1.29	N/A
2016	121	350	141	1.16	N/A
2015	102	280	-	-	N/A
2014	133	271	266	2.00	28
2013	120	336	205	1.71	17
2012	126	343	139	1.1	9
2011	121	350	223	1.86	14
2010	120	350	170	1.43	14
2009	111	410	124	1.13	19
2008	128	369	224	1.76	14
2007	126	435	130	1.03	18
2006	127	462	-	-	18
2005	127	439	156	1.22	13
2004	127	427	163	1.35	10
2003	131	410	116	0.9	10
Average	124.63	373.71	171.42	1.41	14.5

Regional Silage Trials

Partners: Alberta Agriculture and Forestry
Battle River Research Group
Chinook Applied Research Association
Gateway Research Organization
North Peace Applied Research Association
Peace Country Beef and Forage Association
Smoky Applied Research and Demonstration Association
West Central Forage Association
SECAN
Association of Alberta Co-op Seed Cleaning Plants
Alberta Brand, Canadian Seed Growers Association
A&L Canada Laboratories

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

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

In 2016, the LARA Regional Silage Trial included four blocks of plots: barley (13 varieties), oats (10 varieties), triticale (5 varieties) and pulses (9 treatments). Additional varieties can be added at the request of local producers and seed reps so if there is something you would like to see in 2018, let us know.

In partnership with the Association of Alberta Co-op Seed Cleaning Plants and the Alberta Seed Growers Association the Regional Silage Trial information will appear in the Spring 2017 Alberta's Seed Guide (seed.ab.ca).

Regional Silage Trial – Cereals

Partners: Alberta Agriculture and Forestry
Guy Brousseau
Battle River Research Group
Chinook Applied Research Association
Gateway Research Organization
SARDA Crop Research
West-Central Forage Association

Objectives:

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

Background:

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

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

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

Method:

The cereal trials were grown in three blocks of plots: barley, oats and triticale/wheat, in two locations: Fort Kent (NE25-61-5-W4) and St. Paul (SE15-59-9-W4). The trial blocks were seeded as a randomized complete block design (RCBD) with four replicates to reduce error. The plots measured 1.15m by 6m in area.

Agronomic information on the trials can be found in table 1. The trials were seeded using the LARA five-row zero-till small plot drill and blend fertilizer was side-banded at the time of seeding. The trials in Fort Kent were seeded on May 18th, 2017 and the trials in St. Paul were seeded on May 17th, 2018. The trials were sprayed with a 3-point hitch sprayer once during the growing season.

Total rainfall at the St. Paul site was 274.9 mm and the Fort Kent site was 231.4 mm.

Crop height and stage of maturity was recorded prior to harvest with the LARA alfalfa-omega self-propelled forage harvester. The total plot weight was recorded and samples were taken to assess dry matter content. Additional composite samples were taken from each variety, frozen and sent to A & L Canada Laboratories for wet chemistry analysis. Statistical analysis of the data was conducted using ARM 9, P = 0.05.

The following varieties were grown in the Regional Silage Trials in 2017:

Barley

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

Oats

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

- *AC Mustang* – high yielding silage and forage oat variety with good lodging resistance.

Triticale and Wheat

- *Bunker* – early maturing, reduced awn forage variety with great digestibility, high fat content and high silage yields.
- *Sunray* – early maturing, spring triticale variety with improved ergot resistance. Short statured for increased resistance to lodging.
- *Taza* – reduced awn forage and grain triticale variety with good lodging resistance.
- *Tyndal* – early maturing, reduced awn forage and silage variety with good lodging resistance.
- *AAC Chiffon* – high yielding soft white wheat variety that performs well in dry conditions.

Table 1. Agronomic Information, 2017.

Trial	Site	# of Varieties	Seeding Date	Seeding Rate	Fertility (lbs/ac)	Weed Control	Harvest Date
Barley	Fort Kent	14	18-May-17	250 pl/m2	33-5-6-5 @ 275 lbs/ac	Buctril M, Merango	09-Aug-17
	St. Paul	14	22-May-17	250 pl/m2	33-5-6-5 @ 275 lbs/ac	Buctril M, Merango	23-Aug-17
Oats	Fort Kent	9	19-May-17	250 pl/m2	33-5-6-5 @ 275 lbs/ac	Buctril M	10-Aug-17
	St. Paul	9	22-May-17	250 pl/m2	33-5-6-5 @ 275 lbs/ac	Buctril M	23-Aug-17
Triticale	Fort Kent	5	18-May-17	370 pl/m2	33-5-6-5 @ 275 lbs/ac	Buctril M, Merango	18-Aug-17
	St. Paul	5	22-May-17	370 pl/m2	33-5-6-5 @ 275 lbs/ac	Buctril M, Merango	23-Aug-17

Results:

Barley

The barley trials are aimed to be harvested at the soft dough stage. There were 14 barley varieties grown in the trials this year at both locations. The results of the Fort Kent and St. Paul trials can be found in table 2 and table 3, respectively. The Fort Kent trial was harvested after 90 days and the St. Paul trial was harvested after 92 days. High rainfall during seeding allowed for quick establishment of the trials at both sites. Average moisture content of the Fort Kent trial was 75% and the St. Paul trial was 50%.

The varieties yielded significantly higher at the St. Paul location, with the average yield in Fort Kent of 3.09 ton/acre compared to an average of 6.27 ton/acre achieved in St. Paul. The highest yielding variety in Fort Kent was Altorado at 4.63 ton/acre. Altorado was recently registered and has been grown in the RST trials over the past 2 years as TR13740. The second highest yielding variety was Canmore at 3.61 ton/acre, significantly lower than Altorado. Canmore was also one of the higher yielding varieties in St. Paul at 6.58 ton/acre. However, the highest yielding variety was CDC Cowboy at 6.95 ton/acre.

Similar to 2016, feed quality was higher in the barley varieties grown at the Fort Kent location when compared to the St. Paul trial. This is likely due to a later harvest stage for the St. Paul trial beyond the recommended soft dough stage, which is seen in the lower moisture content of the samples

Table 2. RST Barley Fort Kent, 2017 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/ac)		DM Yield (% Austenson)	2017 Quality Data CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
Altorado	4.63	a	168	12.13	34.15	57.77	62.30	0.44	0.29	1.80	0.22
Canmore	3.61	b-e	131	11.40	29.28	50.65	66.09	0.36	0.19	1.32	0.19
Champion	3.57	bcd	129	13.74	34.98	60.11	61.65	0.40	0.22	1.76	0.21
CDC Coalition	3.34	bcd	121	11.64	32.84	56.59	63.32	0.41	0.23	1.73	0.25
Claymore	3.30	bcd	120	12.51	35.91	58.30	60.93	0.26	0.12	0.73	0.12
Sundre	3.02	b-e	109	13.67	23.91	43.41	70.27	0.39	0.38	1.88	0.22
CDC Cowboy	2.93	b-e	106	13.43	35.41	60.10	61.32	0.43	0.26	1.63	0.24
CDC Maverick	2.91	b-e	105	11.84	33.68	54.93	62.66	0.46	0.26	1.51	0.25
Conlon	2.84	b-e	103	10.43	27.98	47.96	67.10	0.49	0.24	1.37	0.23
AAC Austenson	2.76	b-e	100	12.60	36.36	62.08	60.58	0.45	0.22	1.78	0.24
Gadsby	2.71	b-e	98	12.50	32.64	54.08	63.47	0.43	0.13	0.78	0.16
Ranger	2.68	cde	97	12.68	34.95	59.47	61.67	0.75	0.28	1.94	0.34
Amisk	2.59	de	94	12.11	39.45	62.44	58.17	0.53	0.21	1.84	0.22
CDC Meredith	2.42	e	88	10.04	37.98	61.09	59.31	0.46	0.25	1.84	0.22
Average	3.09			12.19	33.54	56.36	62.77	0.45	0.23	1.57	0.22
CV	6.63										

Table 3. RST Barley St. Paul, 2017 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/ac)		DM Yield (% Austenson)	2017 Quality Data CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
CDC Cowboy	6.95	a	107	9.69	32.78	53.87	63.36	0.46	0.19	1.82	0.17
Gadsby	6.81	ab	105	8.89	31.12	52.57	64.66	0.45	0.15	1.48	0.13
Claymore	6.76	ab	104	9.06	35.28	54.50	61.42	0.42	0.18	1.70	0.14
Champion	6.60	ab	101	9.97	29.03	47.98	66.29	0.34	0.18	1.73	0.13
Canmore	6.58	ab	101	8.88	36.15	57.76	60.74	0.45	0.14	1.97	0.15
AAC Austenson	6.51	ab	100	9.16	31.63	52.30	64.26	0.40	0.18	1.84	0.15
Altorado	6.44	ab	99	10.30	25.00	44.13	69.42	0.30	0.21	1.59	0.14
CDC Meredith	6.34	ab	97	9.16	36.39	57.46	60.55	0.37	0.16	1.94	0.13
CDC Maverick	6.21	ab	95	11.31	28.95	47.90	66.35	0.39	0.23	1.63	0.17
Amisk	6.18	ab	95	10.06	26.99	46.83	67.87	0.47	0.20	1.71	0.16
Ranger	5.95	abc	91	9.64	29.11	48.31	66.22	0.45	0.19	2.01	0.16
Sundre	5.82	abc	89	10.04	28.57	48.45	66.64	0.53	0.20	1.75	0.18
CDC Coalition	5.61	bc	86	10.11	60.69	51.54	64.99	0.36	0.19	1.79	0.15
Conlon	4.97	c	76	9.37	28.65	48.70	66.58	0.40	0.22	1.56	0.14
Average	6.27			9.69	32.88	50.88	64.95	0.41	0.19	1.75	0.15
CV	8.31										

Oats

The oat trial is aimed to be harvested at the milk stage. There were 9 oat varieties grown in the trials this year in Fort Kent (NE25-61-5-W4) and St. Paul (SE15-59-9-W4). The results of the Fort Kent trial can be found in table 4 and the results of the St. Paul Trial can be found in Table 5. Average moisture content at the time of harvest in Fort Kent was 75% and in St. Paul was 65%.

The varieties yielded significantly higher at the St. Paul site when compared to the Fort Kent site with an average yield of 4.29 ton/acre in Fort Kent and 5.61 ton/acre in St. Paul. Murphy was among the highest yielding varieties at both locations with an average yield of 5.11 ton/acre in Fort Kent and an average yield of 5.98 ton/acre in St. Paul. Murphy is a well-established forage oat variety that is widely grown across the prairies. It was the highest yielding variety in Fort Kent, followed closely by CDC SO-1 at 5.10 ton/acre. CDC SO-1 has increased in popularity over the last few years although is has consistently yielded low in the regional silage trials with the exception of 2017.

The highest yielding variety in St. Paul was CDC Haymaker at 6.23 ton/acre although it was not significantly higher than CDC Seabiscuit, CDC Baler or Murphy. CDC Haymaker is a high yielding forage oat that was developed as a replacement for CDC Baler and is easily distinguished throughout the growing season by its large, wide leaves.

The Fort Kent trial was harvested 83 days after seeding and the St. Paul trial was harvested 92 days after seeding.

Table 4. RST Oats Fort Kent, 2017 (ton/acre, 1 ton = 2000 lbs).

				2017 Quality Data							
Variety	DM Yield (ton/ac)		DM Yield (% Murphy)	CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
Murphy	5.11	a	100	10.96	38.51	59.11	58.90	0.24	0.24	1.73	0.20
CDC SO-1	5.10	a	100	11.12	36.75	58.75	60.27	0.29	0.20	2.07	0.25
AC Morgan	4.73	ab	93	11.47	38.95	58.58	58.56	0.31	0.22	2.71	0.22
CDC Seabiscuit	4.40	abc	86	12.44	41.30	62.75	56.73	0.25	0.23	1.96	0.20
Waldern	4.28	abc	84	12.69	39.87	60.91	57.84	0.32	0.23	2.22	0.24
CDC Baler	3.87	bc	76	11.60	38.77	59.14	58.70	0.33	0.22	2.14	0.24
AC Mustang	3.87	bc	76	9.87	38.52	60.07	58.89	0.27	0.23	1.74	0.22
CDC Haymaker	3.82	bc	75	13.19	33.86	55.69	62.52	0.29	0.32	1.64	0.19
AC Juniper	3.43	c	67	13.38	41.05	63.14	56.92	0.29	0.23	2.89	0.28
Average	4.29		84	11.86	38.62	59.79	58.81	0.29	0.24	2.12	0.23
CV	7.34										

Table 5. RST Oats St. Paul, 2017 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/ac)		DM Yield (% Murphy)	2017 Quality Data CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
CDC Haymaker	6.23	a	104	10.91	32.69	52.93	63.43	0.40	0.18	2.02	0.21
CDC Seabiscuit	6.22	a	104	9.82	29.73	48.02	65.74	0.32	0.24	1.62	0.20
CDC Baler	6.19	a	104	10.27	34.97	54.45	61.66	0.36	0.15	1.90	0.18
Murphy	5.98	a	100	9.39	35.54	55.32	61.21	0.32	0.14	1.53	0.18
Waldern	5.84	ab	98	9.14	39.07	60.09	58.46	0.37	0.10	1.76	0.18
CDC SO-1	5.71	ab	95	9.66	31.89	50.95	64.06	0.30	0.17	1.76	0.19
AC Mustang	4.98	ab	83	8.86	36.82	56.89	60.22	0.46	0.13	1.97	0.22
AC Morgan	4.83	ab	81	8.94	33.50	52.38	62.80	0.39	0.17	2.00	0.19
AC Juniper	4.53	b	76	8.82	36.99	56.16	60.08	0.39	0.12	2.25	0.23
Average	5.61			9.53	34.58	54.13	61.96	0.37	0.16	1.87	0.20
CV	11.72										

Triticale

The triticale trials are targeted to be harvested at the late milk stage. There were 4 spring triticale varieties and 1 soft white wheat variety grown in the trials this year. The results of the Fort Kent and St. Paul trials can be found in table 6 and table 7, respectively. Average moisture content at the time of harvest at the Fort Kent site was 63% and at the St. Paul site was 50%.

Similar to the oat and barley trials, the triticale and soft wheat varieties yielded higher at the St. Paul site with an average of 6.61 ton/acre compared to an average yield of 4.79 ton/acre in Fort Kent. However, at each site, there were no significant differences in yield between the five varieties. At both sites, Taza was among the higher yielding varieties at 5.13 ton/acre in Fort Kent and 6.62 ton/acre in St. Paul.

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

Table 6. RST Triticale Fort Kent, 2017 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/ac)		DM Yield (% Taza)	2017 Quality Data CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
Taza	5.13	a	100	9.69	34.36	54.47	62.13	0.31	0.22	2.05	0.15
Sunray	4.88	a	95	7.92	35.29	54.47	61.41	0.25	0.20	1.79	0.16
Tyndal	4.79	a	93	10.68	34.56	56.90	61.98	0.26	0.26	1.76	0.16
Bunker	4.73	a	92	9.72	34.50	54.87	62.60	0.26	0.23	1.56	0.19
AAC Chiffon	4.40	a	86	9.53	39.21	60.26	58.36	0.22	0.24	2.27	0.16
Average	4.79			9.51	35.58	56.19	61.30	0.26	0.23	1.89	0.16
CV	6.85										

Table 7. RST Triticale St. Paul, 2017 (ton/acre, 1 ton = 2000 lbs).

				2017 Quality Data							
Variety	DM Yield (ton/ac)		DM Yield (% Taza)	CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
Bunker	6.86	a	104	11.03	32.98	51.23	63.21	0.24	0.21	1.34	0.15
Taza	6.62	a	100	10.61	32.93	52.60	63.25	0.20	0.23	1.40	0.13
Sunray	6.57	a	99	10.69	32.96	51.06	63.22	0.23	0.22	1.52	0.14
AAC Chiffon	6.56	a	99	10.15	34.21	52.99	62.25	0.24	0.24	1.97	0.16
Tyndal	6.44	a	97	10.72	32.88	51.78	63.29	0.21	0.23	1.40	0.13
Average	6.61			10.64	33.19	51.93	63.04	0.22	0.23	1.53	0.14
CV	6.85										

Look for province-wide results in the 2017 *Alberta Seed Guide*.

Regional Silage Trial – Pulse Mixtures

Partners: Alberta Agriculture and Forestry
SECAN
Chinook Applied Research Association
West-Central Forage Association
SARDA Crop Research
Battle River Research Organization

Objectives:

1. To determine which pea-cereal mixtures are a feasible option when compared to conventional cereal forage crops for whole-plant forage production, considering both yield and quality.

Background:

The most commonly utilized forage crops are typically monocultures of barley, oats or triticale. Despite this, there are other annuals available that could provide an alternative crop for forage production or to extend the grazing season. The use of corn has significantly increased in recent years as a method of extending the grazing season. The use of alternative annual crops can provide a break in disease from cereal production or as a break in perennial cropping rotation while still providing a forage crop.

The inclusion of peas into the production of an annual cereal crop can provide multiple benefits over the use of a monoculture crop. Fertilizer costs could be reduced due to the ability of peas to fix nitrogen which could also impact overall soil fertility. Peas have a high protein content and will therefore add protein to the overall forage quality.

Method:

The trial was established at the LARA Fort Kent Research Site (NE25-61-5-W4) on May 23, 2017 in a randomized complete block design (RCBD) with four replicates to reduce error. The plots were seeded with the LARA five-row zero-till small plot drill to a depth of 1.5 – 2" to try and reach an intermediate between cereal and pea recommendations. The peas were inoculated prior to seeding.

Cereal monocultures of CDC Baler oats, Taza triticale and CDC Austenson barley were established as check treatments for comparison to the pea/cereal mixtures. The trial was seeded with 9 treatments and each cereal variety was seeded in a mixture with CDC Leroy peas or CDC Meadow peas.

Agronomic information on the trial can be found in table 1. No in-crop herbicide applications were performed for weed control due to the mixture of broadleaf and grassy plants. Therefore, hand-weeding was done where necessary.

The LARA alfalfa-omega self-propelled forage harvester was used to harvest the plots at the recommended cereal harvest date + 10 days. The individual plot weights were recorded and samples were taken to assess dry matter content. An additional composite sample was taken from each variety, frozen and sent to A & L Canada Laboratories for wet chemistry analysis. Statistical analysis of the data was conducted using ARM 9, $p = 0.05$.

The following varieties were used in the pea/cereal trial in 2017:

- *CDC Austenson barley* - 2-row barley variety with semi-smooth awns, short and strong straw and high feed yield.
- *CDC Baler oats* - very leafy, forage oat variety.
- *Taza triticale* – reduced awn forage and grain triticale variety with good lodging resistance.
- *CDC Leroy peas* – high yielding field pea variety with excellent quality.
- *CDC Meadow peas* – consistently high yielding, competitive yellow field pea variety with good lodging resistance.

Table 1. RST Pea/Cereal Mixture Agronomic Information, 2017.

	Date	Date	Rain			
Site	**Seeded**	**Harvested**	**(mm)**	**Treatments**	**Seeding Rate**	**Fertility**
Fort Kent	23-May-17	18-Aug-17	231.4	Austenson	300 plants/m2	50 % of recommended rate*
				Baler	300 plants/m2	50 % of recommended rate*
				Taza	370 plants/m2	50 % of recommended rate*
				Austenson/Meadow	150 pl/m2, 57 pl/m2	50 lbs/acre of 11-52-0-0
				Baler/Meadow	150 pl/m2, 57 pl/m2	50 lbs/acre of 11-52-0-0
				Taza/Meadow	185 pl/m2, 57 pl/m2	50 lbs/acre of 11-52-0-0
				Austenson/Leroy	150 pl/m2, 57 pl/m2	50 lbs/acre of 11-52-0-0
				Baler/Leroy	150 pl/m2, 57 pl/m2	50 lbs/acre of 11-52-0-0
				Taza/Leroy	185 pl/m2, 57 pl/m2	50 lbs/acre of 11-52-0-0

* 137.5 lbs/acre

Results:

The aim is to harvest the pulse trials at the recommended cereal stage plus 10 days to try and account for the increased moisture content of the forage with the inclusion of peas. In previous years, the trial was harvested at the recommended cereal stage. However, the Forage Pea trials conducted by LARA for four years found that optimal yields and quality could be achieved if harvest was delayed by at least 10 days. The results of the pea-cereal trial are summarized in table 2 and historical data can be found in table 3.

In contrast to previous years, the mixture with barley (CDC Austenson) yielded higher than the monocultures and yielded the highest of the mixture treatments at 4.73 ton/acre. In previous years, the increased biomass typically seen in oat production caused the oat/pea mixtures to out-yield the barley/pea and triticale/pea mixtures. Second to the barley/pea mixture, the second highest yielding mixture was the Taza/CDC Leroy treatment at 3.76 ton/acre. Triticale is known for increased straw strength and reduced lodging, therefore, inclusion with a pea-cereal mixture could help with pea standability and overall ease of harvest. In general, the mixtures with CDC Leroy peas yielded higher than the mixtures with CDC Meadow peas.

The lowest yielding mixture was the Taza/CDC Meadow mixture at 3.19 ton/acre. Triticale tends to have lower leaf biomass production than both oats or barley, which could lead to reduced overall yields in the mixture treatments.

The inclusion of peas in a silage mixture can add up to 1.5% crude protein over cereal silage alone.

Table 2. RST Pea-Cereal Mixture Fort Kent, 2017 (ton/acre, 1 ton = 2000 lbs).

Variety	DM Yield (ton/ac)		DM Yield (% Austenson)	2017 Quality Data CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	M (%)
Austenson/ Meadow	4.73	a	101	16.02	32.76	48.55	63.38	0.67	0.31	1.68	0.30
Austenson	4.67	a	100	10.68	27.52	49.89	67.46	0.43	0.23	1.54	0.27
Baler	4.61	a	99	9.81	38.74	61.48	58.72	0.35	0.23	1.89	0.20
Taza	4.20	ab	90	10.76	35.10	54.85	61.56	0.26	0.28	1.59	0.15
Taza/ Leroy	3.76	ab	81	14.75	33.52	50.20	62.79	0.70	0.24	1.19	0.25
Baler/ Leroy	3.60	b	77	12.19	34.40	53.84	62.10	0.38	0.26	1.97	0.16
Austenon/ Leroy	3.56	b	76	18.15	36.64	53.69	60.36	0.87	0.33	2.13	0.35
Baler/ Meadow	3.49	b	75	11.45	33.95	56.57	62.45	0.32	0.25	1.52	0.18
Taza/ Meadow	3.19	b	68	13.27	33.05	53.49	63.15	0.39	0.31	1.38	0.21
Average	3.98			13.01	33.96	53.62	62.44	0.49	0.27	1.65	0.23
CV	11.78										

Winter Wheat for Forage Variety Trial

Partners: Rob Graf
Agriculture and Agri-Food Canada (AAFC)
MD of Bonnyville

Objectives:

1. To determine the potential of utilizing winter wheat for whole plant forage production in Northeastern Alberta when seeded in fall.
2. To determine the best yielding winter wheat variety for whole plant forage production in Northeastern Alberta.
3. To determine the best quality winter wheat variety for cattle feed in Northeastern Alberta.

Background:

Including winter cereals in your annual rotation can have multiple benefits, particularly in tough years when seeding and harvest are drawn out. Two of the most common types of winter cereals grown in Alberta are winter triticale and winter wheat. Winter cereals can be dual purpose for use as a grazing crop as well as a grain crop due to the need of these crops to go through a cold period before moving into a reproductive stage. Consequently, spring seeding a winter cereal, can be an excellent source of fall grazing and can then be harvested for grain the following summer.

The acres of winter wheat have remained steady over the years, with a large part of the concern for producers being the potential for winter kill in winters with cold temperatures and very little snow. To asses the suitability of winter wheat in the Lakeland area, LARA has been growing a winter wheat variety trial for forage production for the past two years.

According to the Western Winter Wheat Initiative (2014), the top ten reasons to include winter wheat in your crop rotation are:

11. High yield potential means increased returns per acre as compared to other cereal crops.
12. Avoids seeding problems on late, wet springs; earlier harvest than spring wheat.
13. Increases timeliness and profitability of the entire rotation.
14. Increases the effectiveness and efficiency of crop protection products.
15. Helps manage herbicide resistance.
16. Uses early moisture in dry areas more efficiently than spring cereals.
17. Provides soil cover during the fall and winter, reducing the potential for soil loss due to water and wind.
18. Spring moisture is not lost from seeding operation.
19. Matures earlier than spring cereals, spreading out harvest operations and reducing the potential for grade losses due to early frost.
20. Provides an ecological tool to help manage common pests in wheat such as most grassy weeds, orange blossom wheat midge and wheat stem sawfly.

Method:

The trial was seeded on August 29th, 2016 in a randomized complete block design (RCBD) with three replicates to reduce error at the LARA Fort Kent Research Farm (NE25-61-5-W4). The LARA Fabro five-row zero-till small plot drill was used for seeding to a depth of 1". The seed was sent pre-weighed from Agriculture and Agri-Food Canada and was treated. Individual plots measured 1.15 m by 6 m in area. Soil tests were taken prior to seeding and a blend fertilizer was side-banded at the time of seeding.

Plant counts to determine fall germination were done on September 28, 2016.

Results:

The varieties emerged well in the spring. However, due to the wet conditions experienced in May and June caused water to sit on the trial for an extended period of time. Consequently, the trial was drowned out and could not be harvested. Table 1 does illustrate the plant counts done in the fall of 2016 demonstrating emergence.

Table 1. Winter Wheat Plant Counts, 2016.

Variety	Fall Count (avg. plants/m)
CDC Chase	33
AAC Icefield	41
W526	32
AAC Wildfire	33
Radiant	33
W520	34
AAC Elevate	42
W522	34
CDC Buteo	35
AAC Gateway	50

Perennial Forage Project

Partners: Alberta Beef Producers
Alberta Agriculture and Forestry
Chinook Applied Research Association
Foothills Forage and Grazing Association
North Peace Applied Research Association
Gateway Research Organization
Battle River Research Group
West-Central Forage Association
Mackenzie Applied Research Association
SARDA Crop Research
Peace Country Beef and Forage Association

Objectives:

1. To provide unbiased, current and comprehensive regional data regarding the establishment, winter survival, yield and economics of specific species and varieties of perennial forage crops.
2. To identify perennial crop species/varieties that demonstrate superior establishment, hardiness, forage yield and nutritional quality characteristics in different eco-regions of Alberta.
3. To assess any benefits from growing mixtures of selected species.

Background:

Perennial forages include a diverse range of grasses and legumes that are utilized by livestock producers for a wide variety of purposes – from hay and greenfeed to summer pasture and winter grazing through stockpiled forage. They make up one of the largest sources of livestock feed on the prairies and the wide diversity in growth characteristics makes them ideal for many purposes.

According the Alberta Agriculture's Agriprofits Benchmaks, two thirds the cost of maintaining a cow comprising pasture, stored feed and bedding. Consequently, managing the perennial forage supply and having access to high quality and high yielding forage varieties is extremely important to producers.

Historically there has been a gap in perennial forage production knowledge in Alberta and, in particular, regionally specific variety information. There is significant variation in Alberta's ecoregions and varieties that developed and tested in one location or region will likely not perform the same in another region such as those experienced in Northeastern Alberta.

To held bridge this gap in perennial forage information, the perennial forage trial was developed to test cultivars that have been recently developed but have had limited regional evaluation to provide producers with valuable, region specific data. The province wide project data will be available to all producers in Alberta.

Method:

The trial was seeded as three blocks of plots: legumes, grasses and grass/legume mixtures at the LARA Fort Kent Research Site (NE25-61-5-W4) in a randomized complete block designs (RCBD) with four

replicates to reduce error. The legume and legume mixture trials were seeded on June 7, 2016 and the grass trial was seeded on June 2, 2016. Unfortunately, due to slow and patchy establishment, the grass and grass/legume trials were reseeded on June 19, 2017. Table 1 illustrates the forage varieties seeded in each trial.

Table 1. Perennial Forage Trial Varieties seeded, 2016-2017.

Grasses	Legumes	Grass/Legume Mixtures
Fleet Meadow Brome	20-10 Alfalfa	Fleet/Yellowhead
AC Admiral Hybrid Brome	44-44 Alfalfa	AC Knowles/Yellowhead
Success Hybrid Brome	Assalt ST Alfalfa	Success/Yellowhead
Knowles Hybrid Brome	Dalton Alfalfa	Fleet/Spredor 5
Greenleaf Pubsecent Wheatgrass	Halo Alfalfa	AC Knowles/Spredor 5
Kirk Crested Wheat Grass	PV Ultima Alfalfa	Success/Spredor 5
AC Saltlander Green Wheatgrass	Rangelander Alfalfa	Fleet/AC Mountainview
Tom Russian Wilde Rye	Rugged Alfalfa	AC Knowles/AC Mountainview
Killarney Orchard Grass	Spreder 4 Alfalfa	Success/AC Mountainview
Grinstad Timothy	Spredor 5 Alfalfa	
Fojtan Festulolium	Yellowhead Alfalfa	
Courtney Tall Fescue	AC Mountainview Sainfoin	
	Nova Sainfoin	
	Oxley 2 Cicer Milkvetch	
	Veldt Cicer Milkvetch	

Prior to seeding, soil tests were taken and a blend fertilizer was developed (30-22-10-12) and side-banded with the grass trial at seeding. Due to the nitrogen fixing ability of legumes, the legume and grass/legume trial was seeded with 50 lbs/ac of 11-52-0-0 side-banded at seeding. All legumes were inoculated prior to seeding and seeding took place with the LARA Fabro five-row zero-till small plot drill with 9” row spacing. Plots measured 1.15m x 6m in area.

To determine percent emergence and establishment, plant counts were conducted 7, 14 and 21 days after seeding as the number of plants in 3 separate ¼ m squared areas in each plot. Another count was taken 70 days after seeding.

No yield or quality data was taken on the trial in the year of establishment. Since the legume trial was established in 2016, yield and quality data were taken in 2017.

The seeding rates of each variety are shown in table 2.

Table 2. Perennial Forage Trial Seeding Rates, 2016-2017.

Species	Variety	Seeding Rate (lbs/ac)
Meadow Brome	AC Armada	14
	Fleet	14
Hybrid Brome	Success	12
	Knowles	12
Wheatgrasses		
Pubescent	Greenleaf	10
Crested	Kirk	6
Green	Saltlander	9
Russian Wildrye	Tom	8
Fojtan Festulolium		20
Orchard Grass	Killarney	10
Tall Fescue	Courtney	9
Tmothy	Grinstad	4
Alfalfa	AC Grazeland	8
	Dalton	8
	20-10	8
	Halo	8
	Rangelander	8
	Rugged	8
	Spredor 4	8
	Spredor 5	8
	Yellowhead	8
	PV Ultima	8
	44-44	8
Sainfoin	AC Mountainview	30
	Nova	30
Cicer Milk Vetch	Veldt	13
	Oxley 2	13

Results:

The emergence counts and plant count results for the legume, grass and grass/legume mixture trials can be found in table 3, table 4 and table 5, respectively. The higher moisture experienced in 2017 allowed for excellent establishment of the grass and grass/legume trials. However, excessive moisture sitting on the legume site resulting in plots 113 and 114 dying out (Nova Sainfoin and AC Mountainview Sainfoin).

To assess winter survival, plant counts were taken on the legume trial on June 26, 2017 and the results are illustrated in table 3. The alfalfa variety Assalt ST showed the greatest impact of winter on plant survivability with a 56% decrease in plant stand from August of 2016 to June of 2017. Rangelander alfalfa showed a 35% decrease in plant stand while Yellowhead alfalfa and Oxley Cicer Milkvetch only showed a 6% and 8% decrease, respectively. The rest of the varieties showed an increase from 2016 to 2017.

Historically sainfoin has shown poor survivability in central and northern climates, but showed an 18% increase for the new AC Mountainview and a 76% increase for the older variety Nova.

Table 3. Perennial Forage Project Legume Emergence and Plant Counts, 2016-2017.

Variety	Emergence Counts (plants per 1/4 m)			Plant Count	Plant Count	Change
	21-Jun-16	28-Jun-16	05-Jul-16	26-Aug-16	26-Jun-17	(%)
20 - 10	0.00	1.45	3.99	4.92	5.83	18
44 - 44	0.09	1.15	4.32	4.67	7.17	54
Assalt ST	0.00	0.65	2.68	4.58	2.00	-56
Dalton	0.00	0.33	3.09	4.67	5.50	18
Halo	0.00	0.69	4.44	5.33	6.50	22
PV Ultima	0.00	1.02	4.38	5.83	6.42	10
Rangelander	0.10	1.50	3.74	5.50	3.58	-35
Rugged	0.04	0.99	2.97	4.67	6.17	32
Spreder 4	0.00	0.68	3.48	4.83	5.92	23
Spredor 5	0.00	0.43	5.02	5.25	5.58	6
Yellowhead	0.00	1.07	3.57	5.92	5.58	-6
AC Mountainview	0.00	0.79	4.61	5.50	6.50	18
Nova	0.00	1.12	2.72	3.50	6.17	76
Oxley 2	0.00	1.03	3.86	4.33	4.00	-8
Veldt	0.00	0.54	4.15	4.75	5.67	19

The emergence counts of the grass and grass/legume mixture trial are illustrated in table3 and table 4, respectively.

Table 4. Perennial Forage Project Grasses Emergence Counts, 2017.

Variety	Emergence Counts (pls per 1/4 m)		
	Day 7	Day 14	Day 21
Fleet MB	0.00	8.41	7.50
AC Admiral HB	0.00	5.58	5.50
Success HB	0.00	9.00	6.75
Knowles HB	0.00	7.33	4.58
Greenleaf PWG	0.00	10.50	7.58
Kirk CWG	0.00	4.85	1.50
AC Saltlander GWG	0.00	8.41	6.83
Tom RWR	0.00	9.00	13.08
Killarney OG	0.00	15.83	10.25
Grinstad Tim.	0.00	15.92	15.33
Fojtan Festulolium	0.00	28.83	26.58
Courtney TF	0.00	13.00	10.33

Table 5. Perennial Forage Project Grass/Legume Emergence, 2017.

Treatment	Emergence Counts (plants per 1/4 m)					
	Day 7		Day 14		Day 21	
	Grasses	Legumes	Grasses	Legumes	Grasses	Legumes
Fleet MB/Yellowhead	0.00	0.00	3.08	3.17	5.83	2.08
AC Knowles/Yellowhead	0.00	0.00	2.67	3.33	3.75	3.50
Success HB/Yellowhead	0.00	0.00	4.58	4.00	4.67	3.42
Fleet MB/Spredor 5	0.00	0.00	4.67	2.67	4.50	2.50
AC Knowles MB/Spredor 5	0.00	0.00	3.67	2.08	3.42	3.75
Success HB/Spredor 5	0.00	0.00	3.75	3.17	3.58	3.17
Fleet MB/AC Mountainview	0.00	0.00	3.00	2.75	2.58	4.17
AC Knowles HB/AC Mountainview	0.00	0.00	4.16	1.66	2.58	3.08
Success HB/AC Mountainview	0.00	0.00	3.00	2.88	2.67	3.58

The legume trial was harvested on June 14, 2017 at an average moisture content of 76%. The yield and quality results can be found in table 6. The highest yielding variety in the trial was AC Rangelander alfalfa at 3.32 ton/acre followed closely by Dalton alfalfa at3.24 ton/acre. Overall, the alfalfa varieties yielded significantly higher than the Cicer Milkvetch varieties and the Sainfoin Varieties.

Table 6. Perennial Forage Legume Trial Yield and Quality Data, 2017.

Variety	DM Yield (ton/acre)		Height (cm)	Moisture (%)	2017 Quality Data							
					CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Rangelander	3.32	a	92	75	16.26	41.13	50.86	56.86	1.45	0.22	2.81	0.23
Dalton	3.24	a	87	74	14.55	44.42	54.09	54.30	1.20	0.18	2.13	0.17
44-44	3.13	ab	87	78	15.96	41.99	49.66	56.19	1.26	0.24	3.05	0.21
Yellowhead	3.11	ab	84	76	15.80	42.35	50.33	55.91	1.23	0.16	2.20	0.22
Spredor 5	3.09	ab	88	73	12.08	49.39	60.03	50.43	0.95	0.18	2.41	0.16
20 - 10	3.05	ab	83	75	18.85	41.45	49.65	56.61	1.10	0.25	2.92	0.19
Rugged	2.89	ab	88	74	15.16	44.69	56.23	54.09	1.12	0.20	2.61	0.18
Assalt ST	2.81	ab	95	78	14.21	48.39	57.66	51.20	0.99	0.13	2.02	0.14
PV Ultima	2.70	ab	86	76	17.51	38.83	46.45	58.65	1.60	0.16	2.18	0.21
Spreder 4	2.61	ab	91	74	17.85	40.45	48.08	57.39	1.34	0.21	2.28	0.19
Halo	2.46	abc	86	77	17.18	40.16	49.96	57.62	1.33	0.19	2.24	0.24
Oxley	2.25	bc	87	78	18.88	32.52	38.68	63.57	1.47	0.21	2.41	0.26
Veldt	1.82	cd	84	74	13.33	44.80	55.06	54.00	1.05	0.16	2.05	0.22
Nova	1.48	d	92	79	16.05	39.07	46.27	58.46	1.36	0.19	2.59	0.26
AC Mountainview	1.41	d	78	73	17.78	37.13	45.84	59.98	1.32	0.20	2.42	0.24
Average	2.62		87	76	16.10	41.78	50.59	56.35	1.25	0.19	2.42	0.21
CV	15.31											

The highest yielding Cicer Milk Vetch variety was Oxley at 2.25 ton/acre while Veldt yielded significantly lower at 1.82 ton/acre. Historically, use of Cicer Milk Vetch varieties in Alberta has been limited mainly because it can be difficult and slow to establish and has moderate productivity when compared to alfalfa. However, once established, the stand can last longer than those of alfalfa and it has a significant advantage in pasture due to its non-bloat characteristics.

Similar to the Cicer Milk Vetch, Sainfoin has also been minimally used in Alberta due to its historically poor establishment and longevity. However, recent research and the release of new varieties has slowly increased the number of acres seeded to sainfoin mixtures. It is considered a bloat-safe legume and is gaining in popularity for use in pastures to help mitigate the risks of bloat. The newly released sainfoin variety, AC Mountainview, did yield slightly lower than the more well-known Nova, although not significantly so.

High Legume Pasture Project

Partners: Gordon Graves
Alberta Agriculture and Forestry
Agricultural Research and Extension Council of Alberta
Chinook Applied Research Association
Foothills Forage Association
West-Central Forage Association
Mackenzie Applied Research Association
Gateway Research Organization
Grey-Wooded Forage Association
Peace Country Beef and Forage Association
Battle River Research Group
North Peace Applied Research Association
Farming Smarter
PFRA of BC

Objectives:

1. To determine establishment and longevity of high legume pasture stands.
2. To explore increased productivity, increased forage quality, drought aversion and nitrogen fixing benefits within a high legume stand.
3. To determine high legume pasture stands performance under grazing pressure.
4. To assess bloat mitigation potential of sainfoin in pasture stands.

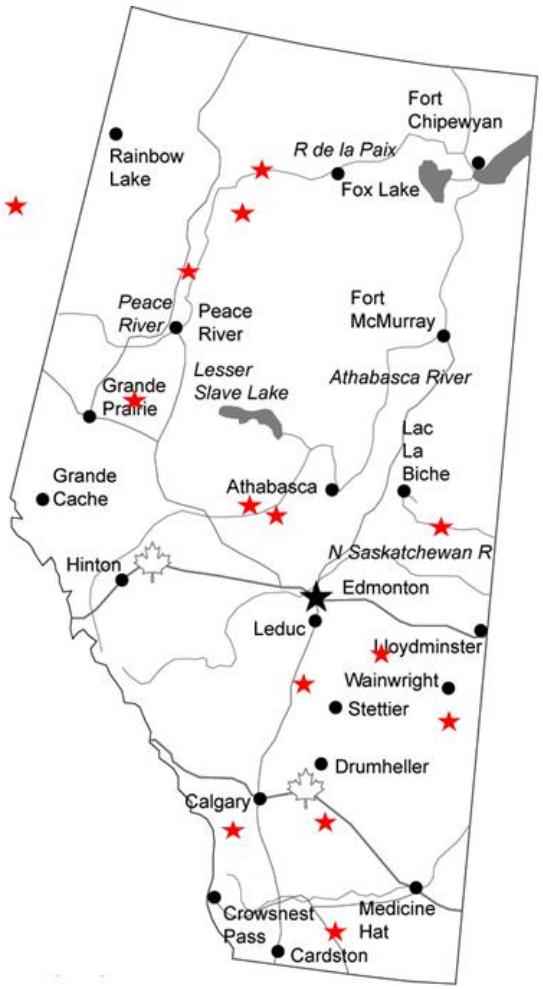
Background:

It is well known that the inclusion of legume crops improves the protein content and digestibility of your forage stand resulting in improved overall quality of livestock feed whether utilized as hay, silage or pasture. However, livestock producers often shy away from high legume pastures due to the risk of bloat in ruminant. To help minimize this risk, there are multiple alternative legume varieties that are considered to be bloat-safe, one of which is sainfoin.

Sainfoin contains condensed tannins which are a compound in the plant that attaches themselves to the bloat-inducing proteins in alfalfa, thus helping to eliminate the potential for bloat. The new sinafoin variety, AC Mountainview, that has been developed at the Lethbridge Research centre is proving to be competitive in forage stands and has higher regrowth than previous varieties, allowing it to regrow at the same rate as alfalfa. Livestock producers could now use AC Mountainview as a natural bloat control and graze higher legume pastures confidently.

To test the new AC Mountainview Sainfoin variety in an applied research setting, 9 of the Agricultural Research and Extension Council's member associations teamed up with Alberta Agriculture and Forestry. Fourteen demonstrations sites were established with a 60% AC Mountainview/Alfalfa and 40% grass mixture across the province and one site in the BC Peace (figure 1).

The goal of this project is to provide farmers with the knowledge necessary to establish a high legume pasture (60+ legumes) and then graze that pasture effectively the year after establishment. High legume pastures have a greater capacity to withstand drought conditions and can be extremely productive, meaning producers could keep livestock on pasture for longer while maintaining good gains.



- Foothills Forage and Grazing Association: Longview
- Foothills Forage and Grazing Association: Gleichen
- MacKenzie Applied Research Association: Fort Vermillion
- Mackenzie Applied Research Association: Buffalo Head Prairie
- Gateway Research Organization: Tiger Lily
- West-Central Forage Association: Camp Creek
- Grey-Wooded Forage Association: Lacombe
- Lakeland Agricultural Research Association: Iron River
- Chinook Applied Research Association: Consort
- Peace Country Beef and Forage Association: Bezanson
- Battle River Research Group: Holden
- North Peace Applied Research Association: Manning
- PFRA of BC: Poucecoupe, BC
- Farming Smarter: Lethbridge

Figure 1. High Legume Pasture Project and Demonstration Site Locations, 2016.

Method:

The trial was seeded on June 8, 2016 to an area of 9.3 acre near Iron River, Alberta (NW34-63-7-W4). Prior to seeding the site was sprayed with Glyphosate on June 1, 2016 at a rate of 0.7 L per acre for control of perennial and annual weeds. Weeds identified at the time of spraying included Foxtail barley, Flixweed, Storks Bill and Canada Thistle. The seedbed was prepared firm with zero-tillage for optimal seed to soil contact.

Seeding was done with an Air Disk Drill with Barton Openers to a depth of 0.5 to 0.75 inches and 15-20-15-10 fertilizer was applied in the seed row at seeding. Due to the ability of legumes to fix nitrogen,

application of high amounts of nitrogen fertilizers can impede legume establishment and overall stand production. AC Mountainview sainfoin and AC Grazeland alfalfa were seeded first and hybrid bromegrass (6 lbs/acre) was seeded after at a 90-degree angle to the legumes.

Dry conditions experienced at the site (20 mm of rain in June) caused germination and establishment to be slow. On June 25, 2015, the field was sprayed with Matador for control of grasshoppers. A cover crop of Cerise Red Proso Millet was seeded on June 27, 2016 at 15 lbs/acre with the Air Disk Drill. No additional fertilizer was applied at seeding.

To determine germination and stand establishment, plant counts were conducted on August 30, 2016 to an area of ¼ m squared at 10 locations throughout the field.

In contrast to 2016, the wet conditions in the spring and summer of 2017 prevented additional touch-up seeding to be done to the pasture. However, an additional 2-acre section was seeded adjacent to the 9.3 acres seeded in 2016 and establishment was good with the high moisture.

Results:

The results of germination and establishment counts are summarized in table 1. Unfortunately, due to dry conditions experienced throughout the growing season, establishment was slow and patchy, with the final counts indicating a poor plant stand. Touch-up seeding will be conducted in the early spring after snow melt to fill in the stand.

In many perennial forage stands, complete germination does not occur in the year of establishment, but many producers find that growth continues into year two as more seeds germinate.

Table 1. Higher Legume Pasture Plant Counts Iron River, 2016.

Toss	Sainfoin (plants per 1/4 m2)	Alfalfa (plants per 1/4 m2)	Grass (plants per 1/4 m2)
1	0	4	1
2	1	3	0
3	1	0	0
4	3	0	0
5	1	0	0
6	2	0	0
7	0	0	0
8	1	1	1
9	2	2	1
10	1	2	0
Average	1.2	1.2	0.3

Demonstration Project:

Cover Crops for Livestock Feed

Partners: Union Forage
Smoky Lake County

Objectives:

3. To assess the growth and establishment of various cocktail cover crop mixtures in Northeastern Alberta.
4. To assess the yield and quality of various cocktail crop mixtures in Northeastern Alberta.

Background:

Cocktail cover crops have been gaining in popularity in recent years, with the acres seeded in Alberta slowly increasing. These crops can be an important tool for producers to generate benefits on farm such as improved soil health, weed suppression, insect management and forage production for livestock feed.

Producers have many different options to choose from when it comes to cocktail cover crop species and each species has different abilities to provide depending on root and plant structure and physiology. Each operation is different and, depending on the desired results of the mixture, cocktail cover crops can be from 5 or 7 to over 15 different species or varieties.

Due to the high nutritional content of many species that are included in cocktail cover crop mixtures, such as brassicas and legumes, it is recommended to seed such species with a cereal crop such as oats or barley to balance out the ration. Recommendations are that brasssica species should not comprise more than 50% of the cattle's feed intake.

Cocktail cover crops can be seeded at various times of the year depending on the required end us. Many brassica species will hold quality late into the fall and early winter, making them an ideal method of extending the grazing season. In these cases, later spring seeding is recommended.

Method:

The demonstration was seeded in five blocks, side-by-side, in Smoky Lake County (NE6-58-13-W4) in early June. Prior to seeding, soil tests were taken and a blend fertilizer was side-banded at the time of seeding (33-5-6-5 @ 175.2 lbs/acre).

The species composition of each cocktail mixture is illustrated in table 1. Due to the high quality of the species included in the mixtures, it is recommended to seed a cereal crop at least 50% of recommended rate. Therefore, each mixture was seeded with CDC SO-1 oats at 50% of recommended rates. Seeding was done with the LARA five-row Fabro no-till drill with 9" row spacing to a depth of 0.5-1".

Prior to harvesting of the demonstration, forage yield samples were taken, weighed and dried to determine dry matter (DM) yield. An additional sample was collected, frozen and sent to A & L Laboratories for wet chemistry analysis.

Table 1. Cover crop cocktail mixtures species composition, 2017.

Cocktial Mixture 1	Cocktail Mixture 2	Cocktail Mixture 3
Union Forage Relay Mixture	**Union Forage Ultimate Blend**	**Union Forage Break Crop**
60% Italian Ry Grass	30% Hairy Vetch	50% Italian Rye Grass
20% Hairy Vetch	25% Italian Rye Grass	25% Crimson Clover
10% Hunter	15% Sorghum	25% Hairy Vetch
10% Winfred	10% Crimson Clover	
	10% Winfred	
	5% Hunter	
	5% Graza	

Results and Discussion:

The DM yield data results are illustrated in table 2. The mixture by Barenburg was the highest yielding treatment in the demonstration at 3.16 ton/acre followed closely by the Union Forage Relay mixture at 2.87 ton/acre. This could be due to the increased moisture content in some of the mixtures above the standard 65%. The pinpoint mixture was at 61% moisture at the time of harvest while the other mixtures were all over 65% moisture at harvest. The Union Forage Break Crop Mixture was the lowest yield at 1.96 ton/acre.

In 2016, a similar demonstration was established at the LARA Fort Kent Research Site (NE25-51-5-W4) and the yield results are illustrated in table 2 as a comparison of the mixtures that were grown in both years. Yields of the Union Forage Relay Mixture and the Union Forage Ultimate Blend were slightly higher at the Fort Kent site in 2016, which could be a result of differing soil composition and weather conditions during the growing season. Total rainfall at the Fort Kent site in 2016 was 139.7 mm while the total rainfall at the Smoky Lake site in 2017 was 212.7 mm through the growing season.

Table 2. Cover crop cocktail mixtures yield data, 2017.

Cocktail Mixture	DM Yield (ton/acre) 2017	DM Yield (ton/acre) 2016
Union Forage Break Crop	1.96	
Union Forage Relay	2.87	3.30
Union Forage Ultimate	2.55	2.64
Pinpoint by Barenburg	3.16	

The quality results of the demonstration are illustrated in table 3. All of the mixtures are adequate to meet the nutritional requirements of beef cows during gestation and after calving.

When considering protein content (CP), the general rule of thumb is 7% in mid-gestation, 9% in late gestation and 11% after calving. Union Forage Break Crop had the highest CP content at 16.08, while Union Forage Ultimate had the lowest at 11.54%.

The total digestible nutrients (TDN) represent the digestible portion of the feed and is the easiest way to estimate energy content. Energy is the most limiting nutrient but is also commonly the most underfed in livestock rations in Alberta. If energy content is limiting, animals will not put any towards growth and reproduction but will be utilizing all energy for maintenance (body functions, movement). The general rule of thumb is 55% in mid-pregnancy, 60% in late pregnancy and 65% after calving. The Union Forage Relay Mixture, Union Forage Ultimate Blend and Pinpoint by Barenburg are adequate to meet energy

requirements of gestating and lactating cattle. However, the Union Forage Break Crop has an estimated energy content adequate to meeting requirements during gestation at 62.2% but an energy supplement will need to be provided after calving.

Table 3. Cover crop cocktail mixture quality data, 2017.

Demo	CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Union Forage Break Crop	16.08	34.28	47.43	62.20	1.30	0.22	2.07	0.26
Union Forage Relay	14.15	25.93	34.96	68.70	1.85	0.24	3.43	0.26
Union Forage Ultimate	11.54	30.90	47.42	64.83	0.60	0.18	2.12	0.17
Pinpoint by Barenburg	13.87	26.37	40.68	68.36	1.64	0.20	2.02	0.29

Neutral Detergent Fibre (NDF) and Acid Detergent Fibre (ADF) are a measure of the fibre content of the feed. It is recommended that NDF does not exceed 59% as increased values will restrict feed intake. The ADF levels in the mixtures are also within acceptable levels of 28-38% for leguminous feeds.

The mineral content of a feed is often overlooked but is a very important part of a feed test to assess as over or under feeding a mineral can lead to significant health and reproductive issues in livestock. With the increased quality of many of the legumes and brassicas that are included in cocktail mixtures, Calcium (Ca) content tends to be closer to that seen in perennial forage mixtures with Phosphorous (P) also mimicking perennial forages for hay and pasture. The rule of thumb is that the Ca:P ration should be at least 2:1 as increased P can interfere with Ca absorption which can lead to significant issue in gestating and lactating cattle due to their high Ca requirements.

Crimson Clover

- Cool Season
- Nitrogen Fixing (legume)
- Shallow taproot
- Sensitive to grazing
- Fair regrowth after grazing or cutting
- 4 seeds/ft2

Hairy Vetch

- Cool season
- Nitrogen fixing (legume)
- Taproot
- Resistant to glyphosate
- Good regrowth after grazing
- 4 seeds/ft2

Forage Brassica

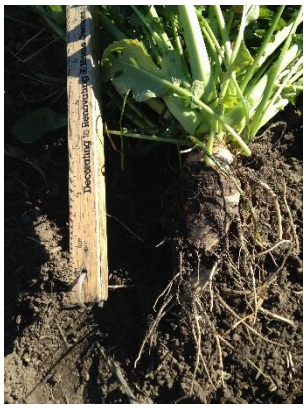
- Cool season
- Nutrient scavenger
- Breaks compaction
- Good regrowth after grazing
- Excellent extended grazing
- 2-4 lbs/ac

Italian Rye Grass

- Cool season
- Bunch grass
- Excellent tolerance to grazing
- Very competitive
- 10-20 lbs/ac

Grazing Radish

- Fast growing
- Drought tolerance
- Rapid regrowth after use
- See at 2-7 lbs/ac



Forage Turnip

- Quick growing leafy
- Minimal blub development
- Multiple grazing through summer
- Excellent regrowth
- 104 lbs/ac

Demonstrations:

Corn Varieties for Cattle Grazing

Partners: Brett Young
DuPont Pioneer
MD of Bonnyville
Evan Chalut

Objectives:

5. To assess the growth and establishment of various forage corn varieties for use as livestock feed in Northeastern Alberta.
6. To assess the yield and quality of various forage corn varieties for use as livestock feed in Northeastern Alberta.

Background:

The single most variable cost in beef production is feed, so it makes sense to experiment with different feeding strategies that could help reduce costs – one of these being extending the grazing season. Extensive systems include stockpiles forages, swath grazing, bale grazing and, more recently, standing corn.

Previous research done at the Western Beef Development Centre has shown that the nutritive value of corn is adequate to meet beef cow requirements and the reduced nutrient content of the leaves/stems later in the season is countered by the high value of the cobs produced. If access is limited through the use of grazing tools such as fencing, cows will consume both the cobs and the leaves/stems. In higher snowfall years, cattle can be turned back into the pasture in the spring to clean up any remaining material.

The agronomics of growing corn for winter grazing is a primary factor in determining yield and grazing days. Although soil temperature, seeding date, fertility and seeding depth will impact emergence and establishment, corn significantly lacks competitiveness with weeds as well as itself. Consequently, row spacing can play an important role in overall yield. Similarly, timing of spraying also has a significant impact on yield as high weed pressure leads to reduced plant vigor and poor or late cob development.

The interest in grazing corn has significantly increased over the last 10 years, with the acres seeded to corn in the Lakeland close to doubling. Lakeland Agricultural Research Association has been growing corn demonstrations over the past five years assessing production agronomics, growth, yield and quality.

Method:

The corn varieties were seeded in blocks side-by-side at the LARA Fort Kent Research Site (NE25-51-5-W4) on May 31, 2017 utilizing a corn planter with 30” row spacing. Prior to seeding, soil tests were taken and a blend fertilizer of 33-5-6-5 was broadcasted at 150 lbs/acre and incorporated via harrowing. All varieties were round-up ready so the trial was sprayed with glyphosate at the 3-5 leaf stage utilizing a three-point hitch sprayer and volunteer canola was hand weeded once during the growing season.

Prior to harvest, cob samples were taken and rated for maturity. The plots were harvested on October 4, 2017 by hand and, at the time of harvest, forage samples were taken, run through a wood chipper to reduce particle size, frozen and sent to A & L Laboratories for wet chemistry analysis.

The five varieties included in the demonstration and their varying corn heat units (CHU) are listed below:

- Fusion RR (2000-2300 CHU)
- P7005 AM (2000 CHU)
- 39F44 (2000 CHU)
- P7527 AM (2150 CHU)
- 39B90 (2200 CHU)

Quality samples will continue to be taken in January, February and March of 2018 to assess quality throughout the winter grazing season of the five varieties.

Results and Discussion:

The yield and quality results are illustrated in table 1. The highest yielding variety was Fusion RR from Brett Young Seeds at 7.65 ton/acre followed by P7527 AM at 6.35 ton/acre. The average yield of the corn varieties was 5.60 ton/acre and the lowest yielding variety was 39B90 at 3.50 ton/acre.

When considering quality, crude protein (CP) tends to be lower in corn while energy, illustrated as total digestible nutrients (TDN), tends to be higher depending on cob development. According to the general rule of thumb for CP of 7% in mid-gestation, 9% in late gestation and 11% after calving, the majority of the varieties are adequate to meet the CP requirements during gestation with the exception of 39F44 where a protein supplement will be needed after mid-gestation. The only variety that can adequately meet CP requirements after calving is P7527 AM at 10.40%.

Table 1. Yield and Quality of Corn Varieties, 2017.

		2017 Corn Quality							
Variety	Yield ton/acre)	CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Fusion	7.65	8.17	27.06	49.29	66.81	0.28	0.18	1.18	0.18
P7005 AM	5.55	9.78	23.29	42.74	72.40	0.36	0.21	1.12	0.2
39F44	4.95	7.08	29.88	54.94	63.16	0.29	0.16	1.28	0.16
P7527 AM	6.35	10.40	24.67	44.65	69.53	0.34	0.19	1.01	0.2
39B90	3.50	9.28	26.48	49.22	65.26	0.31	0.29	1.17	0.17
Average:	**5.60**	**8.94**	**26.28**	**48.17**	**67.43**	**0.32**	**0.21**	**1.15**	**0.18**

Total Digestible Nutrients is the easiest method of estimating energy in a feed and, as expected, the high energy content of the developed cobs significantly increases the energy content of corn over that of other forages utilized for grazing. Based on the energy rules of thumb of 55% in mid-gestation, 60% in late gestation and 65% after calving, the energy content of all of the varieties are adequate to meeting the requirements of gestating and lactating cattle.

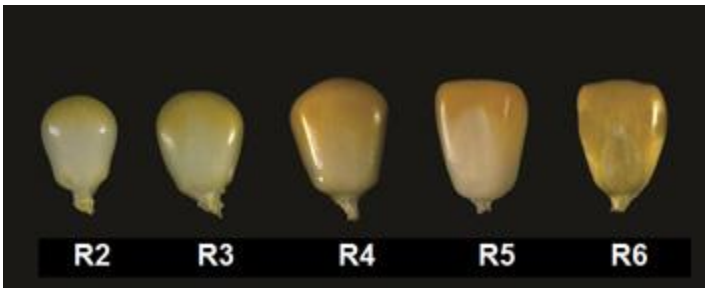
Corn is known to be low in Calcium (Ca) with an average content of 0.32%. The Ca:P ratio should be at least 2:1 as increased Phosphorous (P) can interfere with proper Ca absorption and utilization. Consequently, with an average P content of 0.21, a mineral supplement will be necessary to ensure adequate ratios are available.

Overall, the majority of the varieties are adequate to meet beef cow nutrient requirements during gestation. However, utilizing the variety 39F44 will require protein supplements after mid-gestation and energy supplements after calving to ensure beef cattle requirements are met.

Prior to harvest on October 4, 2017, cob samples were taken to estimate maturity and compare between the varieties. The maturity method used is illustrated below and in figure 1:

- R1 – silks visible outside the husks.
- R2 – kernels are white outside, clear liquid inside.
- R3 – kernel yellow outside, milky white fluid inside.
- R4 – kernel fluid thick/pasty, cob pink or red.
- R5 – most kernels at least partially dented.
- R6 – milk line no longer evident, black layer formed.

Figure 1. Photographic explanation of corn maturity rating scale.



(https://www.pioneer.com/home/site/us/agronomy/library/staging-corn-growth/)

The results of the rating are listed in table 2. Prior to maturity ratings, a cob count was done in each variety and showed an average of 2 cobs per plant in each variety, although the cobs were at varying levels of maturity.

Table 2. Cob and Maturity Rating of Corn Varieties, 2017.

	Number	Cob	Yield
Variety	Cobs/plant	Maturity	ton/acre
Fusion	2	R3	7.65
P7005AM	2	R5	5.55
39F44	2	R4	4.95
P7527AM	2	R3	6.35
39B90	2	R5	3.5

Figure 2. Variations in cob development on October 4, 2017.

Figure 3. Variations in cob development on October 4, 2017.

Demonstrations:
Perennial Forage Establishment

Partners: Performance Seed
MD of Bonnyville

Objectives:

7. To assess the growth and establishment of various perennial forage in monoculture and in mixture in Northeastern Alberta

Background:

Perennial forages make up the largest portion of beef cattle diets in Alberta from hay and greenfeed to summer pasture and winter grazing through stockpiled forages. The wide diversity in perennial forages makes them an ideal feed source for livestock. However, there has historically been a gap in perennial forage knowledge available to producers, particularly on a regional basis.

In 2016, the perennial forage project was started at over 10 locations across the province to help bridge that information gap. To further investigate and provide regional based information to producers, LARA established the Perennial Forage demonstration in 2017 to assess the establishment, growth, yield and quality of additional forage varieties not included in the perennial forage project.

Method:

The demonstration was seeded on June 7, 2017 in 16 blocks measuring 2.5 m by 7.5 m in area at the Fort Kent Research Site (NE25-61-5-W4) utilizing the LARA five-row zero-till small plot drill. Seeding rates varied from 7 lbs/acre to 20 lbs/acre depending on species and were seeded to a depth of 0.25" to 0.5". Prior to seeding, a soil test was taken and a blend fertilizer was developed. All legume plots received 50 lbs/acre of 11-52-0-0 and the grass plots received 128.9 lbs/acre of 33-5-6-5 side banded at seeding.

Plant heights, stand counts and day to flower/heading were recorded for all treatments with the exception of the pollinator mixture.

The trial was hand weeded once during the growing season. No yield and quality data was taken from the demonstration during the year of establishment, but will be taken in 2018 when the trial is harvested.

The following varieties and mixtures were seeded in the demonstration:

- *Fusion Alfalfa* – high yielding alfalfa variety adapted to northern and central climates.
- *Megan Alfalfa* – high, yielding alfalfa variety adapted to northern and central climates.
- *Compass Alfalfa* – elite alfalfa variety providing a great combination, yield and quality. High winter survival and disease resistance and great longevity.
- *Fixation Berseem Clover* – non-bloat, high quality annual legume that has superior nitrogen-fixing capacity with its deep tap root.
- *Frosty Berseem Clover* – non-bloat, high quality annual legume that has exceptional cold tolerance when temperatures dip below freezing.
- *Legumax Mixture* – 45% sainfoin, 20% Cicer Milk Vetch, 15% Berseem Clover, 5% alfalfa.
- *Cowgirl Tall Fescue* – versatile forage grass that is suitable as either pasture or hay production. Tolerant to arid or flooded zones as well as high salt levels.

- *HQL Orchard Grass* – high quality, very fast regrowth and yield potential make this orchard grass an excellent addition to intensive forage systems.
- *York Smooth Brome* – tall, elevated growth makes it an excellent companion in a hay system. Very persistent species with good drought tolerance.
- *Meroa Rye Grass* – late maturing, high yielding Italian rye grass. Excellent forage quality and winter hardiness.
- *Festulolium* – Meadow fescue crossed with Italian Rye Grass, this Festulolium has the nutritive, palatability and digestive qualities of Rye Grass while maintaining the durability and resistance of Meadow fescue.
- *Performa HQ* – 50% soft leaf tall fescue, 30% pardus meadow fescue, 20% HQL orchard grass.
- *Versamax Mixture* – 40% meadow brome, 20% tall fescue, 15% intermediate wheat grass, 15% smooth brome, 10% slender wheat grass.
- *Pollinator Mixture* – blend of annual and perennial forage species well suited as a pollinator habitat.

Results and Discussion:

The plant counts, heights and days to heading/flower for the legumes and grasses are illustrated in table 1 and table 2, respectively. The Fixation Berseem Clover was the first of the legumes to flower 49 days after seeding while the legumax mixture was the last treatment to flower at 63 days after seeding. This could have been due to interactions between the various varieties in the mixture delaying flowering.

Table 1. Legume Demonstration Data, 2017.

Legumes	Height (cm)	Stand (plants/m)	Days to Flower
Fusion Alfalfa	62	26	56
Megan Alfalfa	55	19	55
Compass Alfalfa	59	18	59
Fixation Berseem Clover	60	19	49
Frosty Clover	69	19	53
Legumax	73	22	63

Cowgirl tall fescue was the first grass species/mixture for the heads to emerge at 50 days after seeding.

Table 2. Grasses Demonstration Data, 2017.

Grasses	Height (cm)	Stand (plants/m)	Days to Heading
Cowgirl Tall Fescue	43	26	50
HQL Orchard Grass	65	32	52
York Smooth Brome	28	7	63
Meroa Rye Grass	79	31	N/A
Festulolium	59	33	66
Performa HQ	63	19	52
Versamax	43	12	55

Forage Crop Quality Summary – 2017

The single largest variable cost in maintaining a cow herd is feed. Understanding cow nutrient requirements and ration balancing can help to reduce costs associated with over and under feeding (tables 1 and 2). Previous studies estimate that feeding a balanced ration can save as much as $0.25/hd/day. Consequently, feed tests are critical to ensuring that rations are based on the actual feed being fed.

This year was an interesting and frustrating year for making good quality feed for overwinter your cattle. The wet weather extended the haying season and caused the majority of hay available to have at least one rain shower.

Every year LARA sends in multiple feed samples for quality analysis on our trials and demonstrations. In addition, we offer two free feed tests for each producer in our operational area and results from those tests are also included this summary in table 3. Feed analysis from the LARA plots represent crop cut for forage use.

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

Table 1. Forage intake guidelines (as percent of body weight).*

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

* as taken from CowBytes

Table 2. Minimum Energy and Crude Protein Requirements for Beef Cattle.

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

Table 3. Quality Analysis Summary, 2017.

Annual Forages	CP (%)	ADF (%)	NDF (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Barley - Fort Kent	12.19	33.54	56.36	62.77	0.45	0.23	1.57	0.22
Barley - St. Paul	9.69	32.88	50.88	64.95	0.41	0.19	1.75	0.15
Oats - Fort Kent	11.86	38.62	59.79	58.81	0.29	0.24	2.12	0.23
Oats -St. Paul	9.53	34.58	54.13	61.96	0.37	0.16	1.87	0.20
Oats - Ardmore	10.37	29.43	49.44	65.97	0.20	0.30	1.31	0.18
Triticale - Fort Kent	9.51	35.58	56.19	61.30	0.26	0.23	1.89	0.16
Triticale - St. Paul	10.64	33.19	51.93	63.04	0.22	0.23	1.53	0.14
Pea/Cereal – Fort Kent	13.01	33.96	53.62	62.44	0.49	0.27	1.65	0.23
Corn – Smoky Lake	7.25	33.66	52.46	67.46	0.23	0.14	0.67	0.17
Corn – Smoky Lake	6.64	41.04	62.07	62.81	0.22	0.20	0.81	0.17
Corn – Smoky Lake	8.06	33.58	51.22	70.86	0.24	0.19	0.69	0.16
Corn – St. Paul	8.51	34.91	54.64	66.15	0.23	0.16	0.67	0.17
Barley Silage – Ardmore	16.21	26.91	42.18	67.48	0.57	0.28	1.90	0.29
Barley Straw - Ardmore	9.12	39.75	61.49	57.93	0.28	0.19	0.32	0.11
Oat Greenfeed – Smoky Lake	9.71	38.58	57.37	58.65	0.35	0.22	1.80	0.19
Perennial Forages								
Grass Hay – St. Lina	11.28	37.15	55.13	62.68	0.76	0.27	1.98	0.20
Mixed Hay – Cold Lake	5.14	33.42	51.61	62.87	0.22	0.14	1.89	0.29
Mixed Hay – Lac La Biche	12.47	47.78	59.60	47.78	0.74	0.15	1.10	0.20
Mixed Hay - Ardmore	10.56	40.92	65.59	56.74	0.65	0.18	1.57	0.18
Mixed Hay – Ardmore	12.28	42.25	59.92	53.79	0.86	0.25	1.70	0.21
Mixed Hay – Cold Lake	9.72	49.00	66.56	51.00	0.76	0.21	1.56	0.20
Mixed Hay - La Corey	9.81	46.80	72.37	46.12	0.42	0.13	1.16	0.05
Mixed Hay – Cold Lake	12.19	39.25	56.79	55.25	1.16	0.24	1.83	0.22
Grass Hay – St. Lina	7.96	30.88	52.91	64.84	0.21	0.29	1.90	0.14
Grass Hay – Lac La Biche	10.83	41.59	53.08	56.07	0.84	0.18	1.76	0.19
Grass Hay – Lac La Biche	8.95	40.46	59.59	58.04	0.71	0.22	1.82	0.18
Mixed Hay - Bonnyville	12.03	42.94	59.27	56.87	0.73	0.24	1.75	0.18
Mixed Hay – Rich Lake	11.43	44.60	61.80	55.81	1.12	0.23	1.44	0.31
Mixed Hay – Goodridge	7.94	47.49	64.82	58.52	0.89	0.21	1.44	0.31
Mixed Hay – Smoky Lake	9.16	39.97	57.76	54.88	0.95	0.27	1.30	0.18
Mixed Hay – St. Paul	7.28	35.08	55.34	63.89	0.94	0.20	1.24	0.04
Mixed Hay – St. Paul	6.49	37.51	56.06	59.81	1.02	0.16	0.93	0.02
Mixed Hay – St. Paul	7.17	30.82	46.86	53.03	0.95	0.14	0.95	0.03
Grass Hay - Ardmore	9.16	36.08	57.553	57.52	0.63	0.24	1.74	0.22
Mixed Hay - Ardmore	13.66	34.83	48.34	56.20	1.08	0.28	1.99	0.27
Mixed Hay - Ardmore	10.32	41.88	66.97	56.28	0.55	0.16	1.56	0.10
Mixed Hay - Bonnyville	12.71	46.45	60.42	49.70	0.68	0.18	1.26	0.19

Environment and Extension

2017 Lakeland Agricultural Research Association Extension Activities

Cattlemen's Clinics
On January 17 in Smoky Lake and January 18 in Flat Lake LARA hosted cattlemen's clinics. The days covered several topics including: winter feeding programs; Lakeland corn quality results; Verified Beef Production Plus Program; and cattle market updates. Forty-six producers attended between the two dates.

Local 4-H Presentation
Alyssa Krone presented to the Ardmore 4-H Beef Club on January 10th, 2017 on feed sampling techniques and ration balancing for livestock.

Winter Watering Systems Tour
On January 24th twenty-eight producers attended the winter watering systems tour in Goodridge. Several systems were looked at as well as tips on how to set up your own systems were covered.

Cattle Marketing Workshop
On February 7th at Eastbourne Community Hall 36 producers attended the cattle marketing workshop. The day included: feeder cattle marketing tips; how to buy/sell your cattle on a secure transactional platform; marketing calves as Express Verified with guarantee to feedlot operations BVD free calves though CCIA; and LongRange dewormer for cattle on pasture. Special guests included speakers from AgriClear, Boehringer Ingelheim and Merial.

Septic Sense
On February 2, 2017 Septic Sense: Solutions for Rural Living; understanding and taking care of your septic system was held at the Bonnyville Centennial Centre. Twenty-three people attended to learn about septic systems.

Moose Lake Watershed Society Annual Meeting
On February 7, 2017 thirty-three people attended the Moose Lake Watershed Society Annual Meeting to discuss water concerns, current conditions and what the Society had accomplished. A special presentation by the Alberta Lake Management Society was given to discuss the individual bay sampling results and LakeWatch program.

Farmer Appreciation Night
On February 10, 2017 LARA hosted a Farmer Appreciation Night for area producers. The event was held at the Glendon RCMP hall with supper followed by entertainment by The Wardens. There were 302 producers who attended the evening.

Transition Planning Workshops
LARA supported the Transition Planning Workshops for Farm and Ranch Families on January 16 and February 13 in Vermillion.

4-H Speaking Competition
On February 12, 2017 Kellie Nichiporik served as a judge for the 4-H Speaking Competition in Bonnyville for the local club.

Managing Cropping Challenges of 2016
On February 8th, LARA in partnership with Crop Production Services Smoky Lake hosted a "Let's Talk" workshop on managing cropping challenges of 2016 in Smoky Lake. The workshop featured Murray Hartman and Clair Langlois from Alberta Agriculture and Forestry to discuss exploring options for unharvested crops, identifying market options for crops with high moisture content, planning and preparing for the season ahead and understanding changes to Canadian wheat classes. Twenty-four producers attended.

Seeding for Success Presentation
Alyssa Krone presented at the St. Paul Municipal Seed Cleaning Plants annual Seeding for Success event on February 22, 2017 at the St. Paul Recreation Facility. The presentation focused on L.A.R.A.'s current research and extension activities and results. The event saw over twenty attendees.

Local 4-H Presentation
Alyssa Krone presented to the Beaver River 4-H Beef Club on February 27, 2017 on proper feed sampling techniques and balancing livestock feed rations.

Grain Marketing and Understanding Canada's Grading System
On February 23rd and 24th, LARA in partnership with Crop Production Services hosted grain marketing (local and world perspectives) and understanding Canada's grading system workshop in Flat Lake with 16 producers in attendance and 14 attended in Smoky Lake. The workshop featured Brian Wittal from Procom Marketing Ltd to discuss an overview of world markets, pricing potentials for 2017, and an outlook on spring threshed grain. Bill Adduono from the Canadian Grain Commission presented on knowing your grade and quality, proper dockage assessments and the role and services of the Canadian Grain Commission.

Holistic Management
LARA hosted a full Holistic Management Course with Kelly Sidoryk over 3 weekends in February and March. Twelve farm families took the six-day course to develop their holistic goals, financial planning, planning for a profit, developing communication techniques and land management planning.

LARA Research Report and AGM
The Annual Research Update and AGM was held on February 28th at Eastbourne Community Hall. LARA staff presented information on the 2016 research and extension programs such as the variety trials, fertility trials, forage peas, and forage variety trials. Dan Orchard with the Canola Council of Canada presented on canola agronomics and impact of last year's harvest season. The Canadian Cattle Identification Agency presented on traceability in livestock and what you need to know. There were 47 producers in attendance.

Water Treatment System Workshop
On March 1st at the Bonnyville Centennial Centre 10 people learned about how to test their water, interpret results and how to effectively treat their water with an appropriate water treatment train. Shawn Elgert from Alberta Agriculture and Forestry also discussed the Rural Water Quality Information Tool.

Beavers in Our Landscape
On March 2nd, LARA in partnership with the Beaver River Watershed Alliance and Cows and Fish hosted a Beavers in Our Landscape workshop at Goodridge Hall. Thirty-eight people attended to increase their understanding of beavers and how to live with them in the landscape. Topics included: beaver basics; challenges; case studies; and roundtable discussions on how to manage beavers.

Alberta Verified Beef Production Plus Training
On March 2nd at the Ashmont Agriplex, 52 producers took the Alberta VBP+ training.

Harvest Management Workshop
On March 9th at the Hylo Hall, 6 producers attended the harvest management workshop. The workshop covered the management and harvesting of snow-covered crops, understanding changes to the Canadian wheat classes, and how to manage pests and diseases.

Nutrient Planning and Cover Crop Workshop
On March 16, 2017 a nutrient planning and cover crop workshop was held at the Flat Lake Hall. Sixteen producers attended to learn about soil sampling methods, understanding and interpreting soil test results, using cover crops as a soil improvement tool and results from the LARA cover crop trial. Speakers included Trevor Wallace, a nutrient management specialist from AAF and Graeme Finn from Southern Cross Livestock and Union Forage.

Managing Disease in Pulses
Fourteen people attended the "Let's Talk" managing diseases in pulses workshop in partnership between LARA and Crop Production Services Smoky Lake. The workshop featured presentations from: Robyne Bowness, Pulse Research Scientist from Alberta Agriculture and Forestry; Holly Gelech, VP Sales, Marketing and Client Services from Biovision Seed Labs; and Rae Westersund, Product Line Representative from Loveland Products Canada.

Working Well Workshop
On March 23rd a working well workshop was held at Flat Lake Hall. Nineteen people came to learn about their wells, and to increase their understanding of groundwater and driller's reports, common water well problems, rural water treatments, and proper well maintenance. Attendees also learned how to shock chlorinate their wells.

Wind and Solar: Negotiating Renewable Energy Leases
On April 24th, LARA in partnership with St. Paul County and Alberta Agriculture and Forestry hosted a wind and solar: negotiating renewable energy leases workshop. Eighty people attended the workshop in Elk Point.

Classroom Agriculture Program (CAPs)

Kellie Nichiporik presented the Classroom Agriculture Program in schools in April and May. Information on crops, livestock and sustainability was covered with 17 classes of grade four students at schools across the area to over 300 students. This year Kellie also became the zone 8 CAP Coordinator which served to coordinate volunteers to present to 63 classes to over 1260 students.

Alberta Beef Producer Zone 8 Meetings

Kellie Nichiporik presented regarding social licensing at the zone 8 Alberta Beef Producer meetings on April 4 in Smoky Lake and April 5 in Kitscotty.

Generating Electricity From The Sun

On May 24th Rob Harlan from the Solar Energy Society of Alberta presented on grid-tie solar options for farmers and off-grid systems. Fifteen producers attended to learn about Alberta's solar resource and on-farm applications for solar power at Craigend Hall.

Grade Seven Wetland Education

Seventy grade seven students from Cold Lake Middle School had a hands-on nature experience at Cold Lake Provincial Park and Pelican Point in June where they learned about the value of wetlands, riparian areas, ecosystems, abiotic and biotic factors, symbiotic relationships, and food webs.

Walking With Moose

The Moose Lake Watershed Society held several day sessions of Walking with Moose. Walking with Moose allows grade five students to be further educated about the ecosystem of Moose Lake, supplementing their curriculum, learning about biodiversity, healthy shorelines and forest ecology. The students spend half a day at Pelican Point where they collect animals and organisms and place them in containers where they are identified and then returned to their habitat. The students also learn about water quality, wetlands and larger animals that live along the shore such as birds and fish. The students get lunch and then are taken to the Moose Lake Provincial Park. There they are guided by LARA staff, BRWA staff, Municipal District of Bonnyville staff and volunteers and hike though the dry pine forest, learning about wildlife signs and tracks, vegetation such as lichens and dwarf mistletoe, and the forest ecosystem including potential threats such as the pine beetle and fire. This was the ninth year of Walking with Moose with over 300 children going through the program.

X-Stream Science

Throughout June and September LARA assisted the Beaver River Watershed Alliance with the X-Stream Science Program. The program is delivered to junior high and high school students throughout the region. The students used scientific protocols to collect aquatic benthic macroinvertebrates (water bugs) and conduct water quality tests to answer the question "What is the health of my local river?" Specific parameters that were tested include surrounding land use, riparian area vegetation, aquatic benthic macroinvertebrates and water quality data, such as temperature, dissolved oxygen, pH, conductivity and turbidity.

Lac La Biche Environmental Week

On June 4th LARA ran a booth at the Lac La Biche County Environmental Week kick-off in Alexander Hamilton Park and ran activities for families in attendance teaching about riparian areas and biodiversity.

Soils Workshop with Dr. Jill Clapperton

Healthy soil is the foundation for healthy food. 35 producers attended the soils workshop with Dr. Jill Clapperton on June 6, 2017 in Vermillion. The workshop was brought to the area by LARA in partnership with Chinook Applied Research Association, Gateway Research Organization, Battle River Research Association, and West Central Forage Association. Attendees learned how to measure soil health, monitor soil organisms, impact of cropping practices, plant pathology, root systems and much more.

Mad About Science

The Mad About Science Program was established in 2002 by the Lac La Biche Watershed Project. It is an energetic, up-beat program aimed at educating and encouraging youth to become involved with current environmental issues. This year Kellie presented on agriculture, water quality, riparian areas and biodiversity at sessions in Plamondon, Craigend, Fork Lake and Lac La Biche.

Making a Profit Grass-Farming with Jim Gerrish

Twenty one producers attended the making a profit grass farming with Jim Gerrish on June 23rd in Craigend. Key concepts that were covered included stocking rate and density, post-grazing residue, intake and balancing rest and use, and understanding what determines profitability in grass-farming.

Fort Kent Summer Field Day

On July 20th LARA hosted its Fork Kent summer field day at the LARA office. It featured our Quinoa demonstration, corn variety demonstration, regional cereal variety trials, and perennial forage variety trials. Seventeen producers attended the day.

Farm Safety and Rural Emergency Preparedness

Emergencies can happen at any time and being prepared is the best way to keep you and your family safe. Sixteen people attended the workshop on July 25th at the Ashmont Agriplex. Presentations covered emergency planning, traffic safety, and farm worker coverage by the Workers Compensation Board.

Camp Sunshine

On July 20th LARA staff assisted at Camp Sunshine, a grief camp for children aged 6-12. LARA staff led the children with building their lunch followed by planting tree seedlings in remembrance of the person(s) that they had lost.

St. Paul Summer Field Day

On July 27th at the St. Paul Municipal Seed Cleaning Plant, LARA hosted its summer field day. Twelve producers attended to tour our canola, wheat, barley, oats and triticale trials as well as learn about crop disease scouting: assessing, diagnosing and managing diseases in cereal and oilseed crops with Mike Harding from Alberta Agriculture and Forestry.

Smoky Lake Summer Field Day

On August 8th eleven producers attended the summer field day at Quiet Nook Community Centre to tour the Smoky Lake research plots. Presentations included Northern Quinoa on Quinoa agronomics, Alberta Pulse Growers on pulse agronomics, and Alyssa Krone on using small plot research on your operation.

Shoreline Cleanup

On August 10th at Pelican Point on Moose Lake, twenty volunteers spent their morning removing litter and debris from the shoreline, truly making an improvement in the health of our aquatic ecosystems. Over 2200 kilograms of garbage was removed from the area including an abandoned camper, freezer and rail ties. The shoreline cleanup is an annual event and volunteers are always appreciated.

Holistic Management Open Gate Field Day

On August 15th twenty-nine producers toured Gibson/Flynn Ranch and Christensen operation near Smoky Lake. The day looked at how Holistic Management has worked on their operations, improved soils and land management, and operational decision making.

MD of Bonnyville ASB Summer Tour

On August 17th the Municipal District of Bonnyville hosted its ASB summer tour. The day featured stops at the winners of the ASB rural beautification awards, Rocky Meadows U-Pick Saskatoon, Farm, Lynn Rob Strawberries Market Garden, Wakulchyk Brothers Sawmill, Kalinsky mixed farming operation, and LARA's plots and greenhouse.

Brush Control and Pasture Management Bus Tour Part II

On August 24th eighteen producers met at Craigend for the tour. The day featured presentations on: Lac La Biche County's vegetation management control and equipment; Kellie Nichiporik on invasive weed control in pastures; the interpretation of results on pastures sprayed in 2016 by Dow AgroSciences; and a pasture managed by a RanchWorx Pasture Aerator and equipment demonstration.

Livestock Traceability Workshop

On August 29th in Smoky Lake the Canadian Cattle Identification Agency's Mobile Field Representative demonstrated on how to use your CLTS account and update your Premise Identification Number. They also assisted with entering 2017 age verification records online. Four people attended.

Lakeland Women's Conference

Alyssa Krone presented at the first Annual Lakeland Women's Conference in Bonnyville on September 16, 2017 on women in agriculture and her experiences working in the agriculture industry. Over 250 ladies attended the event.

Industrial Hemp Crop Walk

On September 19th at the Fort Kent LARA Research Farm 38 producers and 17 college students from Lakeland College attended the Hemp Crop Walk. Six varieties were grown in the LARA demonstration. Dr. Jan Slaski from InnoTech Alberta presented on industrial hemp.

Shoreline Cleanup

On September 25, 2017 at Sandy Beach on Cold Lake, over 150 grade sevens and eights from Cold Lake Middle School spent their morning removing litter and debris from the shoreline, truly making an improvement in the health of our aquatic ecosystems. Over 200 kilograms of garbage was removed from the area. The shoreline cleanup is an annual event and volunteers are always appreciated.

Tools to Build Your Cow Herd

Fifty producers attended the Tools to Build Your Cow Herd in Vermillion on October 26th. The workshop covered how genetic and genomic tools can help you develop a productive and profitable cow herd, potential health and nutrition problems, and how to minimize difficulties during calving and breeding season.

Farm Safety Day

On October 27, 2017 at the Vilna Cultural Centre, twenty-five people attended Farm Safety Day. The day covered: dealing with mental stress; components of a farm safety plan; available tools and resources; electrical safety; WCB coverage; and emergency response planning. Guest speakers included AgSafe, Lloyanne Yaremko-Galas, and ATCO.

Working Well Workshop

On November 9th a working well workshop was held at Craigend Hall. Five people came to learn about their wells, and to increase their understanding of groundwater and driller's reports, common water well problems, rural water treatments, and proper well maintenance. Attendees also learned how to shock chlorinate their wells.

Cattle Marketing Workshop

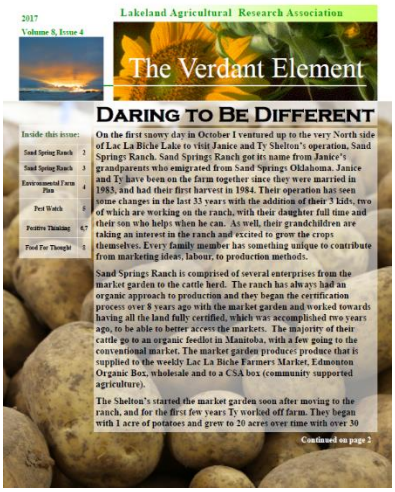
On November 14th at Elk Point Seniors Hall, 23 producers attended the cattle marketing workshop. The day featured Brian Perillat from CanFax discussing: the Canadian/global cattle market and how it relates to Canadian producers; understanding US futures markets; the CFX Pro smartphone App for cattle producers; and what feedlots are looking for when purchasing feeder cattle. AFSC presented on the Western Livestock Price Insurance Program.

SafeTALK

Fourteen people attended the Suicide Awareness for Everyone: Tell, Ask, Listen and Keep Safe (SafeTalk) in Mallaig on November 15th. This half day workshop by the Centre for Suicide Prevention was brought to the area by LARA in partnership with The Demeria Memorial Fund.

Newsletter

Along with articles in LARA's bimonthly *Grow With Us* newsletter, this year four editions of *The Verdant Element* were produced and distributed to 2100 farm mailboxes in the MD of Bonnyville, County of St. Paul, Smoky Lake County and Lac La Biche County.



Lakeland Agricultural Research Association

2017
Volume 8, Issue 4

The Verdant Element

DARING TO BE DIFFERENT

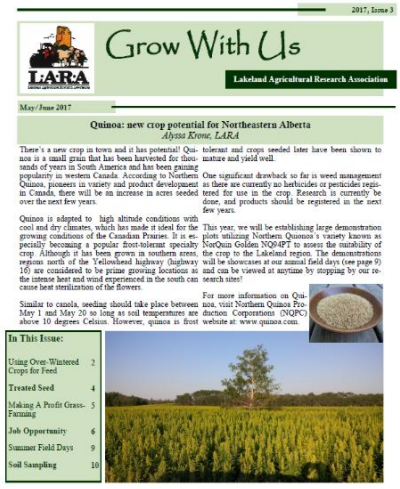
Inside this issue:

On the first snowy day in October I ventured up to the very North side of Lac La Biche Lake to visit Janice and Ty Shelton's operation, Sand Springs Ranch. Sand Springs Ranch got its name from Janice's grandparents who emigrated from Sand Springs Oklahoma. Janice and Ty have been on the farm together since they were married in 1983, and had their first harvest in 1984. Their operation has seen some changes in the last 33 years with the addition of their 3 kids, two of which are working on the ranch, with their daughter full time and their son who helps when he can. As well, their grandchildren are taking an interest in the ranch and excited to grow the crops themselves. Every family member has something unique to contribute from marketing ideas, labour, to production methods.

Sand Springs Ranch is comprised of several enterprises from the market garden to the cattle herd. The ranch has always had an organic approach to production and they began the certification process over 8 years ago with the market garden and worked towards having all the land fully certified, which was accomplished two years ago, to be able to better access the markets. The majority of their cattle go to an organic feedlot in Manitoba, with a few going to the conventional market. The market garden produces produce that is supplied to the weekly Lac La Biche Farmers Market, Edmonton Organic Box, wholesale and to a CSA box (community supported agriculture).

The Shelton's started the market garden soon after moving to the ranch, and for the first few years Ty worked off farm. They began with 1 acre of potatoes and grew to 20 acres over time with over 30

Continued on page 2



2017, Issue 3

Grow With Us

LARA

Lakeland Agricultural Research Association

May / June 2017

Quinoa: new crop potential for Northeastern Alberta

Alyssa Krone, LARA

There's a new crop in town and it has potential! Quinoa is a small grain that has been harvested for thousands of years in South America and has been gaining popularity in western Canada. According to Northern Quinoa, pioneers in variety and product development in Canada, there will be an increase in acres seeded over the next few years.

Quinoa is adapted to high altitude conditions with cool and dry climates, which has made it ideal for the growing conditions of the Canadian Prairies. It is especially becoming a popular frost-tolerant specialty crop. Although it has been grown in southern areas, regions north of the Yellowhead highway (highway 16) are considered to be prime growing locations as the intense heat and wind experienced in the south can cause heat sterilization of the flowers.

Similar to canola, seeding should take place between May 1 and May 20 so long as soil temperatures are above 10 degrees Celsius. However, quinoa is frost tolerant and crops seeded later have been shown to mature and yield well.

One significant drawback so far is weed management as there are currently no herbicides or pesticides registered for use in the crop. Research is currently being done, and products should be registered in the next few years.

This year, we will be establishing large demonstration plots utilizing Northern Quinoa's variety known as NorQuin Golden NQ04PT to assess the suitability of the crop to the Lakeland region. The demonstrations will be showcases at our annual field days (see page 9) and can be viewed at anytime by stopping by our research sites!

For more information on Quinoa, visit Northern Quinoa Production Corporations (NQPC) website at: www.quinoa.com.

In This Issue:

Canada Thistle Stem Mining Weevils

In 2012, as part of a provincial protocol, LARA released 1260 Canada thistle stem mining weevils (*Hadropontus litura*) to determine if the weevils can establish native populations for Canada thistle suppression. This species is host specific to Canada thistle, and as adults feed on the leaves, lay their eggs in the stem and the hatched larvae mine down the stem to the roots feeding on plant tissue. This summer Kellie went back to the release sites to monitor for damages to the plants as well as to check for surviving weevils. Sites will continue to be monitored in 2018. If you are interested in this project please contact the LARA office.

Demonstration Solar Watering System

In 2006 LARA constructed a portable solar watering system with funding from the Alberta Stewardship Network. The unit, on a pull trailer, contains solar panels, trough, pump, batteries, float and hoses. It can water 150 head of cattle with a 15 foot lift, or 200 head with a 10 foot lift. It can be used for any surface body of water such as a dugout or creek.

This system is available for a free trial and allows the producer a chance to see if an alternative watering system will work for their situation. Call the LARA office to book the system if you are interested.

Environmental Farm Plans

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

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

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

This year 7 producers completed Environmental Farm Plans.

The EFP Process

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

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

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

If you wish to complete an EFP or have any questions regarding EFP please contact the LARA office at 780-826-7260.

Riparian Health Assessments

The riparian zone is the interface between the upland and a water course. This area is heavily influenced by water, how and where it flows and is reflected in the plants, soil characteristics and wildlife that are found there. Riparian areas have a large role in water quality, quantity and biodiversity. They provide eight key functions to: trap and store sediment; build and maintain banks and shorelines; store water; recharge aquifers; filter and buffer water; reduce and dissipate energy; create primary production; and maintain biodiversity by providing habitat for plants, wildlife and fish.

This Riparian Health Assessment is a tool designed to evaluate the selected site. It can provide a foundation to build an action plan and identify priorities. The assessment provides a snapshot in time and to be an effective tool for monitoring should be done on the same riparian area several years apart.

If you are interested in having a riparian health assessment completed on your land, please contact the LARA office.

Moose Lake Watershed Society

The Moose Lake Watershed Society (MLWS) is a Watershed Stewardship Group. It was founded in 2002 as the Moose Lake Water for Life committee, and became a society in 2008. This group was formed to address the health of Moose Lake, increase public knowledge and interest, and improve water quality as well as fish and wildlife habitat. This group is made up of volunteers. If you want to get involved with the MLWS please contact the Moose Lake Watershed Society or the LARA office.

The MLWS continued working with the schools to deliver Walking With Moose to grade 5 students in the area. Walking with Moose allows grade five students to be further educated about the ecosystem of Moose Lake, supplementing their curriculum, learning about biodiversity, healthy shorelines and forest ecology. The students spend half a day at Pelican Point (or full day in Cold Lake Provincial Park) where they collect animals and organisms and place them in containers where they are identified and then returned to their habitat. The students also learn about water quality, wetlands and larger animals that live along the shore such as birds and fish. The students get lunch and then are taken to the Moose Lake Provincial Park. There they are guided by the Municipal District of Bonnyville staff, LARA staff, BRWA staff and volunteers, and hike though the dry pine forest, learning about wildlife signs and tracks, vegetation such as lichens and dwarf mistletoe, and the forest ecosystem including potential threats such as the pine beetle and fire. This was the 9th year of Walking with Moose with over 300 children going through the program.

This year with funding from the Summer Village of Pelican Narrows and Bonnyville Beach, MLWS teamed up with Alberta Lake Management Society to test individual bays for the LakeWatch Sampling for the second year. The LakeWatch report can be found at https://alms.ca/reports-2/ for the most recent and past reports.

This year the MLWS received grant funding from the Alberta Land Stewardship Centre to fund tributary sampling around Moose Lake. It also funded a shoreline session and the lunch for the volunteers at the Moose Lake Shoreline Cleanup.

Moose Lake Watershed Tributary Monitoring

The Moose Lake Watershed Society conducted tributary monitoring four times throughout the summer. The locations were: Valere Creek, Mooselake River, Yelling Creek, Thinlake River at Highway 28, and Thinlake River near Franchere Bay. The four dates sampled were: July 19, August 11, September 1, and September 27. The water was initially tested for routine chemical parameters as well as nutrients and the subsequent samplings were only for nutrient content and coliforms.

Phosphorous is one of the main driving forces of algae blooms in water bodies. Phosphorous can be in high concentrations due to fertile soils, but can be compounded in the environment by fertilizer use, septic leaks, chemicals and soil erosion. Nitrogen is also needed for plant growth, but generally limits terrestrial plants versus aquatic species that are much more dependent on phosphorous. High amounts of these nutrient lead to algal blooms and cyanobacterial blooms in our water bodies. These can have detrimental effects on fish populations as the blooms increase water temperature, decrease dissolved oxygen content and increase turbidity. Cyanobacteria (blue-green algae) can also be toxic to humans and wildlife which can cause skin irritation to liver damage to even death within a short period after consumption.

Reducing our impacts on the watershed by responsible use of chemicals and fertilizers, keeping vegetation in place and preventing soil erosion and protecting/enhancing our riparian areas can help improve water quality and our ecosystem.

Date of Sampling	Weather Conditions
July 19, 2017	19°C sunny with calm wind
August 11, 2017	25°C sunny
September 1, 2017	19°C partly cloudy
September 27, 2017	10°C overcast

Mooselake River

Parameter	Units	July 19	August 11	September 1	September 27
Total Coliforms	mpn/100mL	>2400		>2400	
E.Coli	mpn/100mL	32		78	
Dissolved Organic Carbon	mg/L	23	24	19	18
Ammonia-N total	mg/L	0.24	0.17	0.2	0.83
Total Kjeldahl Nitrogen	mg/L	1.9	1.7	2.0	2.7
Dissolved Phosphorous	mg/L	0.069	0.056	0.067	0.062
Total Phosphorous	mg/L	0.11	0.075	0.12	0.095
Total Dissolved Solids	mg/L	590	540	570	520
Total Suspended Solids	mg/L	2.0	4.7	6.7	4.0

Mooselake River had a pH of 8.03 and alkalinity of 320 mg/L.

Yelling Creek

Parameter	Units	July 19	August 11	September 1	September 27
Total Coliforms	mpn/100mL	>2400		2400	
E.Coli	mpn/100mL	410		32	
Dissolved Organic Carbon	mg/L	36	35	37	31
Ammonia-N total	mg/L	0.076	0.054	0.039	0.057
Total Kjeldahl Nitrogen	mg/L	2.9	2.6	2.8	3.4
Dissolved Phosphorous	mg/L	0.98	0.39	0.21	0.091
Total Phosphorous	mg/L	1.1	0.56	0.49	0.5
Total Dissolved Solids	mg/L	340	330	360	390
Total Suspended Solids	mg/L	2.7	8.0	11	25

Yelling Creek had a pH of 7.66 and an alkalinity of 180 mg/L.

Thinlake River Highway 28

Parameter	Units	July 19	August 11	September 1	September 27
Total Coliforms	mpn/100mL	>2400		>2400	
E.Coli	mpn/100mL	96		33	
Dissolved Organic Carbon	mg/L	26	24	23	17
Ammonia-N total	mg/L	0.20	0.12	0.19	0.33
Total Kjeldahl Nitrogen	mg/L	2.0	2.0	2.1	1.8
Dissolved Phosphorous	mg/L	0.38	0.28	0.43	0.38
Total Phosphorous	mg/L	0.52	0.60	0.80	0.66
Total Dissolved Solids	mg/L	660	720	860	930
Total Suspended Solids	mg/L	7.3	87	29	6.0

Thinlake River at Highway 28 had a pH of 7.87 and alkalinity of 380 mg/L.

Thinlake River (Franchere Bay)

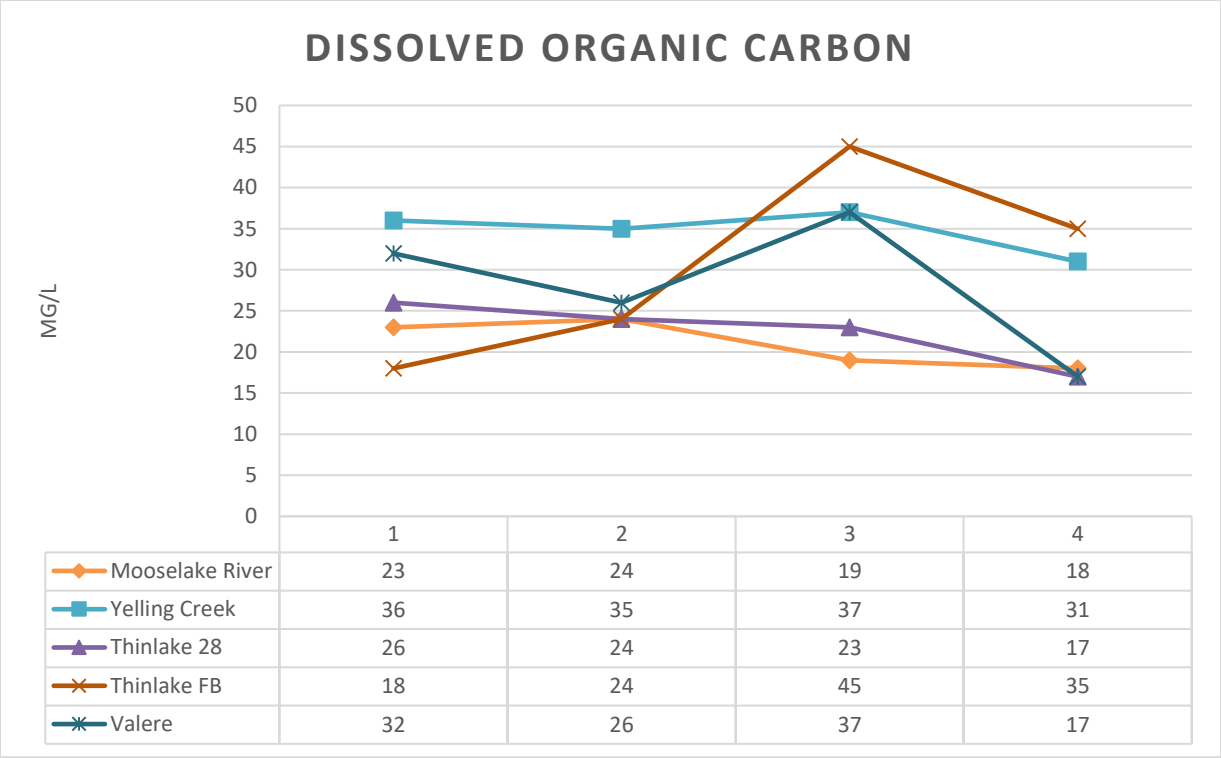
Parameter	Units	July 19	August 11	September 1	September 27
Total Coliforms	mpn/100mL	1600		>2400	
E.Coli	mpn/100mL	7.4		43	
Dissolved Organic Carbon	mg/L	18	24	45	35
Ammonia-N total	mg/L	0.15	0.12	0.047	0.37
Total Kjeldahl Nitrogen	mg/L	2.0	2.0	3.1	3.2
Dissolved Phosphorous	mg/L	0.044	0.28	0.49	0.50
Total Phosphorous	mg/L	0.14	0.60	0.56	0.54
Total Dissolved Solids	mg/L	560	720	540	550
Total Suspended Solids	mg/L	6.0	87	8.0	15

Thinlake River where it enters Moose Lake by Franchere Bay had a pH of 8.56 and alkalinity of 290 mg/L.

Valere Creek

Parameter	Units	July 19	August 11	September 1	September 27
Total Coliforms	mpn/100mL	>2400		>240	
E.Coli	mpn/100mL	370		29	
Dissolved Organic Carbon	mg/L	32	26	37	17
Ammonia-N total	mg/L	0.15	0.10	0.46	0.36
Total Kjeldahl Nitrogen	mg/L	2.1	1.4	3.1	2.2
Dissolved Phosphorous	mg/L	0.51	0.46	0.69	0.099
Total Phosphorous	mg/L	0.54	0.55	1.6	0.16
Total Dissolved Solids	mg/L	580	460	670	580
Total Suspended Solids	mg/L	11	11	84	5.3

Valere Creek had a pH of 7.66 and alkalinity of 180 mg/L.



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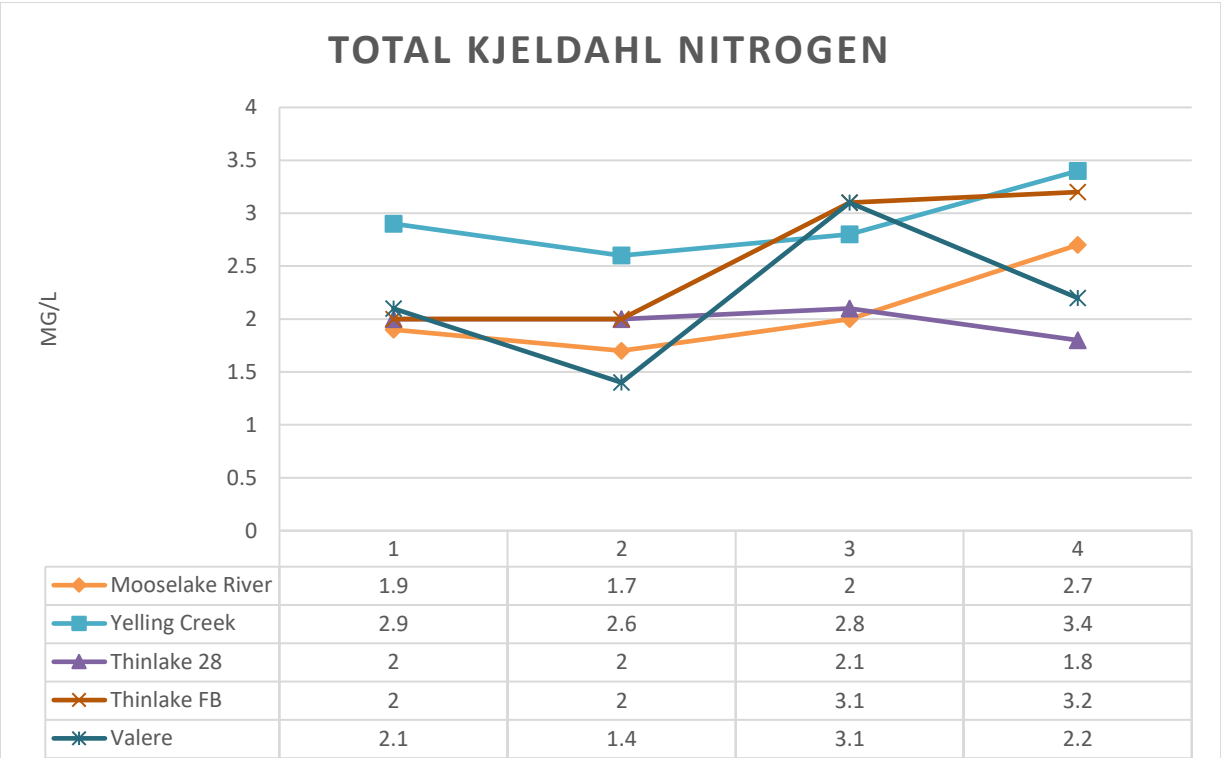
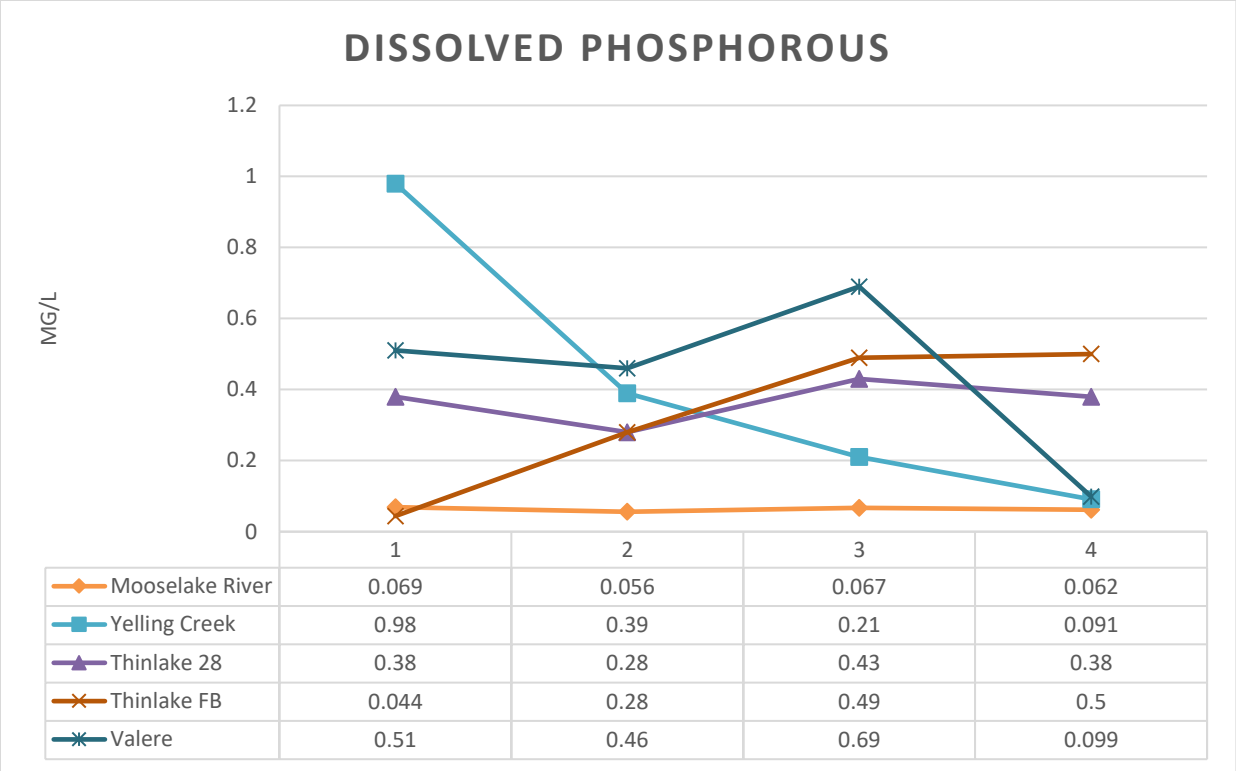
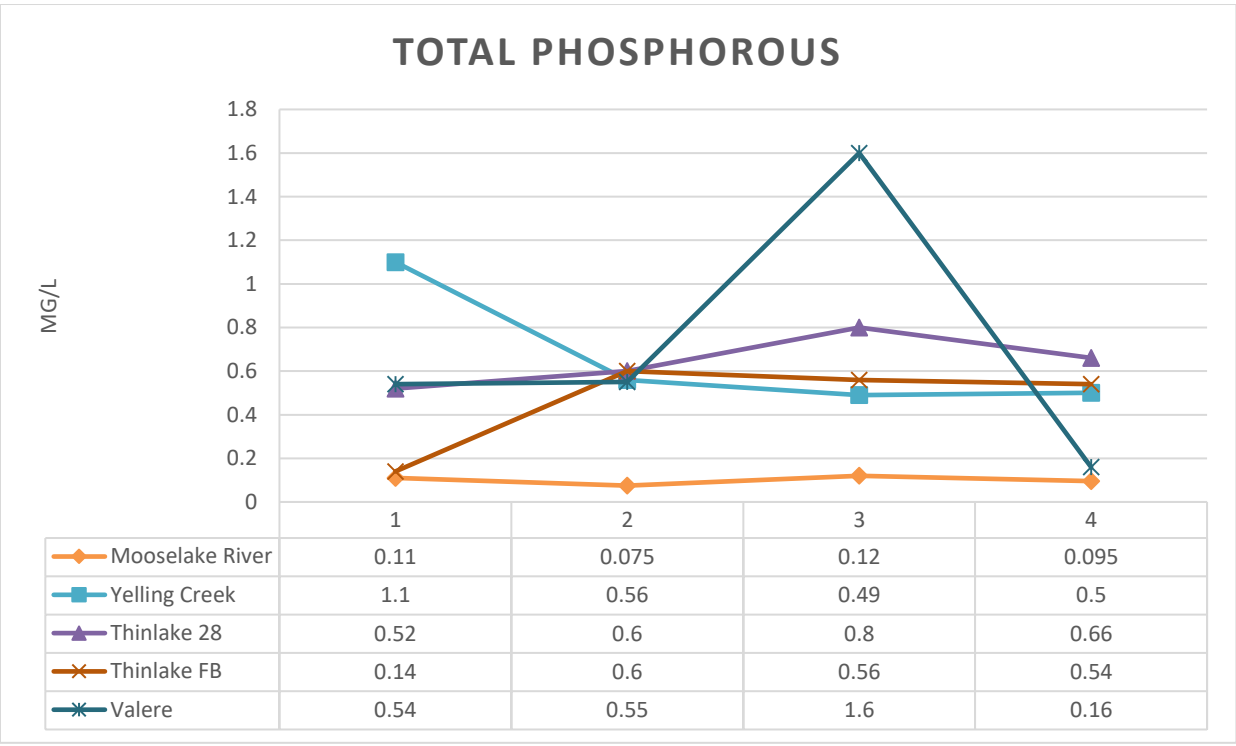
Mooselake River	23	24	19	18
Yelling Creek	36	35	37	31
Thinlake 28	26	24	23	17
Thinlake FB	18	24	45	35
Valere	32	26	37	17



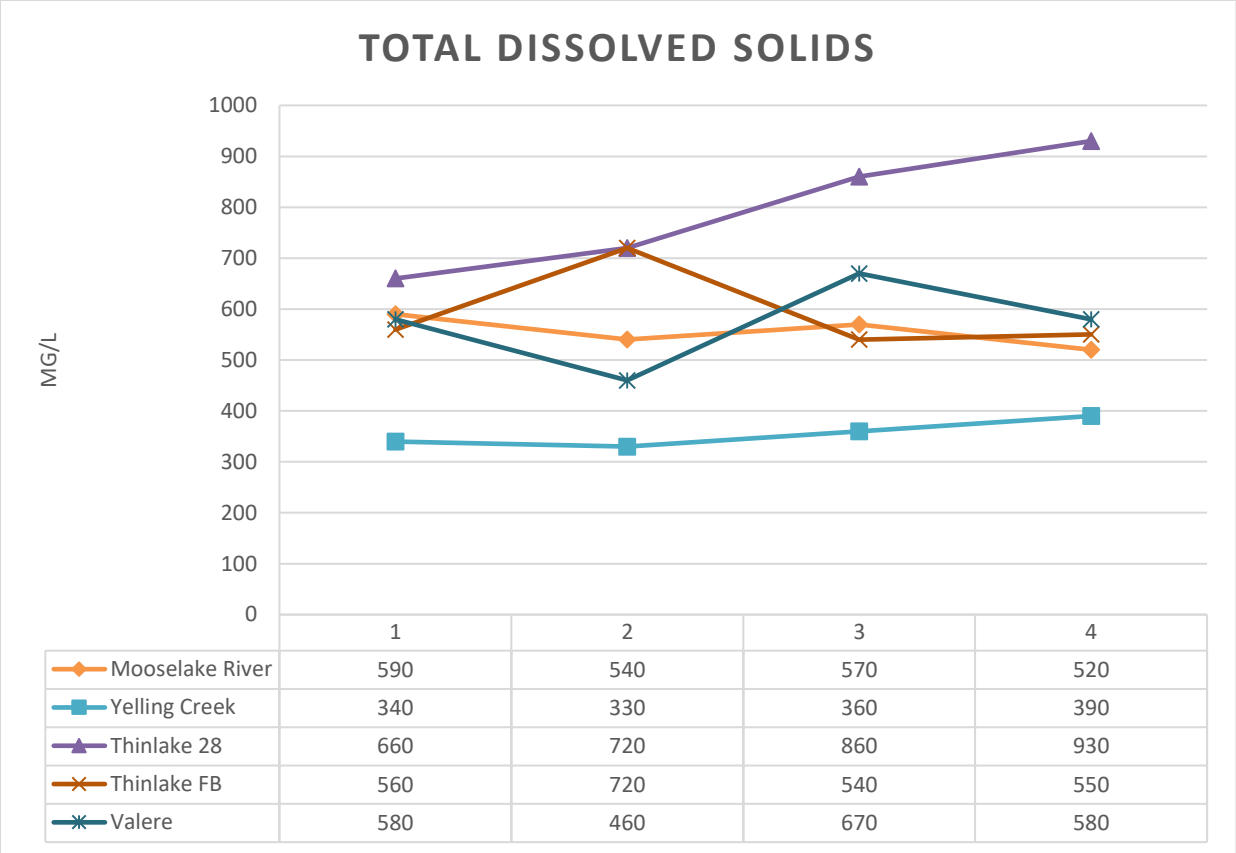
	1	2	3	4
Mooselake River	1.9	1.7	2	2.7
Yelling Creek	2.9	2.6	2.8	3.4
Thinlake 28	2	2	2.1	1.8
Thinlake FB	2	2	3.1	3.2
Valere	2.1	1.4	3.1	2.2



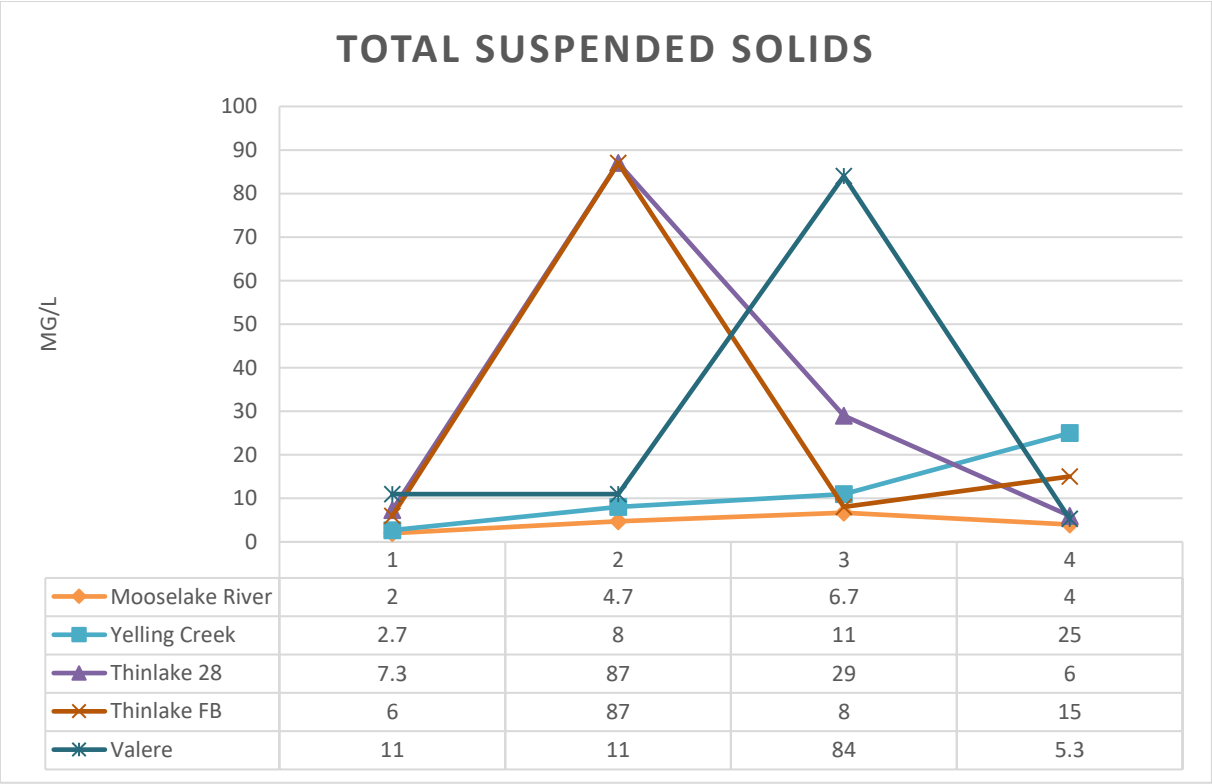
	1	2	3	4
Mooselake River	0.069	0.056	0.067	0.062
Yelling Creek	0.98	0.39	0.21	0.091
Thinlake 28	0.38	0.28	0.43	0.38
Thinlake FB	0.044	0.28	0.49	0.5
Valere	0.51	0.46	0.69	0.099



	1	2	3	4
Mooselake River	0.11	0.075	0.12	0.095
Yelling Creek	1.1	0.56	0.49	0.5
Thinlake 28	0.52	0.6	0.8	0.66
Thinlake FB	0.14	0.6	0.56	0.54
Valere	0.54	0.55	1.6	0.16



	1	2	3	4
Mooselake River	590	540	570	520
Yelling Creek	340	330	360	390
Thinlake 28	660	720	860	930
Thinlake FB	560	720	540	550
Valere	580	460	670	580



	1	2	3	4
Mooselake River	2	4.7	6.7	4
Yelling Creek	2.7	8	11	25
Thinlake 28	7.3	87	29	6
Thinlake FB	6	87	8	15
Valere	11	11	84	5.3

Impact of Stem Mining Weevil (*Hadropontus litura*) population density on Canada Thistle Suppression

Canada thistle (*Cirsium arvense*) is an aggressive, colony-forming perennial weed which reproduces by both seeds and horizontal creeping root systems. It is listed under the Alberta Weed Control Act as noxious. Canada thistle has a high tolerance to many different environmental conditions and is highly competitive with other vegetation. It is prevalent in many locations such as riparian areas that do not allow for chemical or mechanical control methods.

The adult lifespan of the Stem Mining Weevil, *Hadropontus litura,* is approximately 10 months as they overwinter in the soil and leaf litter, and emerge in the spring to feed on rosette leaf foliage and stem tissue. Eggs are laid in May and June in the mid vein of the leaf and eggs hatch 9 days later. The larva mine down the stem into the root collar consuming plant tissues.

The majority of previous research on *Hadropontus litura* has been dependant on geographic location. On the west coast of British Columbia and California the weevils have not been very successful compared to the Midwest including Montana. Montana has similar climate to Alberta, therefore weevils may be effective across the region.

Hadropontus litura offers a viable option for Canada thistle suppression in sensitive areas or in conjunction with other control options. The success of *Hadropontus litura* on suppression of Canada thistle will demonstrate:

- Use of a biological control as an alternate means of pest control;
- A possible reduction in chemical use; and
- Weed control in sensitive areas where other traditional methods are not able to be utilized

In 2012, as part of the provincial ARECA Environmental Team protocol, LARA released 1260 adult weevils across 4 sites at various population levels. Each site had a Canada thistle population density of 5 – 10 plants per square meter. Sites were revisited in 2013, 2014, 2015, and 2016 to monitor for plant damage and presence of weevils. Adults were found this past year and notable damage to the plants was observed. Sites will continue to be monitored in 2018.

Conferences

This year Kellie was on the planning committee for the Alberta Lake Management Society Conference which was held in Lac La Biche on September 29 and 30th. For more information on the conference including speakers go to: https://alms.ca/2017-workshop/

Photos from top: BNR plant in Lac La Biche, presentation from parks staff at Sir Winston Churchill Provincial Park, Lac La Biche Lake, and the Mission

Horticulture Program

Garden 2017

2017 will certainly not be considered a banner year for gardening. Wet conditions delayed planting and appear to have reduced germination rates significantly (some were in the 10 to 25% range). The wet conditions did seem to agree with the slugs though as we had an invasion of them – in spite of a continual battle, slugs did inflict significant damage on many of our vegetables. A severe hailstorm in early August further damaged garden plants and produce (zucchini, tomatoes, etc).

In spite of those setbacks, the garden did produce some interesting items – Reisetomate, Galina and Black Vernissage were taste favorites from our tomato patch. The few surviving Sikkim cucumber plants produced large, tasty cucumbers with a unique, interesting appearance (see picture). Zucchini were all seriously damaged by the August hailstorm.

We also planted "highland rice." Plants outside actually performed better than those in the greenhouse. Our growing season seems to be too short to produce usable seeds.

Sikkim Cucumber

Reisetomate

Our sour cherries, chokecherries, and saskatoons were all seriously damaged by the storms. The grapes, however, did very well producing large quantities of usable fruits.

Hopefully 2018 will allow us to have a garden with reliable comparative data.

Appendices

Definition of Common Feed Nutrient Terms

ADF Acid Detergent Fibre – the least digestible portion of roughage. ADF content is used to determine digestibility and energies.

AIP Available Insoluble Protein – the portion of the total available protein which is not soluble in the rumen fluid, but is still available to the cow.

AP Available Protein – the portion of the total protein which is available to the animal if the animal could completely digest the feed.

BP Bypass Protein – ingested protein that is not degraded in the rumen.

CP Crude Protein – the total protein contained in feeds as determined by measuring nitrogen content.

DE Digestible Energy – the amount of energy consumed minus the amount of energy lost in feces.

GE Gross Energy – measure of total caloric energy of a feedstuff.

IP Insoluble Protein – the portion of protein which digestive juices or similar solutions cannot dissolve.

ME Metabolizable Energy – equal to DE minus energy lost in urine, feces and in methane for ruminants.

NDF Neutral Detergent Fibre – measures cellulose, hemi-cellulose, lignin, silica, tannin and cutin; used as an indicator of feed intake.

NEG Net Energy for Gain – amount of energy for gain above that which is required for maintenance; used for balancing rations for ruminants.

NEM Net Energy for Maintenance – amount of energy required to maintain an animal with no change in body weight or composition.

RFV Relative Feed Value – an index for assessing quality based on the ADF and NDF levels of a feed. As fibre values increase the RFV of forages decreases.

SP Soluble Protein – the portion of protein which digestive juices of ruminant can dissolve.

TDN Total Digestible Nutrients – a term which is estimated from the ADF content and is used to describe the digestible value of a feed.

Forages and Cattle Nutrient Requirements

Table 1. Composition of Some Common Feedstuffs.

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

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

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

Table 2. Tolerance Information for Some Perennial Legumes.

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

Table 3. Tolerance Information for Some Perennial Grasses.

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

Table 4. Nutrient Requirements for Beef Cattle.

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

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

Provincial Blackleg Survey Results

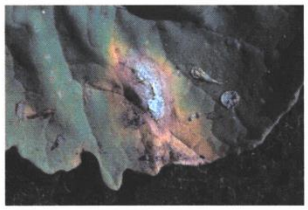
BLACKLEG AND SCLEROTINIA SURVEY IN 2017

Blackleg is a fungal canker of the actively growing crop that causes stem girdling and lodging. Blackleg causes dead patches that appear as pepper-like spots on canola leaves, pods and stems. Blackleg is spread by infected seed or by spores splashed about by rain or carried by the wind in the growing crop. In western Canada, yield losses up to 50% have been reported in individual fields.

Sclerotinia stem rot, is one of the most destructive diseases of canola. The severity of stem rot is extremely variable from year to year, region-to-region and even from field to field. Sclerotinia has become more serious as canola production has increased, likely due to a combination of more acres of canola in rotations and management practices that contribute to high yields, but also produce dense canopies, which are a better microclimate for disease development.

Monitoring the severity and distribution of these diseases will help producers manage risk. In 2017, ARECA member associations and municipalities sampled canola fields across Alberta for these diseases. In total, 421 canola fields were surveyed for blackleg. 346 showed symptoms. 311 fields were sampled for Sclerotinia, 252 of those fields showed symptoms.

Blackleg



Sclerotinia

Municipality	affected/ sampled	
	Blackleg	Sclerotina
North East		
Athabasca	4/4	0/4
Bonnyville	0/2	0/2
Lac La Biche	1/1	0/1
Smoky Lake	3/4	0/4
St. Paul	5/5	0/5
Peace		
Big Lakes	6/9	0/9
Birch Hills	9/9	2/9
Clear Hills	3/3	0/3
Fairview	3/6	2/6
Grande Prairie	9/10	1/10
Greenview	3/5	1/5
Peace	1/2	0/2
Saddle Hills	5/5	0/5
Smoky River	8/12	0/4
Spirit River	3/3	0/3
North		
Mackenzie	5/7	0/7
Northern Lights	6/7	0/7
Northern Sunrise	31/32	4/32

Municipality	affected/ sampled	
	Blackleg	Sclerotina
North Central		
Barrhead	6/6	NA
Beaver	8/9	NA
Brazeau	4/8	0/8
Camrose	15/16	NA
City of Calgary	1/1	1/1
Flagstaff	10/12	9/12
Lac Ste Anne	1/2	NA
Lamont	6/7	NA
Leduc	5/5	NA
Minburn	12/12	4/12
Paintearth	4/6	2/6
Parkland	2/2	NA
Ponoka	5/5	0/5
Provost	4/6	0/6
Red Deer	9/9	4/9
Stettler	5/5	0/5
Strathcona	3/3	NA
Sturgeon	9/10	NA
Thorhild	3/4	NA
Two Hills	4/7	0/7

Municipality	Affected/sampled	
	Blackleg	Sclerotina
South Central		
Cardston	1/6	3/6
Foothills	4/4	0/4
Kneehill	11/15	8/15
Lethbridge	4/6	0/6
Mountain View	6/6	0/6
Newell	3/3	2/3
Pincher Creek	0/2	0/2
Rocky View	7/8	1/8
SA 2	1/2	0/2
SA 3	0/2	0/2
SA 4	3/3	2/3
Starland	6/6	4/6
Taber	5/5	1/5
Vulcan	14/15	8/15
Wheatland	5/15	0/15
Willow Creek	4/5	4/5
South		
Cypress	0/2	0/2
Forty Mile	5/5	4/5
Warner	5/6	2/6

2017 Regional Silage Variety Trials

An important component of the annual feed supply for Alberta's cattle producers comes in the form of silage, green feed and swath grazing. It could be argued that there is more grain forage than cereal grain fed to take many market animals from conception to plate. Selection of annual crop varieties which produce the highest forage yield and/or nutritional quality becomes increasingly important.

Participating Organizations (2017)

- Battle River Research Group, Forestburg, AB, (780) 582-7308
- Chinook Applied Research Association, Oyen, AB, (403) 664-3777
- Gateway Research Organization, Westlock, AB, (780) 349-4546
- Lakeland Agricultural Research Association, Bonnyville, AB, (780) 826-7260
- Mackenzie Applied Research Association, Fort Vermilion, AB (780) 927-3776
- Peace Country Beef and Forage, Fairview, AB, (780) 836-3354
- Smoky Applied Research and Demonstration Association, Falher, AB, (780) 837-2900

Major Sponsors

- Doug Mccaulay, AOF Coordinator
- A & L Canada Laboratories Inc.
- Davidson Seeds, Degenhardt Farms, Dyck Seed Farm, Kevin Elmy, Fabian Seeds, Lindholm Seed Farm, Mastin Seeds, Solick Seeds, H. Warkentin,

Trial Information

Silage yield and nutritional information was collected by seven applied research associations in 2017 at sites from Oyen in the south to Fort Vermilion in the north. Data from additional sites grown during the past six years has been included in the variety summaries below. Varieties of barley, oats, triticale and peas commonly used for silage, green feed and swath grazing were included in the trial. The cereal trials, (barley, oats & triticale), were seeded at recommended seeding density rates with recommended fertility. The pulse mixture trial looked at increasing the nutritional value of silage, with a potential side benefit of decreasing future nitrogen costs. The pulse mix plots were seeded with 50 pounds of 11-52-0-0. Peas were seeded at 75 percent of their recommended seeding rate and cereals at 50 percent when in mixtures. Growing conditions at the trial sites in 2017 ranged from below average to excessive moisture.

The tables below show a summary of data from 2012 through 2017 as compared to the control variety (**in bold**). Yield of the test varieties are expressed as wet tons/acre (ie. 65% moisture, typical of silage production). Data sets which did not meet minimum quality standards and variance levels were excluded.

Test Yield Categories

The defined range for each Test Yield Category is provided in tons per acre. Variety yields are reported as average yields in Low, Medium and High Test Yield Categories. This allows for comparison with the check when growing conditions, management regimes and/or target yields are anticipated to be of low, medium or high productivity. Caution is advised when interpreting the data with respect to new varieties that have not been fully tested. It should also be noted that the indicated yield levels are those from small plot trials, which can be 15 to 20 per cent higher than yields expected under commercial production. As yield is not the only factor that affects net return, other important agronomic and disease resistance characteristics should also be considered. The genetic yield potential of a variety can be influenced by various management and environmental factors.

Nutritional Analysis

Nutrition was assessed using NIRS for macro-nutrient assessments and wet chemistry for the micro-nutrients. Full nutritional analysis was done on each sample, however, only six nutritional categories are reported: crude protein (CP), total digestible nutrients (TDN) which is an estimation of energy, calcium (Ca), phosphorus (P), potassium (K) and magnesium (Mg).

OAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category: Low < 8.0 (t/ac)	Medium 8.0 - 11.0 (t/ac)	High > 11.0 (t/ac)	Nutritional Data: CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to CDC Baler)											
CDC Baler (t/ac)		**9.9**	**5.9**	**9.9**	**13.3**	**9.5**	**61.4**	**0.3**	**0.2**	**1.8**	**0.2**
CDC Baler	**39**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
AC Juniper	29	93-	103	78-	93	101	101	94	107	103	106
AC Morgan	38	101	105	96	101	98	101	100	111	100	97
AC Mustang	39	98	99	97	99	101	99	99	103	101	99
CDC Haymaker	34	100	105	97	98	98	100	98	101	103	98
CDC Seabiscuit	12	98	97	96	101	99	100	88	99	95	97
CDC SO-1	39	96-	100	93-	95-	102	102	95	103	98	104
Murphy	33	103	105	101	103	92	95	94	96	103	98
Waldern	32	103	104	107	98	94	99	105	102	95	98
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to CDC Baler)											
Derby	6	96	XX	XX	XX	89	100	98	99	100	110
Everleaf	5	94	XX	XX	XX	96	98	105	97	110	92
Foothills	21	99	99	97	102	99	98	103	103	102	100
Jordan	20	100	103	100	94	97	100	96	105	97	112

BARLEY

Variety	Overall Station Years of Testing	Overall Yield	Yield Category: Low < 9.0 (t/ac)	Medium 9.0 - 12.0 (t/ac)	High > 12.0 (t/ac)	Nutritional Data: CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2017 trials (Yield and agronomic data only directly comparable to CDC Austenson)											
CDC Austenson (t/ac)		**10.7**	**6.8**	**11.4**	**14.8**	**10.3**	**67.2**	**0.3**	**0.2**	**1.4**	**0.2**
CDC Austenson	**41**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Altorado	22	102	107	98	102	98	99	101	103	100	92
Amisk	29	91-	90-	91-	92-	103	102	130	106	104	108
CDC Coalition	33	94-	96	91-	XX	101	100	104	108	105	100
CDC Cowboy	33	101	102	100	XX	96	99	117	110	108	117
CDC Maverick	35	104	106	102	102	96	99	122	108	95	116
CDC Meredith	22	100	102	99	101	95	98	99	101	102	94
Canmore	22	99	101	95	101	99	99	118	102	98	102
Champion	22	102	107	99	102	99	100	103	100	102	99
Claymore	22	100	100	93	105	93	97	119	97	96	99
Conlon	27	86-	82-	88-	XX	97	102	125	113	97	103
Gadsby	33	99	101	98	XX	96	100	127	100	96	101
Ranger	19	94-	91-	96	XX	99	99	161	105	122	128
Sundre	33	93-	91-	94-	XX	102	100	132	106	112	113
Previously tested varieties (Yield and agronomic data only directly comparable to CDC Austenson)											
Busby	19	93-	87-	97	XX	100	99	128	100	100	103
Chigwell	19	90-	90-	91-	XX	101	99	152	101	105	116
Muskwa	13	90-	89	90-	XX	104	100	167	107	121	127
Ponoka	19	96	95	97	XX	97	99	148	103	104	115
Seebe	19	96-	95	98	XX	103	96	136	109	113	103
Trochu	18	88-	82-	92-	XX	99	101	139	107	109	119
Vivar	19	93-	90-	94	XX	103	100	144	99	104	123
Xena	19	95-	95	95	XX	101	99	111	105	102	106

WHEAT & TRITICALE

Variety	Overall Station Years of Testing	Overall Yield	Yield Category: Low < 10.0 (t/ac)	Yield Category: Medium 10.0 - 12.5 (t/ac)	Yield Category: High > 12.5 (t/ac)	Nutritional Data: CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2017 trials (Yield and agronomic data only directly comparable to Taza)											
Taza (t/ac)		**10.9**	**7.5**	**11.3**	**14.7**	**9**	**62.7**	**0.2**	**0.2**	**1.4**	**0.1**
Taza	**44**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
AAC Chiffon	15	104	XX	102	XX	107	100	87	94	109	111
Bunker	36	99	102	98	98	103	99	109	94	95	115
Sunray	37	100	100	102	99	104	103	106	102	103	109
Tyndal	43	99	100	99	99	103	101	100	103	96	105
Previously tested varieties (Yield and agronomic data only directly comparable to Taza)											
AAC Innova	8	104	XX	XX	XX	108	100	87	106	109	107
AAC Ryley	8	97	XX	XX	XX	103	100	95	106	89	117
AC Ultima	7	103	XX	XX	XX	110	100	101	93	97	122
Pasteur	8	94	XX	XX	XX	107	103	96	99	107	117
Pronghorn	21	102	105	8	XX	103	100	102	99	109	106
Sadash	8	102	XX	XX	XX	99	99	88	91	110	105

PULSE MIXTURES

Variety	Overall Station Years of Testing	Overall Yield	Yield Category: Low < 8.0 (t/ac)	Medium 8.0 - 10.0 (t/ac)	High > 10.0 (t/ac)	Nutritional Data: CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2017 trials (Yield and agronomic data only directly comparable to CDC Austenson)											
CDC Austenson (t/ac)	**9**	**8.4**	**6.1**	**9.1**	**12**	**10.5**	**66.8**	**0.3**	**0.2**	**1.5**	**0.2**
CDC Austenson	**9**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
CDC Baler	9	106	101	XX	XX	95	95	106	106	113	115
Taza	9	106	107	108	XX	93	95	75	108	101	84
CDC Austenson/CDC LeRoy	4	86	XX	XX	XX	128	97	167	120	116	119
CDC Austenson/CDC Meadow	9	100	102	99	XX	116	86	162	110	107	143
CDC Baler/CDC LeRoy	4	87	XX	XX	XX	107	95	135	108	121	109
CDC Baler/CDC Meadow	9	96	XX	100	XX	107	96	152	106	120	132
Taza/CDC LeRoy	4	95	XX	XX	XX	122	95	183	109	98	120
Taza/CDC Meadow	9	98	108	103	XX	106	95	181	105	103	129
Previously tested varieties (Yield and agronomic data only directly comparable to CDC Austenson)											
CDC Austenson/CDC Horizon	5	105	XX	XX	XX	101	97	156	102	111	133
CDC Baler/CDC Horizon	5	101	XX	XX	XX	109	94	173	101	123	145
Taza/CDC Horizon	5	108	XX	XX	XX	116	96	179	106	106	137
Varieties tested in the 2012 - 2014 trials (Yield and agronomic data only directly comparable to Vivar)											
Vivar (t/ac)		**8.6**	**5.8**	**9.7**	**10.3**	**9.4**	**63.5**	**0.5**	**0.2**	**1.2**	**0.2**
Vivar	**19**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Murphy	18	119+	XX	108	125+	88	94	77	99	129	88
Pronghorn	19	111	106	105	122	96	101	63	105	103	75
Murphy/40-10	12	105	XX	XX	XX	142	98	161	129	117	141
Pronghorn/40-10	12	104	XX	XX	XX	125	98	150	115	103	134
Vivar/40-10	12	97	XX	XX	XX	140	98	170	107	108	141
Murphy/CDC Horizon	19	112	121	97	120+	114	94	130	100	124	114
Pronghorn/CDC Horizon	19	111	120	101	112	125	98	143	105	105	106
Vivar/CDC Horizon	19	98	103	87-	105	128	97	162	101	107	116
Murphy/CDC Meadow	7	105	XX	XX	XX	104	95	116	101	123	95
Pronghorn/CDC Meadow	7	101	XX	XX	XX	122	99	124	113	105	95
Vivar/CDC Meadow	7	99	XX	XX	XX	115	100	187	89	98	119

Regional Variety Trial Provincial Results

This annual publication provides information on cereal and oilseed variety performance in Alberta and northeastern British Columbia. Important agronomic characteristics and disease resistance information is provided for varieties of wheat, barley, oat, rye, triticale, flax and canola. The Alberta Regional Variety Testing program for cereals and flax is coordinated by the Alberta Regional Variety Advisory Committee (ARVAC) and Alberta Agriculture and Forestry (AAF). Funding for the program is provided by:

- Alberta Agriculture & Forestry
- Alberta Wheat Commission
- Alberta Barley Commission
- Alberta Oat Growers Association
- Alberta Seed Growers
- Alberta Seed Processors
- Prairie Oat Growers Association
- Entry fees for the varieties being tested

Data for this publication come from various sources, including:

- Alberta Agriculture & Forestry
- Agriculture & Agri-Food Canada
- British Columbia Grain Producers
- CPS Canada
- University of Alberta
- Alberta Innovates Technology Futures
- Farming Smarter
- SARDA Ag Research
- Battle River Research Group (BRRG)
- Chinook Applied Research Association (CARA)
- Gateway Research Organization (GRO)
- Lakeland Applied Research Association (LARA)
- McKenzie Applied Research Association (MARA)
- Northern Peace Applied Research Association (NPARA)
- Prairie Grain Development Committee
- Canola Council of Canada

The following individuals are the Regional Variety Trial and crop specific coordinators:

- Alex Fedko, Regional Variety Trial Coordinator
- Spring wheat, Drs. H. Randhawa, D. Spaner & S. Strydhorst
- Barley, J. Anderson
- Oat, Dr. J. Mitchell-Fetch
- Triticale, Dr. H. Randhawa
- Winter Wheat, Dr. R. Graf
- Fall Rye, Dr. J. Larsen
- Winter Triticale, Dr. J. Larsen

- Flax, M. Hartman

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Yield Results and Reporting

Variety choice should never be based solely on yield performance, as it is only one factor that affects net return. The genetic yield potential of a variety is often masked by numerous factors, some of which can be controlled through variety choice and others through astute agronomic management. Producers are encouraged to consider other characteristics such as maturity, plant height, lodging and disease/pest resistance when deciding which varieties to grow. Long term satisfaction with a variety is often related to non-yield characteristics.

New for 2018

On a trial basis for 2018, the yield data for CWRS wheat are reported in two ways. The first method is the traditional manner that has been used since 2010 (see below). New for 2018 is an alternative method that reports head-to-head comparisons of all varieties on the annual trials within a five year timeframe. This new method retains low and high yield test categories based on the average yield of the AC Barrie (60 bu/ac), the long term check. The advantage of this method is that all comparisons within a column are statistically valid, rather than only to the check. The Overall Yield is also reported using all data that are available, but since this is a dataset with varying numbers of comparisons over different years, the only valid comparison is to the check, as has been the case in the older method. Statistical differences among the varieties are also reported in this column. We welcome your comments on this new table.

Also new for 2018 is the inclusion of "benchmark" varieties. Producers have asked for additional checks in the regional variety trials that reflect more commonly grown varieties. To accommodate this request, two additional varieties are now grown as "benchmark" checks and reflect the two most popular varieties for the crop or within a market class during the previous year, based on crop insurance data. These checks will change as the popularity of varieties change.

Traditional Yield Reporting Method

Exercise caution when making yield comparisons among varieties. Variety yield should only be directly compared to the standard reference check. Actual head-to-head yield comparisons between other varieties may not have occurred. Small plot agronomic trials are expensive to grow and new varieties are registered every year. It is simply impractical to grow all varieties at the same time. Following several years of data collection, the yield performance for a particular variety stabilizes relative to the check and further testing is no longer required. It is for these reasons that the check varieties are grown every year (e.g. AC Barrie for CWRS wheat, AC Metcalfe for barley) and that changes to these checks are infrequent. The "Overall Station Years of Testing" column provides an indication of the unbalanced nature of the dataset. At least six station-years of yield data collected over two years are required prior to reporting the figures in this publication. For new varieties, Overall Yield is often the first indication of yield potential relative to the check. As additional data become available, yield performance is also expressed on the basis of environmental productivity (Yield Test Categories of Low, Medium, High and Very High). Yield rankings among varieties can change substantially due to growing conditions. To reflect these differences, results from a test site that produced high yield in a particular year are placed into the database for 'high' yielding environments. The same site may contribute to the 'low' yield category in a drought year, when yields are

low. Consistent performance over all Yield Test Categories indicates that a variety has environmental responses similar to the check and may have good yield stability over a wide range of environments. Scientific studies conducted on variety performance in western Canada have shown that Yield Test Category analysis provides a more reliable indication of yield performance than results organized by geographic region.

The yield comparison tables have several features:

- Overall actual yield of the check (bushels/acre) based on all data available to the testing program is provided along with the number of station years of testing.
- The range in yield for each Yield Test Category is defined.
- Actual yield of the check in each Yield Test Category is reported.
- For varieties with sufficient data, the Overall Yield and performance in each Yield Test Category is expressed relative to the check.
- Significant statistical differences relative to the check are indicated.

Yields that are statistically higher (+) or lower (-) than the check are indicated to aid in the selection process. No symbol after the yield figure indicates that there is no statistical difference from the check. Pay particular attention to data on new varieties that have not been fully tested. If a large difference from the check is reported but is not significant, it could mean that yields have varied widely, and/or there are not enough data to prove a statistical difference. With additional years of testing, the reported yield differences will become more accurate.

To make effective use of the yield comparison tables, producers should set a realistic yield target for the season and determine where it fits within the Low, Medium, High and Very High Yield Test Categories. This approach facilitates matching of variety choice to expected productivity levels and is similar to that used when making decisions on other levels of inputs. Please note that the actual yield levels indicated are from small plot trials, which may be 15 to 20 per cent higher than yields expected under commercial production.

Maturity Ratings

As is the case for yield, growing conditions have a tremendous influence on the date of maturity. For example, a variety of CWRS wheat may mature in 98 days in Lethbridge, but take 103 days in Edmonton. Likewise, a two day difference in maturity between varieties in southern Alberta may amount to a five day difference in a more northerly location. To take this into account, maturity is expressed using a five category scale: Very Early, Early, Medium, Late and Very Late. To aid producers with this relative scale, the average number of days to maturity for the check is reported. Note that this scale is different for each crop type. For example, an early barley variety will mature much earlier than an early flax variety.

Seed Size and Plant Populations

Seed size within a crop kind will vary from variety to variety, requiring adjustment of seeding volumes to achieve desired plant populations. Some of the tables provide an average 1000 kernel weight (TKW) which can be used as a guide for variety differences. The best approach is to determine the 1000 kernel weight of the seed to be planted, germination rate, emergence mortality, and in the case of fall seeded crops, an estimate of winterkill. For more information and user-friendly seeding rate calculators that take into account these and other considerations, please see www.agric.gov.ab.ca/app21/ldcalc.

Plant Breeders' Rights

Plant Breeders' Rights (PBR) are a form of intellectual property rights by which plant breeders can protect new varieties in the same way an inventor protects a new invention with a patent. In 2015, Canada amended the PBR Act to bring it into conformity with UPOV 91. Varieties protected under the previous legislation (UPOV 78) are indicated with the logo, whereas those protected under the new legislation that are shown with a new logo. The use of the ▲ logo indicates that an application for PBR has been accepted. For more information on Plant Breeders' Rights, please see www.pbrfacts.ca or the Canadian Food Inspection Agency website at www.inspection.gc.ca.

CANADA WESTERN RED SPRING WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Barrie): Low < 45 (bu/ac)	Medium 45 – 75 (bu/ac)	High > 70 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to AC Barrie)																		
AC Barrie (bu/ac)		60	42	63	84													
AC Barrie		**100**	**100**	**100**	**100**	**M**	**14.0**	**63**	**37**	**89**	**N**	**G**	**G**	**MR**	**I**	**S**	**MS**	**I**
Carberry - check	**95**	**107+**	**110+**	**106+**	**104**	**L**	**0**	**63**	**39**	**79**	**Y**	**VG**	**F**	**MR**	**R**	**MR**	**MS**	**MR**
AAC Cameron VB	42	117+	110+	123+	115+	M	-0.6	62	44	94	Y	G	F	S	R	S	I	I
AAC Redberry	42	108+	108+	109+	106	M	-0.1	63	41	84	Y	G	G	R	I	R	MS	I
AAC Tisdale ▲	28	106+	106	107	106+	M	0.4	63	43	89	Y	F	F	MR	MR	S	MS	MR
AAC Viewfield ▲	42	117+	116+	118+	117+	L	-0.3	63	40	76	Y	VG	G	S	MR	R	I	I
CDC Adamant VB	28	111+	103	118+	110+	M	-0.3	63	40	83	Y	P	F	S	S	MS	MS	I
CDC Bradwell	42	108+	107+	108+	110+	L	-0.3	63	38	84	Y	VG	F	MR	R	MS	MS	I
CDC Go	104	111+	106+	113+	115+	M	0.1	61	42	82	Y	G	VP	MS	I	MS	S	MS
CDC Hughes VB ▲	28	111+	110+	111	112+	M	-0.2	64	44	84	Y	G	G	MR	MS	I	I	I
CDC Landmark VB ▲	28	113+	108	117	113+	M	-0.1	64	44	85	Y	VG	VG	MR	MS	MR	I	I
Stettler	83	112+	115+	110+	112+	M	0	62	38	84	Y	G	G	R	MR	I	MS	MS
SY Slate ▲	42	108+	108	110+	106+	M	0.2	62	41	85	Y	F	P	MS	S	MR	MS	I
SY Sovite	28	104	105	109	101	M	0	62	43	89	Y	F	F	R	MS	R	MR	MR
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to AC Barrie)																		
5604HR CL	76	99	102	98	99	E	-0.7	63	33	87	Y	G	G	MS	I	XX	MS	I
5605HR CL †	43	109+	XX	114+	106+	M	-0.2	64	38	91	Y	G	XX	R	MR	I	MS	MR
AAC Bailey †	58	103	102	104	103	M	-0.6	63	37	92	N	G	G	MS	I	I	I	I
AAC Brandon	41	114+	106	117+	113+	M	-0.2	64	38	81	Y	VG	P	MR	S	MR	I	MR
AAC Connery	42	106+	XX	108	108+	E	0	62	40	81	N	VG	G	MR	I	R	I	MR
AAC Elie	41	115+	107	120+	112+	M	-0.1	64	38	81	Y	G	F	I	I	MR	I	I
AAC Prevail	42	106+	XX	107+	107+	L	-0.6	62	39	96	Y	G	G	S	S	R	MS	I
AAC Redwater	41	103	96	106	104	E	0	64	35	87	Y	G	VG	MS	I	MR	MS	I
AC Intrepid †	107	102	98	103	105+	E	0	62	39	90	N	G	P	I	MR	MR	MS	MS
AC Splendor †	153	95-	93-	96-	98	VE	0.9	61	37	89	N	F	F	I	I	I	I	MS
Cardale	41	105+	100	106+	105	M	-0.3	63	37	84	Y	G	G	I	S	MS	MS	MR
Coleman	43	101	XX	105	98	M	0	64	37	93	Y	F	P	S	S	MR	I	MR
CDC Abound	88	110+	108+	110+	112+	M	-0.1	63	40	82	Y	G	F	I	I	MS	MS	S
CDC VR Morris	41	109+	105	111+	107	M	-1	65	37	84	N	G	P	I	I	XX	I	MR
CDC Plentiful	41	106+	100	108+	106+	M	-0.2	64	35	87	N	VG	P	R	I	MR	I	MR

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CANADA WESTERN RED SPRING WHEAT (continued)

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Barrie): Low < 45 (bu/ac)	Medium 45 – 75 (bu/ac)	High > 70 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
CDC Stanley	76	113+	114+	114+	113+	M	-0.8	63	34	87	N	G	G	MR	S	I	I	MS
CDC Titanium VB	41	108+	XX	112+	103	E	0.5	65	41	87	Y	G	P	MS	I	R	MS	MR
CDC Utmost VB	53	112+	115+	112+	111+	M	-0.2	64	36	85	N	G	G	MS	S	I	I	MS
Glenn	61	104	110+	100	104	L	-0.2	65	36	85	Y	VG	F	I	I	MR	I	I
Go Early	42	104	XX	105	104	VE	0.3	61	40	93	Y	G	P	I	MR	I	S	I
Goodeve VB †	96	105+	107+	103	104	M	-0.1	62	36	88	N	VG	G	MR	S	I	MS	S
Muchmore	53	111+	114+	107	111	L	-0.9	63	37	75	Y	VG	G	MR	R	MR	MS	MS
Peace †	53	100	100	97	103	M	0.1	63	37	92	N	G	P	R	R	MR	XX	S
Shaw VB	53	112+	116+	109+	113+	M	-0.9	63	37	92	N	G	G	S	MR	I	MS	MS
Superb	184	112+	110+	112+	115+	L	-0.4	62	42	85	Y	G	F	I	MR	S	S	MS
SY433	44	104	101	104	104	M	-1	64	39	95	Y	G	G	I	S	XX	I	MR
SY479 VB	42	97-	XX	100	95-	M	0.8	62	40	94	Y	VG	VG	MS	R	S	MS	I
SY637	42	103	XX	101	103	L	0.8	62	39	91	Y	G	XX	MS	MR	MR	I	MR
Thorsby	43	106+	XX	110	105	E	-0.5	64	38	89	N	G	F	I	S	R	MS	I
Vesper VB †	45	106+	106	108+	104	M	-1.5	63	37	90	Y	F	F	I	S	S	I	I
WR859 CL †	79	106+	110+	103	107+	M	-0.4	64	34	81	Y	G	G	R	R	I	MS	MR

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. Several CWRS varieties will be reclassified to the new CNHR wheat class, effective August 1, 2018. The varieties affected are AC Abbey, AC Cora, AC Eatonia, AC Majestic, AC Michael, AC Minto, Alvena, Alikat, CDC Makwa, CDC Osler, Columbus, Conway, Harvest, Kane, Katepwa, Leader, Lillian, McKenzie, Neepawa, Park, Pasqua, Pembina, Thatcher, Unity VB and 5603HR. For more information see the Canadian Grain Commission website www.grainscanada.gc.ca. The long term average maturity for AC Barrie is 106 days and rated as Medium (M). Fusarium Head Blight (FHB) infection is highly influenced by the environment and heading date. Under high levels of FHB all varieties will sustain damage. Moderately Resistant (MR) and Resistant (R) ratings for FHB do not equate to immunity. Varieties rated Intermediate (I) to Susceptible (S) for loose smut or bunt should be treated with a systemic seed treatment to reduce the potential for infection. CDC Adamant VB, CDC Landmark VB and CDC Hughes VB have a solid stem that confers resistance to the wheat stem sawfly. 5604HR CL, 5605HR CL, CDC Abound, CDC Imagine, CDC Thrive and WR589 CL are tolerant to the CLEARFIELD® herbicides Adrenalin SC and Altitude FX. VB - designates a varietal blend to preserve the *Sm1* orange wheat blossom midge tolerance gene. New CWRS registrations: AAC Jatharia VB (BW483), AAC Alida (BW980), CDC Adamant VB (BW488). Insufficient data to describe: AAC Jatharia VB, AAC Alida, and Parata. XX - Insufficient data to describe. † - Flagged for possible removal in 2019.

CANADA WESTERN RED SPRING WHEAT (alternate reporting format)

Yield: Annual Means by Productivity Environment *

Variety	Low Yield Sites (< 60 bu/ac)					High Yield Sites (>= 60 bu/ac)					Overall Yield	Station Years of testing
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
AC Barrie (bu/ac)	**36**	**44**	**46**	**48**	**47**	**75**	**71**	**69**	**78**	**75**	**60**	**363**
AC Barrie (check)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**363**
Carberry			**106**	**104**	**113**			**107**	**101**	**109**	**107+**	**138**
5604HR CL	95					101					99	76
5605HR CL	114	95	105			114	109	108			109+	43
AAC Bailey	106	94				98	104				103	58
AAC Brandon	119	104				114	122				114+	41
AAC Elie	135	105				114	121				115+	41
AAC Redwater	103	97				107	109				103	41
Cardale	113	96				103	108				105+	41
CDC VR Morris	105		115			113		110			109+	41
CDC Plentiful	111	101				108	110				106+	41
CDC Stanley	106					120					113+	76
CDC Titanium VB	112	102	110			107	111	104			108+	41
Coleman	104	92	94			103	104	101			101	43
Katepwa	95	96				98	99				97	278
SY433	108					105					104	44
Thorsby	98	97	103			106	113	109			106+	43
AAC Connery		94	104	107			108	108	108		106+	42
AAC Prevail VB		99	104	106			107	107	109		106+	42
Go Early		97	107	102			105	109	102		104	42
SY479 VB		95	98	99			97	98	97		97-	42
SY637		95	101	98			107	104	103		103	42
AAC Cameron VB			112	113	105			118	118	122	117+	42
AAC Redberry			109	109	107			111	104	108	108+	42
AAC Viewfield ▲			118	116	110			116	117	119	117+	42
CDC Bradwell			104	112	106			105	112	109	108+	42
SY Slate ▲			109	106	109			106	105	113	108+	42
AAC Tisdale ▲				107	103				106	107	106	28
CDC Adamant VB ▲				109	96				110	116	111+	28
CDC Hughes VB ▲				111	107				109	114	111+	28
CDC Landmark VB ▲				110	103				112	119	113+	28
SY Sovite				105	105				102	106	104	28
CDC Go (benchmark)					**110**					**115**	**111+**	**104**
Stettler (benchmark)					**107**					**112**	**112+**	**83**
Number of Sites	**4**	**4**	**5**	**4**	**3**	**11**	**10**	**9**	**10**	**11**		

* Please see the INTRODUCTION for an explanation of this new yield format

CANADA WESTERN HARD WHITE SPRING WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Barrie): Low < 45 (bu/ac)	Medium 45 – 75 (bu/ac)	High > 70 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
						Previously tested varieties (Yield and agronomic data only directly comparable to AC Barrie)												
AC Barrie (bu/ac)		60	42	63	84													
AC Barrie		**100**	**100**	**100**	**100**	**M**	**14**	**62**	**38**	**87**	**N**	**G**	**G**	**MR**	**I**	**S**	**MS**	**I**
AAC Iceberg	39	104	96	106	107	M	-0.7	64	39	86	Y	G	P	MS	I	MR	MS	I
CDC Whitewood	43	107+	XX	110	105	M	-0.9	64	38	87	Y	G	G	S	S	I	MS	I
Snowbird	94	101	99	101	101	M	-0.2	62	36	89	N	G	G	MR	MS	MS	S	I
Snowstar	58	102	99	103	102	M	-0.8	64	30	82	N	G	G	MS	S	MS	I	MS
Whitehawk	42	107	112+	108+	106	E	-0.9	63	33	90	N	G	G	I	MS	MS	MS	I

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. The long term average maturity for AC Barrie is 106 days and rated as Medium (M). Fusarium Head Blight (FHB) infection is highly influenced by the environment and heading date. Under high levels of FHB all varieties will sustain damage. Moderately Resistant (MR) and Resistant (R) ratings for FHB do not equate to immunity. Varieties rated Intermediate (I) to Susceptible (S) for loose smut or bunt should be treated with a systemic seed treatment to reduce the potential for infection. XX - Insufficient data to describe. † - Flagged for possible removal in 2019.

CANADA PRAIRIE RED SPRING WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Barrie): Low < 65	Medium 65 - 90 (bu/ac)	High > 90 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
			Varieties tested in the 2016 trials (Yield, significant differences and agronomic data only directly comparable to AC Barrie)															
AC Barrie (bu/ac)		66	42	64	89													
AC Barrie		**100**	**100**	**100**	**100**	**M**	**13.8**	**63**	**40**	**90**	**N**	**G**	**G**	**MR**	**I**	**S**	**MS**	**I**
Carberry - check		**106+**	**107+**	**107+**	**104+**	**L**	**0**	**63**	**40**	**79**	**Y**	**VG**	**F**	**MR**	**R**	**MR**	**MS**	**MR**
AAC Crossfield	43	122+	119+	124+	122+	M	-1.2	62	42	80	Y	G	XX	MS	I	R	I	I
AAC Entice ▲	30	119+	114+	125+	119+	M	-0.7	62	40	77	Y	G	XX	MS	S	R	MS	I
AAC Goodwin ▲	31	123+	121+	126+	122+	M	-0.4	63	41	83	Y	VG	G	MS	MS	R	I	I
AAC Penhold	58	118+	113+	123+	118+	M	-1	63	45	71	Y	VG	G	I	R	MR	I	MR
CDC Terrain ▲	30	122+	124+	122+	119+	M	-1.4	62	44	88	Y	G	G	MR	MR	R	I	MS
SY Rowyn ▲	30	114+	113+	117+	111+	M	-1	62	36	78	Y	G	F	I	S	MR	I	MR
			Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to AC Barrie)															
5700PR *	117	117+	XX	121+	113+	L	-1.9	62	42	75	Y	VG	F	MS	R	MS	MS	MS
AAC Crusader †	40	116+	XX	116+	117+	M	-1.2	60	41	80	Y	G	P	MR	I	XX	MS	I
AAC Foray VB	41	128+	XX	130+	120+	M	-1.7	63	51	85	Y	G	G	MS	I	MR	MS	I
AAC Ryley	37	118+	XX	120+	114+	M	-0.6	60	48	82	Y	G	G	I	R	S	MS	MS
AAC Tenacious VB †	40	107+	XX	109+	101	M	-1.3	62	39	97	Y	P	VG	R	R	MR	MS	R
AC Crystal	278	115+	XX	119+	113+	L	XX	62	42	79	Y	G	P	I	R	S	I	S
SY985 *	51	112+	XX	115+	109+	M	0.1	61	44	78	Y	G	P	R	MR	XX	I	I
SY995	41	118+	XX	119+	113+	M	-1.9	63	45	79	Y	G	P	S	MR	MR	MS	MS

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. Several CPSR varieties will be reclassified to the CNHR wheat class. AC Foremost, AC Taber, Conquer and Oslo will be reclassified on August 1, 2018 and AC Crystal will be reclassified on August 1, 2019. For more information see the Canadian Grain Commission website www.grainscanada.gc.ca. The long term average maturity for AC Barrie is 106 days and rated as Medium (M). Fusarium Head Blight (FHB) infection is highly influenced by the environment and heading date. Under high levels of FHB all varieties will sustain damage. Moderately Resistant (MR) and Resistant (R) ratings for FHB do not equate to immunity. Varieties rated Intermediate (I) to Susceptible (S) for loose smut or bunt should be treated with a systemic seed treatment to reduce the potential for infection. VB - designates a varietal blend to preserve the *Sm1* orange wheat blossom midge tolerance gene. New CPSR registrations: AAC Goodwin (BW968). XX - Insufficient data to describe. * Yield figures based on direct and indirect comparisons with AC Barrie. † - Flagged for possible removal in 2019.

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CANADA NORTHERN HARD RED WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Barrie): Low < 55	Medium 55 - 75 (bu/ac)	High > 75 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
			Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to AC Barrie)															
AC Barrie (bu/ac)		**66**	**44**	**60**	**83**													
AC Barrie		**100**	**100**	**100**	**100**	**M**	**13.8**	**63**	**40**	**89**	**N**	**G**	**G**	**MR**	**I**	**S**	**MS**	**I**
Carberry - check		**106+**	**107**	**106+**	**106+**	**L**	**0**	**64**	**40**	**79**	**Y**	**VG**	**F**	**MR**	**R**	**MR**	**MS**	**MR**
AAC Concord ▲	45	110+	112+	105	113+	M	-0.6	62	41	87	N	F	F	I	MR	R	I	MS
Elgin ND	43	118+	122+	118+	116+	M	-0.6	63	38	87	Y	G	XX	XX	S	MR	I	I
			Effective August 1, 2018 the following varieties are designated as CANADA NORTHERN HARD RED															
AC Foremost *	141	119+	116+	123+	117+	L	-1.3	62	42	73	Y	VG	F	I	R	S	MS	S
Conquer VB *	51	121+	XX	123+	120+	M	-0.8	62	45	84	Y	F	P	MS	R	MR	I	MS
Harvest	118	102	98	103	104+	M	-0.1	62	36	84	N	VG	VG	MR	S	MR	MS	S
Lillian	87	104+	111+	100	104	M	0.2	61	37	86	N	F	G	I	MR	R	MR	S
Unity VB †	71	110+	111+	110+	111+	M	-0.7	64	36	89	Y	F	G	MS	R	MS	MS	MS

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. Several CWRS and CPSR varieties will be reclassified to this new CNHR class, effective August 1, 2018. The CWRS varieties are AC Abbey, AC Cora, AC Eatonia, AC Majestic, AC Michael, AC Minto, Alvena, Alikat, CDC Makwa, CDC Osler, Columbus, Conway, Harvest, Kane, Katepwa, Leader, Lillian, McKenzie, Neepawa, Park, Pasqua, Pembina, Thatcher, Unity VB and 5603HR. The CPSR varieties are AC Foremost, AC Taber, Conquer and Oslo. AC Crystal will be reclassified on August 1, 2019. For more information see the Canadian Grain Commission website www.grainscanada.gc.ca. The long term average maturity for AC Barrie is 106 days and rated as Medium (M). Fusarium Head Blight (FHB) infection is highly influenced by the environment and heading date. Under high levels of FHB all varieties will sustain damage, Moderately Resistant (MR) and Resistant (R) ratings for FHB do not equate to immunity. AAC Concord has a solid stem that confers resistance to the wheat stem sawfly. Varieties rated Intermediate (I) to Susceptible (S) for loose smut or bunt should be treated with a systemic seed treatment to reduce the potential for infection. Insufficient data to describe: Faller, Prosper. XX- Insufficient data to describe. † - Flagged for possible removal in 2019.

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CANADA WESTERN SPECIAL PURPOSE WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Barrie): Low < 65	Medium 65 - 90 (bu/ac)	High > 90 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
			Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to AC Barrie)															
AC Barrie (bu/ac)		**66**	**42**	**66**	**92**													
AC Barrie		**100**	**100**	**100**	**100**	**M**	**14.2**	**63**	**40**	**90**	**N**	**G**	**G**	**MR**	**I**	**S**	**MS**	**I**
Carberry - check		**106+**	**107+**	**107+**	**103**	**L**	**0.1**	**63**	**40**	**79**	**Y**	**VG**	**F**	**MR**	**R**	**MR**	**MS**	**MR**
AAC Awesome VB ▲	26	140+	141	135+	142+	L	-2.7	62	43	89	Y	G	P	I	I	R	I	I
Alderon	26	137+	125	133+	146+	VL	-2.9	58	41	75	N	VG	F	XX	MS	MR	I	XX
Charing VB ▲	26	143+	134	144+	145+	VL	-2.4	61	41	80	N	VG	G	XX	XX	R	MR	XX
Sparrow VB	26	141+	133+	143+	143+	VL	-2.5	61	41	80	N	VG	G	XX	I	MR	I	XX
Pasteur *	43	140+	139+	141+	139+	VL	-2	63	41	81	N	VG	G	MS	S	MR	I	I
			Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to AC Barrie)															
AAC Innova	38	134+	XX	135+	135+	L	-3.2	60	41	82	Y	G	P	S	S	R	I	S
AAC NRG097	41	124+	XX	121+	126+	L	-3	63	47	80	Y	G	F	I	R	S	I	I
CDC NRG003 * †	51	121+	XX	126+	112+	M	-1.9	61	43	80	Y	G	F	MS	R	XX	MS	S
SY087	41	120+	XX	122+	114+	M	-1.4	63	40	82	Y	G	F	MS	MR	MR	I	MR

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. The long term average maturity for AC Barrie is 106 days and rated as Medium (M). Fusarium Head Blight (FHB) infection is highly influenced by the environment and heading date. Under high levels of FHB all varieties will sustain damage. Moderately Resistant (MR) and Resistant (R) ratings for FHB do not equate to immunity. Varieties rated Intermediate (I) to Susceptible (S) for loose smut or bunt should be treated with a systemic seed treatment to reduce the potential for infection. * Yield figures based on direct and indirect comparisons with AC Barrie. XX - Insufficient data to describe. † - Flagged for possible removal in 2019.

CANADA WESTERN SOFT WHITE SPRING WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Andrew): Low < 65 (bu/ac)	Medium 65 - 100 (bu/ac)	High > 100 (bu/ac)	Agronomic Characteristics: Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Awns (Y/N)	Resistance to: Lodging	Shattering	Sprouting	Disease Tolerance: Loose Smut	Bunt	Stripe Rust	Leaf Spot	Fusarium Head Blight
Varieties tested in the 2017 trials (Yield, statistical differences and agronomic data only directly comparable to AC Andrew)																			
AC Andrew (bu/ac)		**85**	**54**	**86**	**123**														
AC Andrew *		**100**	**100**	**100**	**100**	**L**	**11.0**	**62**	**40**	**80**	**Y**	**VG**	**VG**	**P**	**S**	**S**	**I**	**MS**	**I**
AAC Indus VB	39	104	96	108	105	VL	-0.2	61	42	87	Y	VG	VG	P	S	MS	R	MS	MS
Sadash VB	61	107+	110+	106+	104	L	-0.1	63	39	81	Y	VG	VG	P	I	S	R	I	S
Previously tested varieties (Yield, statistical differences and agronomic data only directly comparable to AC Andrew)																			
AAC Chiffon VB	39	104+	106	105+	101	L	-0.4	62	46	88	Y	G	VG	P	S	S	MR	I	S
AC Meena †	51	97-	101	97-	95-	L	0	62	37	80	Y	G	G	F	MS	MS	MR	S	S

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. AC Andrew yields about 35% more than AC Barrie. In addition to traditional markets, SWS wheat varieties may have demand as a feedstock for ethanol production. *Maturity, resistance to lodging and sprouting are compared with AC Barrie. Varieties rated Intermediate (I) to Susceptible (S) for loose smut or bunt should be treated with a systemic seed treatment to reduce the potential for infection. New CWSWS registrations: AAC Paramount (SWS433). Insufficient data to describe: AAC Paramount. * Yield figures based on direct and indirect comparisons with AC Andrew. † - Flagged for possible removal in 2019.

MALTING BARLEY

Variety	2 or 6 row	Awn Type	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Metcalfe): Low < 75 (bu/ac)	Medium 75 - 100 (bu/ac)	High 100 - 125 (bu/ac)	V. High > 125 (bu/ac)	Agronomic Characteristics: Maturity Rating	Test Weight (lb/bu)	TKW (g)	Height (cm)	Resistance to Lodging	Disease Tolerance: Loose Smut	Other Smuts	Root Rot	Scald	Net Blotch: Spot form	Net Blotch: Net form	Fusarium Head Blight
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to AC Metcalfe)																				
AC Metcalfe (bu/ac)				**100**	**59**	**88**	**110**	**137**												
AC Metcalfe	**2**	**R**		**100**	**100**	**100**	**100**	**100**	**M**	**52**	**46**	**79**	**F**	**R**	**I**	**I**	**S**	**I**	**S**	**I**
AAC Connect ▲	2	R	27	103+	XX	XX	106	104+	M	50	49	77	G	S	R	MS	S	MR	I	MR
AAC Synergy	2	R	54	114+	121+	112+	114+	113+	M	51	48	76	F	S	I	I	S	R	MR	MS
CDC Fraser ▲	2	R	39	109+	XX	114	110+	108+	M	51	49	76	G	R	MR	MS	MS	MR	MR	MR
Lowe ▲	2	R	27	110+	XX	XX	115+	105+	L	51	48	84	F	R	R	XX	MR	MR	I	MR
Sirish ▲	2	R	27	111+	XX	XX	108	114+	M	51	48	67	G	S	R	XX	MR	MS	MS	MS
TR13606 ▲	2	R	27	109+	XX	XX	107	109+	M	51	46	79	G	R	R	XX	MS	MR	I	I
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to AC Metcalfe)																				
Bentley	2	R	77	105+	109	102	105+	106+	M	52	47	81	G	MS	MR	MR	S	R	MS	MS
CDC Bow	2	R	42	104+	XX	106	105	104	M	51	48	77	VG	S	I	MS	MS	MR	S	MS
CDC Clear (hulless)	2	R	43	95-	XX	92-	100	XX	L	62	47	85	G	R	R	I	S	R	MS	MR
CDC Copeland	2	R	137	103+	96	101	106+	104+	M	51	47	81	F	MS	I	I	S	I	I	I
CDC Kindersley	2	R	47	104+	XX	102	104	104+	E	53	43	78	G	S	R	I	S	MR	MS	I
CDC Meredith	2	R	65	107+	102	108+	108+	107+	L	51	46	76	F	R	MR	MR	S	R	S	I
CDC PlatinumStar ▲	2	R	42	106+	XX	108	107+	102	M	53	49	82	F	R	R	S	S	MR	I	MR
CDC PolarStar	2	R	43	101	XX	103	105+	97	M	52	44	79	G	S	R	MS	S	MR	S	MR
Cerveza	2	R	49	109+	XX	109+	108+	109+	M	51	46	74	F	R	R	I	S	MR	MS	I
Harrington †	2	R	284	93-	96-	94-	93-	91-	M	51	44	78	F	MS	MS	I	S	MS	S	MR
Major	2	R	72	107+	104	108+	107+	106+	M	51	45	73	G	R	MR	I	MS	MR	I	I
Merit 57 †	2	R	87	109+	110+	108+	109+	111+	VL	51	44	79	F	MS	S	I	MS	MR	MS	MS
Newdale	2	R	94	105+	106	104+	105+	106+	M	52	46	73	F	S	MR	MR	MS	MR	I	I
LEGACY	6	SS	122	99	93	95-	102	103	M	49	39	82	G	I	MR	MR	S	MR	S	MS
Tradition †	6	SS	121	98	90-	95-	101	103	E	50	40	81	G	S	MR	MR	S	I	S	S

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. The long term average maturity for AC Metcalfe is 95 days and is rated as Medium (M). Varieties rated Intermediate (I) to Susceptible (S) for smuts should be treated with a systemic seed treatment to reduce the potential for infection. The Canadian Malting Barley Technical Centre (CMBTC) evaluates and recommends malting barley varieties for industry acceptance. Please refer to the 2017-2018 CMBTC Recommended Malt Barley Variety List for more information. CDC Clear is a hulless malting variety. New registrations:AAC Connect (TR12225), CDC GoldStar (TR13812), Lowe (TR13609), Sirish (TR14928). † - Flagged for possible removal in 2019.

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FEED AND FOOD BARLEY

Variety	2 or 6 row	Awn Type	Overall Station Years of Testing	Overall Yield	Yield Category (% AC Metcalfe): Low < 75 (bu/ac)	Medium 75 - 100 (bu/ac)	High 100 - 125 (bu/ac)	V. High > 125 (bu/ac)	Agronomic Characteristics: Maturity Rating	Test Weight (lb/bu)	TKW (g)	Height (cm)	Resistance to Lodging	Disease Tolerance: Loose Smut	Other Smuts	Root Rot	Scald	Net Blotch: Spot form	Net Blotch: Net form	Fusarium Head Blight
GENERAL PURPOSE																				
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to AC Metcalfe)																				
AC Metcalfe (bu/ac)				**100**	**59**	**88**	**110**	**137**												
AC Metcalfe	**2**	**R**		**100**	**100**	**100**	**100**	**100**	**M**	**52**	**46**	**79**	**F**	**R**	**I**	**I**	**S**	**I**	**S**	**I**
Altorado	2	R	39	112+	XX	117	109+	114+	M	52	48	74	G	MR	MR	MR	S	MR	S	I
CDC Austenson	2	R	77	112+	110	112+	110+	115+	L	53	47	78	G	S	R	I	S	R	MS	I
Champion	2	R	178	112+	120+	111+	111+	111+	M	53	49	76	G	S	R	MR	S	I	S	I
Claymore	2	R	54	113+	106	113+	110+	118+	L	51	47	77	G	S	R	I	S	I	S	I
Oreana	2	R	54	111+	105	108+	115+	114+	L	53	50	66	VG	S	R	I	S	MR	S	S
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to AC Metcalfe)																				
Brahma	2	R	87	111+	112+	109+	113+	111+	M	53	47	74	G	MS	R	MR	S	I	I	I
Busby	2	R	45	104+	107	103	106	103	M	53	49	78	G	S	MR	S	I	MR	MS	I
CDC Coalition	2	R	57	110+	107	112+	108+	109+	L	53	47	74	G	R	R	I	S	MR	S	I
CDC Cowboy	2	R	75	95-	107	94-	93-	96-	L	52	55	103	F	MS	MR	I	MS	MR	I	MR
CDC Maverick	2	S	43	95-	XX	90-	97	96	M	54	55	98	F	S	R	I	MS	MR	I	MR
CDC Trey	2	R	106	103+	101	105+	101	105+	M	52	50	80	G	MS	R	MR	MS	R	I	I
Canmore	2	R	40	107+	XX	104	111+	108+	M	52	49	73	G	R	R	I	MR	MR	MS	I
CONLON	2	S	63	94-	97	93-	93-	96-	VE	52	52	80	G	I	I	MR	S	MR	I	MR
Gadsby	2	R	45	112+	XX	114+	114+	108+	M	53	51	83	F	R	R	I	R	MR	MS	I
Ponoka †	2	R	120	108+	101	107+	110+	109+	L	51	46	80	G	R	R	I	MR	MR	MS	I
Seebe †	2	R	229	101	97	100	102	100	VL	52	50	86	G	S	R	I	MR	MS	S	MR
XENA †	2	R	271	112+	111+	109+	114+	112+	M	52	49	77	G	MS	MS	MR	S	I	S	MR
AC Harper †	6	SS	166	103+	95	96-	102	111+	M	48	40	80	G	MS	I	I	I	I	I	MS
AC Ranger	6	S	48	107+	101	99	118+	107+	L	49	43	74	F	MS	I	MR	MS	MR	I	S
AC Rosser †	6	S	166	108+	101	102	109+	113+	M	48	41	82	G	MS	R	MR	S	MR	I	S
Amisk	6	SS	40	105+	XX	105	104	108+	M	49	46	69	VG	S	MS	MS	I	MR	I	S
Chigwell	6	S	43	104	XX	98	106	111+	M	49	41	76	G	MS	MR	MS	MR	MR	I	S
Muskwa †	6	S	44	105+	XX	103	105	110+	M	50	42	73	G	MS	R	MS	MR	MR	MS	S
Sundre	6	S	72	110+	100	105	112+	117+	L	51	43	86	G	MS	R	MS	R	I	MS	S
Trochu	6	S	136	107+	101	102	109+	112+	M	49	41	78	G	MS	MR	MR	I	MR	S	I
Vivar	6	R	175	109+	97	105+	109+	115+	M	49	44	73	VG	I	R	MR	I	MR	R	S
HULLESS																				
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to AC Metcalfe)																				
CDC Ascent ▲	2	R	27	95-	XX	102	92	94-	M	60	44	81	G	MR	MR	I	MS	MR	S	MR
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to AC Metcalfe)																				
CDC Carter †	2	R	45	97-	97	99	94-	XX	M	62	39	77	VG	R	R	S	MS	MR	I	I
CDC McGwire †	2	R	107	93-	88-	93-	99	XX	M	61	39	80	VG	MS	MR	MR	I	MR	I	MR
Falcon	6	S	181	83-	72-	83-	91-	89	E	58	35	68	VG	MS	MR	I	I	I	I	S
Tyto †	6	S	72	81-	79-	84-	96	96	M	55	40	73	VG	S	R	I	MS	I	S	MS

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. The long term average maturity for AC Metcalfe is 95 days and is rated as Medium (M). Varieties rated Intermediate (I) to Susceptible (S) for smuts should be treated with a systemic seed treatment to reduce the potential for infection. Hulless varieties leave the hull in the field and thus grain yields comparable to hulled varieties are 9-12% lower. Handling of hulless varieties should be minimized to avoid seed damage. CDC Carter, CDC McGwire, Falcon and Tyto are normal starch barleys suitable for food use. New registrations: CDC Ascent (HB13324). † - Flagged for possible removal in 2019.

SPRING TRITICALE

Variety	Overall Station Years of Testing	Overall Yield	Yield Category: Low < 70 (bu/ac)	Medium 70 - 100 (bu/ac)	High 100-130 (bu/ac)	V. High > 130 (bu/ac)	Agronomic Characteristics: Maturity Rating	Test Weight (lb/bu)	TKW (g)	Height (cm)	Resistance to: Lodging	Shattering	Sprouting	Disease Tolerance: Ergot	Stripe Rust	Bunt	Fusarium Head Blight
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to Brevis)																	
Brevis (bu/ac)		**102**	**61**	**90**	**124**	**158**											
Brevis		**100**	**100**	**100**	**100**	**100**	**M**	60	46	92	**G**	**G**	**F**	**MR**	**MR**	**R**	**I**
AAC Delight ▲	21	95-	XX	XX	98	94	M	57	55	96	G	G	XX	MR	R	R	I
Previously tested varieties: 2011 - 2013 (Yield and agronomic data only directly comparable to Brevis)																	
Sunray	35	90-	93-	91-	XX	91-	M	57	45	94	VG	G	F	MR	MR	R	MS
Taza	35	88-	91-	89-	XX	90-	M	58	47	100	G	G	F	I	MR	R	S
Previously tested varieties: 2001 - 2013 (Yield and agronomic data only directly comparable to AC Ultima)																	
AC Ultima (bu/ac)		**82**	**54**	**85**	**117**	**146**											
AC Ultima		**100**	**100**	**100**	**100**	**100**	**E**	**57**	**45**	**96**	**G**	**G**	**F**	**MS**	**MR**	**R**	**I**
Bumper †	41	104	114+	100	99	96	E	59	45	90	VG	G	F	XX	MR	R	MS
Bunker	49	90-	88-	92-	92-	xx	VL	57	48	107	F	G	F	XX	MR	R	I
Pronghorn	120	101	100	101	103	102	M	55	43	98	G	G	F	I	MR	R	MR
Taza	48	98	98	100	93-	XX	M	57	47	99	G	G	F	I	MR	R	S
Tyndal	55	101	104	99	98	96	L	57	44	97	G	G	P	XX	MR	R	MS

Remarks: Triticale is late maturing compared to CWRS wheat (approximately five days later). AC Ultima yields about 30% more than AC Barrie (CWRS wheat) in areas of adaptation. AAC Delight, Bunker, Taza, and Tyndal have heads with reduced-awns which may be beneficial when harvested as forage or silage. New registration: AAC Delight (T225). XX - Insufficient data to describe. † - Flagged for possible removal in 2019.

OAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% CDC Dancer): Low < 70 (bu/ac)	Medium 70 - 100 (bu/ac)	High 100 - 130 (bu/ac)	V. High > 130 (bu/ac)	Agronomic Characteristics: Maturity Rating	Test Weight (lb/bu)	TKW (g)	Height (cm)	Resistance to Lodging	Tolerance to Smuts
MILLING												
Varieties tested in the 2017 trials (Yield, significant differences and agronomic data only directly comparable to CDC Dancer)												
CDC Dancer (bu/ac)		**96**	**49**	**84**	**111**	**148**						
CDC Dancer		**100**	**100**	**100**	**100**	**100**	**E**	**41**	**37**	**95**	**G**	**R**
AC Morgan	73	113+	113+	110+	114+	115+	M	40	41	91	VG	I
Akina	30	109+	XX	103	114+	111+	M	40	39	90	VG	R
CDC Ruffian	38	110+	108	109	116+	108	M	40	39	93	G	R
Kara	20	108	XX	101	112	110	M	41	41	95	VG	MR
Kyron ▲	20	115+	XX	108	121+	117+	M	41	40	98	VG	XX
Pomona ▲	20	104	XX	101	103	107	M	42	39	104	G	XX
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to CDC Dancer)												
AAC Justice	28	104	XX	99	109+	XX	M	42	36	91	G	R
AC Juniper	80	104+	102	104	106+	105+	E	41	38	94	VG	I
Bradley †	31	104+	XX	103	108	106	M	39	39	92	VG	R
CDC Boyer †	89	102	103	102	100	105	M	39	42	101	G	MS
CDC Minstrel	61	104+	103	103	105	105+	M	39	38	88	VG	R
CDC Norseman	27	101	XX	100	101	XX	E	41	38	94	G	MS
CDC Orrin	52	109+	113+	107+	107+	XX	M	41	40	84	G	R
CDC Seabiscuit	30	111+	124	106	108	108	M	39	41	101	G	MR
CDC Weaver †	44	104	108+	103	100	100	M	40	43	91	F	R
CS Camden	27	109+	XX	109+	106	XX	L	41	39	90	G	I
Derby	79	101	103	102	96-	105	L	41	39	103	G	MS
Jordan †	36	112+	112+	109+	117+	XX	VL	38	44	87	G	R
Souris †	28	110+	120+	103	111	XX	M	41	34	91	VG	R
Stride	30	104+	101	102	107	106	M	42	35	104	G	R
Triactor	47	110+	109	108+	114+	110+	M	38	38	89	G	R
FEED												
Previously tested varieties (Yield, significant differences and agronomic data only directly comparable to CDC Dancer)												
AC Mustang *	108	114+	118+	112+	110+	116+	L	42	37	103	G	I
CDC Nasser	31	116+	132	107	115+	110	L	39	36	98	G	MR
Lu *†	58	100	99	98	99	108	VE	41	39	85	G	R
Previously tested varieties (Yield and agronomic data only directly comparable to CDC Dancer)												
CDC Baler *	42	99	96	106	96	XX	L	40	43	99	XX	S
CDC Haymaker	28	104	XX	103	105	XX	L	39	40	100	F	MR
Murphy *	51	95-	93	96	97	94	M	39	36	108	XX	S

Remarks: For explanations on data summarization methods, abbreviations and other pertinent information, please see the comments at the beginning of this publication. The long term average maturity for CDC Dancer is 98 days and rated as Early (E). Varieties rated Intermediate (I) to Susceptible (S) for the smuts should be treated with a systemic seed treatment to reduce the potential for infection. New registrations: Kara (CFA1102), Kyron (CFA1207), ORe3541M (OT6008), ORe3542M (OT6009), OT3085 and Pomona (CFA1220). Insufficient data to describe: ORe3541M (OT6008), ORe3542M (OT6009) and OT3085.
* Yield figures based on direct and indirect comparisons with CDC Dancer. † - Flagged for possible removal in 2019.

WINTER WHEAT

Variety	Overall Station Years of Testing	Overall Yield	Yield Category (% Radiant): Low <45 (bu/ac)	Medium 45 - 75 (bu/ac)	High 75 - 105 (bu/ac)	V. High >105 (bu/ac)	Agronomic Characteristics: Winter Survival	Maturity Rating	Protein %	Test Weight (lb/bu)	TKW (g)	Height (cm)	Resistance to Lodging	Disease Tolerance: Stripe Rust	Leaf Rust	Stem Rust	Bunt	Fusarium Head Blight
CANADA WESTERN RED WINTER																		
Yield, significant differences and agronomic data only directly comparable to Radiant																		
Radiant (bu/ac)		**76**	**37**	**63**	**87**	**114**												
Radiant		**100**	**100**	**100**	**100**	**100**	**VG**	**L**	**12.0**	**63**	**36**	**90**	**VG**	**S**	**S**	**S**	**S**	**S**
AAC Elevate	72	106+	106	107+	107+	XX	G	M	+0.3	63	39	84	VG	MS	I	MR	MR	I
AAC Gateway	75	100	XX	99	103	XX	F	M	+0.9	63	33	77	VG	MR	I	MR	S	I
AAC Goldrush ▲	29	102	XX	98	105	XX	VG	M	+0.5	63	34	86	G	I	R	MR	S	I
AAC Wildfire ▲	43	114+	XX	117+	114+	XX	VG	VL	+0.3	64	38	86	G	R	I	S	MR	MR
AC Tempest †	117	97-	96	97	96-	99	P	VL	+1.5	63	37	91	VG	MR	S	S	MS	I
CDC Buteo †	198	97-	94-	98	95-	101	VG	M	+0.3	65	34	91	F	S	I	I	S	MR
CDC Chase †	43	101	XX	96	104	XX	F	M	+0.6	64	33	94	F	MR	R	R	S	MS
Emerson	79	98	96	95	100	XX	G	M	+0.7	64	30	86	G	MR	I	R	S	R
Flourish †	119	100	99	98	102	104	F	E	+0.6	63	35	80	VG	I	I	I	MR	S
Moats	90	104+	91	102	107+	108+	G	M	+0.7	64	33	91	F	MR	R	R	MS	S
CANADA WESTERN EXPERIMENTAL																		
Yield, significant differences and agronomic data only directly comparable to Radiant																		
AAC Icefield ▲	39	105	XX	98	111+	XX	F	M	-0.6	63	32	82	VG	R	R	MR	S	MS
CANADA WESTERN SPECIAL PURPOSE																		
Yield, significant differences and agronomic data only directly comparable to Radiant																		
Pintail	79	108+	XX	109+	109+	XX	VG	L	-1.4	61	29	88	F	MR	MS	MS	S	S

REMARKS: Winter wheat can be grown successfully in all areas of Alberta if seeded into standing stubble within the optimal seeding date period (generally before September 15) and if there is adequate snowfall. Varieties with poor (P) winter survival are generally not suitable outside of southern Alberta. The long term average maturity for **Radiant** is August 10 and is rated as late (L). Fusarium head blight infection may be reduced if varieties with Intermediate (I) resistance or better are used and when recommended seeding dates are followed. **Radiant** and **AAC Elevate** have tolerance to the wheat curl mite, the vector for Wheat Streak Mosaic Virus. To preserve the effectiveness of the wheat curl mite tolerance gene, agronomic practices that eliminate the "green bridge" of plant material that serves as a reservoir for mites should be followed whenever possible. Fields in southern Alberta should be inspected in the fall for infestation by Russian wheat aphid, as it may reduce winter survival. **AAC Wildfire** expresses some tolerance to Russian wheat aphid. **AC Tempest, Radiant** and **AAC Wildfire** have bronze chaff at maturity. **AAC Icefield** is a hard white winter wheat under interim registration, eligible for experimental grades to facilitate market research under an Identity Preserved system. **AAC Icefield** expresses high milling yield of very white flour and good gluten strength at lower protein concentrations that may be of interest in some niche markets. For more information contact FP Genetics. **Pintail** has an awnless head which may improve palatability when harvested for forage or silage. **AAC Wildfire** will be available in 2018. Limited quantities of **AAC Goldrush** and **AAC Icefield** may be available in 2019. XX - Insuficient data to describe. † Flagged for possible removal in 2019.

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