2022, Issue 3

# Grow With Us

Lakeland Agricultural Research Association

May/June 2022

## Patch-burn Grazing Provides Benefits for Livestock Production

*Megan Wanchuk, LARA*

In recent years, heterogeneity has become a key focus of conservation-based land management practices on grazing rangelands. Heterogeneity refers to differences in vegetation and habitats across a landscape and is mostly driven by disturbances. Historically, disturbances such as climate, fire, and grazing shaped the landscape, but remain important today for the continued diversity of plants, wildlife, and pollinators. While management for heterogeneity has been established as beneficial for the biodiversity of several plant and wildlife species, it remains relatively unknown how management for heterogeneity influences livestock production.

Prior to European colonization, fire and grazing together were major drivers in vegetation patterns across North America. Grazing wildlife preferred these recently burned areas, grazing them heavily until another area was burned and grazing shifted to this newly burned area. This shift in utilization allowed previously burned patches to undergo a rest period until fuels built up for another fire event. These disturbance patterns created a heterogeneous landscape through the shifting mosaic of patches, providing habitat for wildlife that require diverse types of vegetation structure.

The historical disturbance of fire and grazing can be mimicked using a grazing strategy called patch-burn grazing. Patch-burn grazing combines patchy, low intensity, prescribed fire with season-long grazing. Each year a specified section of a pasture is burned, creating a recently burned patch each grazing season. As a result, livestock concentrate grazing in recently burned areas and avoid areas with the longest time since fire, creating heterogeneity through the varying time since fire patches.

Rotational grazing can also be used to create structural heterogeneity without the use of fire. Continuous grazing and some rotational grazing systems create

*Continued on page 9...*

## In This Issue:


| | |
|---|---|
| ***Organic Waste Recycling*** | **3** |
| *Cleanfarms* | 3 |
| ***2022 Project Highlights*** | **4** |
| *Welcome Megan!* | 7 |
| ***Dugout Management*** | **8** |
| *Early Seeding Winter Cereals* | 10 |
| ***Crop Rotation*** | **11** |


# *2022 Calendar of Events*

| | | |
|---|---|---|
| Fort Kent Field Day | July 21st, 2022 | LARA Research Site |
| Soil Health, Cover Crops and Livestock | July 26th, 2022 | TBD |
| Lac La Biche Field Day | July 27th, 2022 | Craigend Hall |
| Transitioning to Organics | August TBD | Lac La Biche County |
| St. Paul Field Day | August 4th, 2022 | County of St. Paul |
| Smoky Lake Field Day | August 10th, 2022 | Smoky Lake County |

## Call the LARA Office for help with:

Age Verification, Feed Testing, Environmental Farm Plans, Canadian Agricultural Partnerships Applications and more.

780.826.7260

## Feed Testing

We offer two free feed tests to all producers in the MD of Bonnyville, Lac La Biche County, Smoky Lake County and the County of St. Paul.

Call the office to borrow a bale probe or to drop off a sample: 780.826.7260

Find us on Facebook

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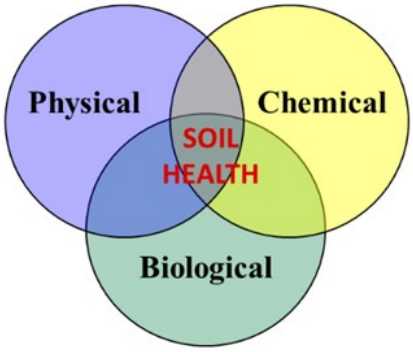
## Regenerative Agriculture through Organic Waste Recycling

*Alyssa Krawchuk, LARA*

Regenerative agriculture has been described as a rehabilitation approach to farming systems where farming and grazing practices use technologies to regenerate and revitalize the soil and environment. Regenerative agriculture can include a wide range of agricultural practices such as reduced tillage, cover cropping, integration of livestock, application of soil stimulants and the list goes on.

In recent years, focus has been on regenerating soil health, which can be defined as "the capacity of soil to function as a living system" and includes three components: physical, chemical and biological. Physical components include compaction and water infiltration. The chemical component of the soil is probably the one we are all most familiar with, particularly nutrient cycling. Soils cycle nutrients required for plant growth and the cycle needs to be in balance to produce healthy microbial and plant life. The least understood component is the biological, which includes the role of bacteria, mycorrhizal fungi, earthworms and other microbes building and maintain healthy soils.




According to Dr. Elaine Ingham with the Soil Food Web, some of the many benefits of improving soil biology include:

- Making nutrients in the soil more available to plants thus reducing the need for synthetic fertilizers.
- Retain more nutrients in the soil by reducing runoff and leaching.
- Help to suppress disease and reduce the need for pesticides.
- Build soil structure to help reduce water use, increase water holding capacity and increase plant rooting depth.
- Help to suppress weeds.
- Increases carbon sequestration in the soil.
- Assist in decomposing toxins.

*Continued on page 6...*

In January 2022, it was announced that the < 23 L pesticide & fertilizer container recycling program will transition from a municipal-based collection model to a retail-based collection model across the province over the next three years.

cleanfarms

The transition will involve phasing out a portion of the municipal locations each year. The lowest volume municipal sites will close by end of year 2022, medium volume sites will close by end of year 2023 and highest volume sites will close end of year 2024. **Retail sites will be providing customers with bags to be used to return empty chemical jugs to municipal sites or retail sites.**

Below is a list of when sites in the local area will be closing. Please contact your local municipality for additional information or to determine if there are any recent changes to closure dates as these may be subject to change.

**County of St. Paul:**
Evergreen Regional Landfill – December 2024
Ashmont, Mallaig, St. Lina, St. Edouard & Whitney Lakes—December 2024
**Smoky Lake County**
Smoky Lake Landfill – December 2023
Vilna, Bellis & Spedden – December 2022
**Lac La Biche County**
Plamondon & Beaver Lake Landfill – December 2022
**MD of Bonnyville**
Bonnyville Municipal Seed Cleaning Plant – December 2023
Goodridge Landfill – December 2022

## Spotlight on 2022 Annual Crop Research Trials

*Amanda Mathiot, LARA*

The 2022 seeding season has started at LARA, and we are incredibly excited to see trials going into the ground. There will be 25 trials conducted alone within the Cropping Program, consisting of over 1100 small plots. The trials we conduct within the Cropping Program range from variety trials to agricultural products and practices. A couple of the tests being conducted this year are:

**Assessment of ESN on productivity and grain quality of wheat and barley in Northeastern Alberta.**

Funding for the trial is provided by the Canadian Agricultural Partnership (CAP) and fertilizer is being supplied by Top Gro Agro LTD. This trial is in its fourth and final year of testing. Within the ESN trial, we are looking at how applying various rates of ESN within a fertilizer blend affects spring wheat and barley production and the economic feasibility of applying different rates of blended ESN. The treatments are as stated below:

1. Check (No ESN applied; blend created based on soil test for optimal yield)
2. ESN blended at 30% total N fertilizer.
3. ESN blended at 50% total N fertilizer
4. ESN blended at 70% total N fertilizer
5. ESN blended at 80% total N fertilizer

The assessment of ESN trials will be showcased at the Fort Kent field tour on July 21st, 2022 and the Smoky Lake field tour on August 10th, 2022.

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**Evaluation of the interaction between seed size and seeding depth on canola establishment and yield.**

This year another trial conducted at LARA is the canola seed size vs. depth trial. This CAP trial is conducted alongside Smoky Applied Research Association (SARDA) and Battle River Research Group (BBRG). Within this project, we are looking at evaluating the interaction between seed size and seeding depth on canola establishment and yield. All three of the associations are using canola seeds from the same lot to ensure accuracy within the trial and seeding at the recommended rate of 120 plant/$m^2$. To ensure accurate data on plant establishment, plant counts will be taken 7, 14 & 21 days after seeding. Twelve different treatments within the trial look at thousand seed weight (TSW) and depth. Treatments are as stated below:

1. 2.0 - 3.0 (TSW) at 1cm seeding depth
2. 2.0 – 3.0 (TSW) at 2.5 cm seeding depth
3. 2.0 – 3.0 (TSW) at 4 cm seeding depth
4. 4.0 – 4.6 (TSW) at 1 cm seeding depth
5. 4.0 – 4.6 (TSW) at 2.5 cm seeding depth
6. 4.0 – 4.6 (TSW) at 4 cm seeding depth
7. 4.7 - 4.8 (TSW) at 1 cm seeding depth
8. 4.7 – 4.8 (TSW) at 2.5 cm seeding depth
9. 4.7 – 4.8 (TSW) at 4 cm seeding depth
10. 4.9 – 5.7 (TSW) at 1 cm seeding depth
11. 4.9 – 5.7 (TSW) at 2.5 cm seeding depth
12. 4.9 – 5.7 (TSW) AT 4 cm seeding depth

The canola seed size vs. depth trial will be showcased at our Lac La Biche field tour on July 27th, 2022 taking place at Craigend Hall.

We are looking forward to collecting data from these trials in the fall and comparing the results to previous years.

# *July 26th, 2022*

Join Lakeland Agricultural Research Association for a hands-on event exploring the links between livestock, cover crops and soil health!

**With guest speaker Kevin Sedivec from North Dakota State University**

*Watch for more information!*

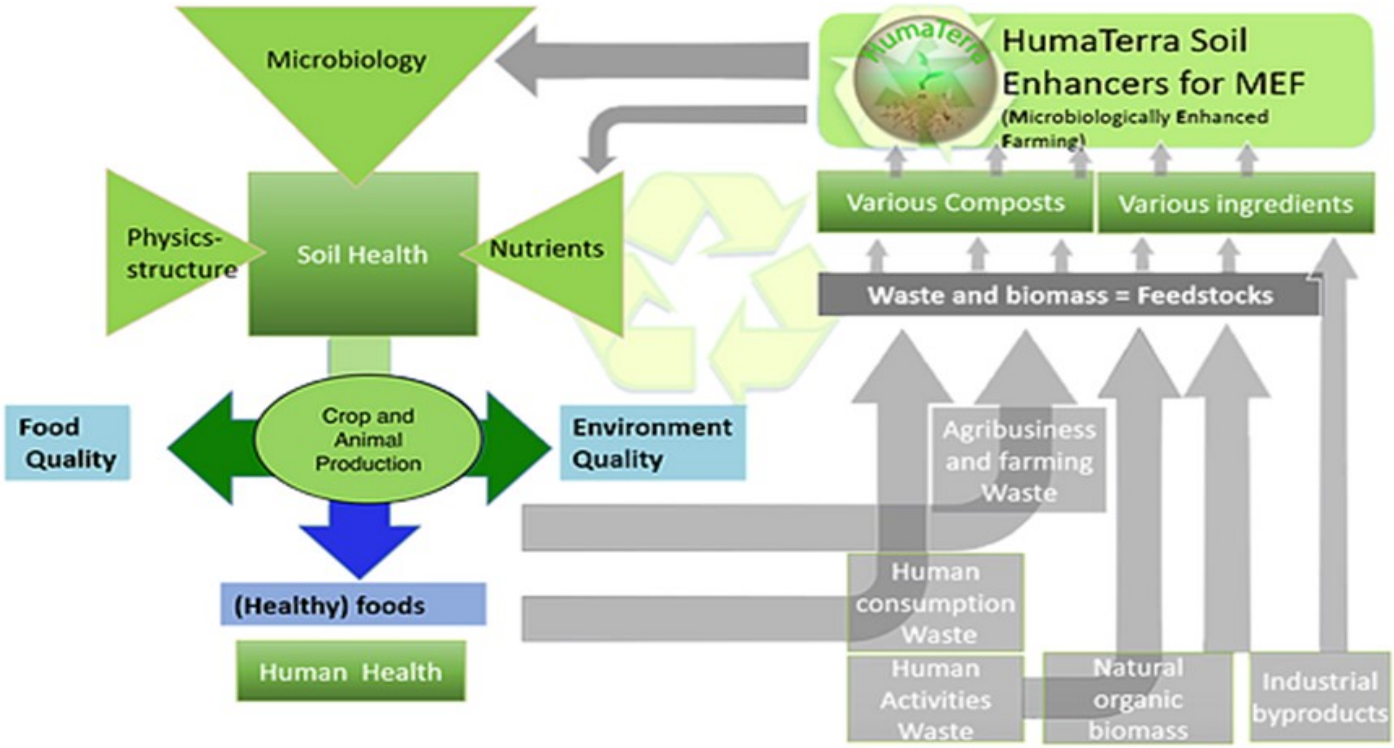
## Organic Waste Recycling

*Continued from page 3*

Lakeland Agricultural Research Association (LARA) is excited to be partnering with HumaTerra Regen Ag Inc. on a five-year trial assessing the impact of using Soil Enhancers or microbial biostimulants on multiple crops in the Lakeland region. The trial will demonstrate potential opportunities for Alberta farmers to not only improve soil health but also to increase yields, nutrition, protein profiles, drought resistance and reduce the need for costly inputs of fertilizer, herbicide and pesticide.

HumaTerra recycles organic waste produced by industries such as forestry, landscaping and agriculture, through composting. This compost is then used as a feedstock to producer Soil Enhancers and Conditioners that can be applied to agricultural crops in a pelletized form at the time of seeding.

The trial will be seeded at our Fort Kent Research Site and will be featured in our Summer Field Day scheduled for July 21st, 2022. Please call the office to reserve your spot in this event!




https://htregen.com/

## *Welcome Megan!*


Hello, my name is Megan Wanchuk. I am excited to be joining LARA as the Forage and Livestock Program Manager.

I was born and raised on a cow-calf operation in Boyne Lake, Alberta. I completed a Bachelor of Science in Agriculture degree from the University of Saskatchewan with a major in Animal Science and a minor in Field Crop Production. During summer through my bachelor's degree, I worked for BASF assisting with canola agronomy trials which sparked my interest in applied research. This spring, I completed a Master of Science degree in Range Science from North Dakota State University. My master's research compared livestock production and forage quality on different grazing management strategies. I continue to be involved in my family's ranch, where I run a small herd of my own cattle along side my parents and brother.

I am excited to be joining the LARA team. I look forward to meeting and working with producers in the Lakeland area.


**on Soil Health & Grazing**

**SAVE THE DATE**

Western Canadian Grazing Conference

**December 13, 14 & 15, 2022**
**Double Tree by Hilton West Edmonton**

WESTERN CANADA Conference on Soil Health

## *Dugout Management*

*Kellie Nichiporik, LARA*

Driving around early this spring, you may have noticed many water bodies and dugouts having a bright green appearance. Too cold (and let's be honest, early) for it to be cyanobacteria or algae; you may have been wondering what it is. Euglena is a single cell flagellate eukaryote (protist) that has over 1,000 different species. Seen this spring as bright lime green, they can also, depending on the species and sun intensity, be red in color. These tiny microorganisms feature both plant and animal characteristics and are found worldwide in fresh or brackish water or even moist soils. They have the ability to photosynthesize, as well as feed on other microorganisms. Certain species can develop into large toxic blooms with a very high nitrogen content. Euglena can be controlled using dye packs or chemical control such as copper products.

Dugouts are a good source of water but many encounter problems over their lifespan. Last summer with the drought, water quantity and quality were negatively affected. To ensure a quality water source and increase the longevity of a dugout, inspect them for signs of: animal entry (both domestic and wild), failure of aeration, algae growth, damage to buffer areas, erosion, and water quality (turbidity, colour, smell etc).

Dugouts built properly (minimum 13 feet deep, 1.5:1 side-slopes and 4:1 end-slopes, spoil pile either removed or leveled out and grassed, and big enough for a two-year supply of water) will provide a dependable source of water. The deeper your dugout, typically will have better water quality than a shallow one. This is due partly to water temperature, as warmer water will enable greater plant/algae growth, as well as a greater concentration of nutrients in a shallow dugout.

Trees around the dugout are good for snow trap, but must be setback to prevent roots from breaking through the clay liner and to prevent leaves and branches from the trees falling into the water and adding organic matter. Having trees too close also leads to reducing natural aeration, which greatly impacts water quality. Deciduous trees should be no closer than 50 meters from the bank and coniferous trees no closer than 20 meters. Here are some troubleshooting tips for common dugout problems:

For more information on dugout management and construction the Quality Farm Dugout manual is a great resource. To access the manual, follow the QR code:

Or go to: https://open.alberta.ca/dataset/a55d220d-b8c7-405d-90b4-e216b7fa1776/resource/770e7737-9c69-455c-98f5-56c5cccfe589/download/716-b01.pdf

| Problem | Causes | Treatment |
|---|---|---|
| Black smelly water | Depletion of oxygen due to algae growth, plant decay or no aeration. Damaged or improper intake pipe. | Install or fix aeration, change diffuser at the bottom. Control weeds and algae. Physically remove decaying matter. Raise intake pipe. |
| Dirty water | Soil erosion, human activities, and animals such as ducks, muskrats and salamanders. | Coagulation. Plant vegetation and soil erosion control. Create a two dugout filtration system. |
| Algae | There are many types of algae; most common is green algae and blue-green algae (cyanobacteria which are toxic). | Aeration and prevent nutrient overloading. Ensure runoff entering the dugout has a vegetative filter strip/buffer<br>Algaecides, hydrated lime or Copper Sulphate (bluestone). |
| Vegetation | Some types are beneficial (providing shade, take up excess nutrients, and lowering water temperature) and some are harmful | Physical removal (raking, mowing), biological control (weevils), registered herbicides, aeration/diffuser. |

## Patch-burn Grazing and Livestock Production

*Continued from front cover*

homogeneity by targeting even forage utilization and grazer distribution. Under rotational grazing, heterogeneity in vegetation structure can be created between grazing paddocks through the manipulation of stocking rates, grazing intensities, and rest periods.

Both livestock production and conservation are important to consider when evaluating the sustainability of grazing management practices. Therefore, the objective of my master's project at North Dakota State University was to evaluate livestock production under heterogeneity based grazing management strategies. We compared livestock performance and forage quality, under patch-burn grazing, conservation-based rotational grazing, and continuous grazing strategies. We also evaluated early and late grazing season forage mineral content between unburned and recently burned areas in patch-burn grazing pastures.

We found that the most recently burned patch had the best forage quality compared to longer time since fire patches in patch burn grazing, all the rotational grazing paddocks and continuous grazing. The recently burned patch had the highest CP (Crude Protein), TDN (Total Digestible Nutrients), net energy for maintenance ($NE_m$), and NDF (Neutral Detergent Fiber) digestibility, along with the lowest ADF (Acid Detergent Fiber), NDF and lignin content. When forage quality was compared to monthly requirements of April calving cows with calves at side, the recently burned patch best met requirements throughout the mid-May to mid-October grazing season.

Cows and calves in patch-burn grazing pastures had the most consistent weight gains each year. Cows on patch-burning gain an average of 47 pounds over the grazing season more than cows on rotational grazing pastures. Calves gained an average of 55 pounds more on patch-burn grazing pastures than rotational grazing pasture over the grazing season. There were no differences between the patch-burn and continuous grazing, except for a drought year where cows on patch-burn grazing had greater weight gains than both continuous and rotational grazing.

Forage minerals were greater in the recently burned areas than unburned areas. All minerals evaluated, except for copper and magnesium during early grazing season, met grazing cattle requirements in forage from recently burned areas. Forage in unburned areas was deficient in phosphorous during the early grazing season, potassium during the late grazing season, and magnesium, copper, and zinc throughout the grazing season.

While the grasslands of North Dakota are vastly different than the Aspen Parkland and Boreal Transition pastures of the Lakeland area, fire also historically occurred in these areas. Prescribed fire is a potentially useful tool for producers in the Lakeland area to increase carrying capacity through the development of bush pastures and control of aspen encroachment, while simultaneously benefiting biodiversity, forage quality and livestock performance.

*Cows grazing after prescribed burn.*

## Ultra-Early Seeding Winter Cereals for Livestock Feed as a Drought Management Strategy

*Alyssa Krawchuk, LARA*

The Lakeland region of Alberta experienced one of the driest years since 2002, leaving many agricultural producers scrambling for feed and water resources for livestock and harvesting crops that were yielding as low as 30% of normal yields. As a result, many pastures were overgrazed last fall as producers searched for ways of extending available feed sources. Overgrazed pastures tend to produce less the following year and require additional management strategies that include reduced grazing days to ensure long-term recovery.

Winter cereals seeded in fall have been shown to provide an early season grazing opportunity for livestock producers (Agdex 133/20-1). This could allow for delayed turnout into stressed perennial pastures, thus providing more recovery time for those forages. A second option is to seed winter cereals in the spring, which prevents the cereals from entering a reproductive stage, meaning that these winter cereals would remain vegetative through summer and fall. Current research into spring seeded winter cereals has focused on seeding during typical seeding times when temperatures are over 10°C.

Lakeland Agricultural Research Association (LARA) recently received funding from Results Driven Agriculture Research (RDAR) for a project investigating the potential benefits of seeding winter cereals in spring when soil temperatures are between 2-6°C.

The objectives of this project are to:

1. Provide unbiased, regional information regarding the establishment, dry matter yield and nutritional quality of early spring seeded winter cereals for production as livestock feed in Northeastern Alberta.
2. To compare the establishment, dry matter yield and nutritional quality of early spring seeded winter cereals (soil temperatures between 2-6°C) with winter cereals seeded at soil temperatures above 10°C.
3. To determine the additional forage yield achieved throughout the summer by seeding winter cereals early (soil temperatures between 2-6°C) in a simulated grazing environment.

*Continued on next page...*

Recent research conducted by Agriculture and Agri-Food Canada in Lethbridge has shown that as long as soil temperatures are between 2-6°C, spring wheat can be sown and produce commendable yields when compared to spring wheat sown when soil temperatures are over 10°C. This research was replicated by seven Applied Research Associations (ARA) across Alberta over a four-year period and found similar results.

Seeding early during drought conditions could allow these cereals to utilize early spring moisture from snow melt that might not be available later in the spring. However, this concept has not yet been evaluated for use in winter cereals for forage production.

Work done by Baron et al. (1990) found that spring-planted winter cereals can maintain yield and quality late in the summer and into the fall under simulated pasture treatments. This is an important advantage to their use as spring cereal production tends to decline after the end of July (Berkenkamp 1984).

RDAR
Results Driven Agriculture Research

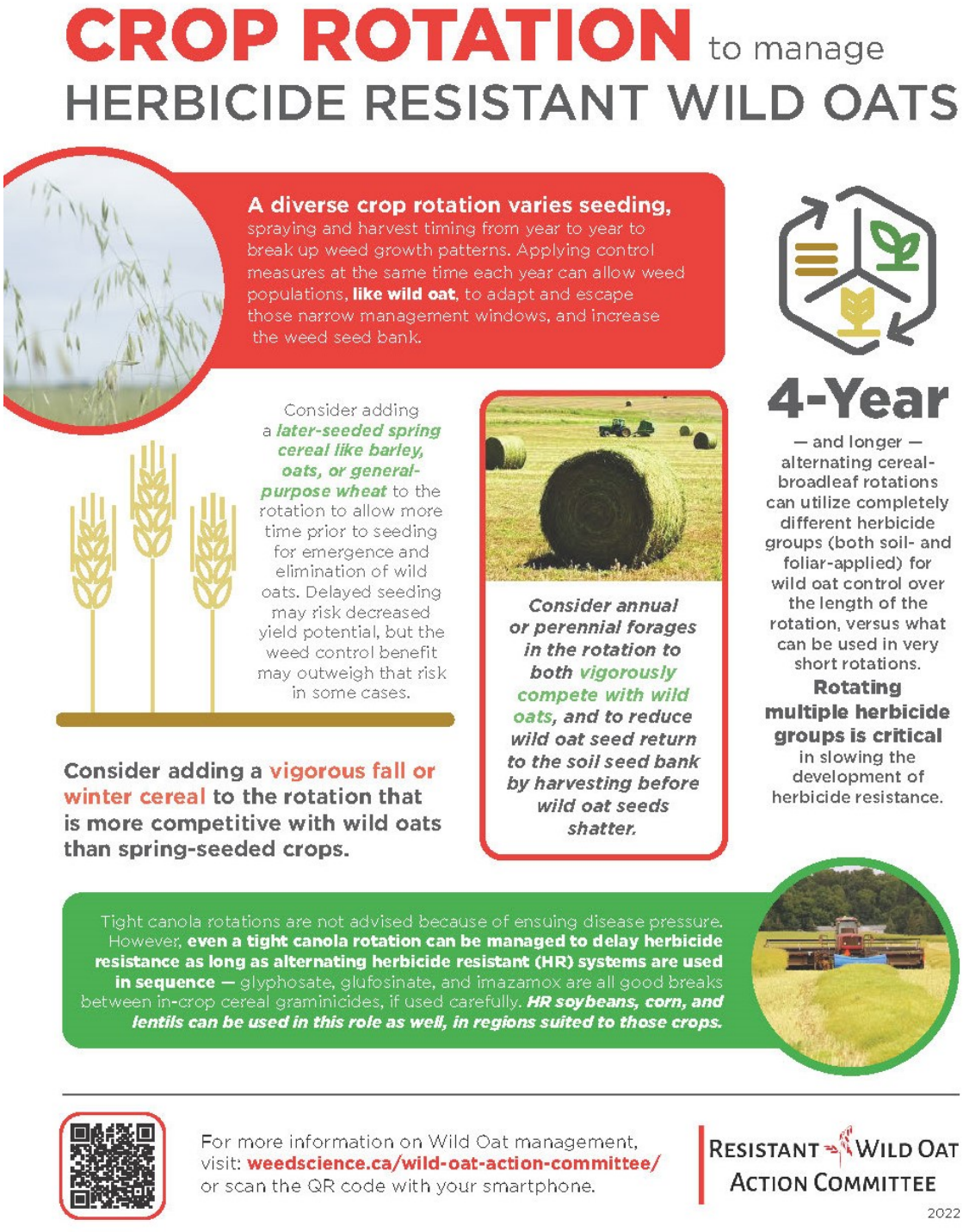
The successful completion of this project will provide Northeastern Alberta livestock producers with a new tool to help manage drought or dry conditions. Comparing multiple varieties and species (triticale, wheat, rye etc.) will provide producers with multiple options for selecting the best variety for their region. Work done with the Regional Variety Trials across the province have shown that there can be a 15% increase in production from selecting the best variety for your environment over an average variety, leading to an average increase of $25 per acre (Alberta Beef Producers, Project No.: 0009-028).

The potential increase in grazing days by including an early seeded winter cereal could reduce producer's production costs while maintaining adequate quality and quantity of livestock feed for their operation. This could also provide a new planning tool for local producers when preparing and dealing with drought conditions.

## References

Baron, V.S., Salmon, D.F., Najda, H.G., and de St. Remy, E.A. 1990. Feasibility of double cropping and intercropping winter cereals for fall pasture. Final Report, FFF Project 87-0064. Alberta Agricultural Research Institute, Edmonton, AB.

Berkenkamp, B. 1984. Annual forage crops for Alberta (Parkland Region). Final Report, FFF project No. 78-0181. Alberta Agricultural Research Institute, Edmonton, AB.



**Mission Statement:**

*The Lakeland Agricultural Research Association (LARA) conducts innovative unbiased applied research and extension supporting sustainable agriculture.*

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