



Grow With Us

Lakeland Agricultural Research Association

March/April 2020

Winterkill in Perennial Forages

Alyssa Krawchuk, LARA

Perennial forages account for a large percentage of beef cattle diets in Northeastern Alberta and are utilized in many different forms including summer grazing, stockpiled forages, hay and silage. Often, perennial forage stands are established for over 3-4 years with some stands being in production for upwards of 15 years. Because these stands remain on an operation for an extended period of time and are an important feed source, their longevity becomes a key management strategy for the long-term productivity of an operation.

One of the most common issues causing deteriorating pastures in Alberta is winterkill which refers to severe damage or death of perennial forage species over winter. There are a number of factors that lead to increased risks of winter kill and older stands tend to be more vulnerable. Winterkill occurs due to four main environmental stressors:

- **Cold temperatures.** Prior to winter, perennial for-

ages need to harden off, which refers to the process by which forages transition from the warm climate of summer months to the cooler temperatures of the winter months. Forages need to go through this period prior to freezing in order to survive the winter. Perennial forages, when properly hardened, can withstand extremely low temperatures. The plant's cold hardiness is highly variable between species and varieties, meaning it is extremely important to select varieties that are regionally adapted to your area with appropriate winter hardiness.

- **Fluctuating temperatures.** Fluctuations in temperature can cause plants to de-harden or break their winter dormancy leading to increased risk of damage or death due to cold temperatures. If a period of high temperatures causes de-hardening and is followed by a period of low temperatures, significant injury and death may result.

In This Issue:

Pea Inoculant	4
Disease Scouting School	5
Sniffing out Clubroot	6
Spraying out Pasture	8
Regenerative Farming	9
Soil Health Academy	10
Upcoming Events	12



2020 Calendar of Events

Disease Scouting School	June 25th, 2020	Fort Kent Research Farm
Soil Health Academy	July 15-17, 2020	County of St. Paul
Smoky Lake Summer Field Day and BBQ Social	July 23rd, 2020	Smoky Lake Research Site
Fort Kent Summer Field Day	July 29th, 2020	Fort Kent Research Site
St. Paul Summer Field Day	August 5th, 2020	St. Paul Research Site
Lac La Biche Summer Field Day	August 12th, 2020	Lac La Biche Research Site

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



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Winterkill in Perennial Forages

Continued from front cover...

- **Ice sheeting.** An adequate layer of snow can aid in preventing freezing and winterkill by providing insulation. However, freeze-thaw cycles during the winter can often lead to the formation of ice sheeting over the soil surface. These ice sheets provide very little protection to forage during cold temperatures when compared to adequate snow cover. Ice sheeting can lead to the depletion of oxygen levels within the soil as soil microbes continue to respire. This respiration uses up available oxygen converting it to carbon dioxide.
- **Excess soil moisture.** Areas with excess moisture leading into fall can increase the risk of winterkill, particularly through frost heaving. Frost heaving occurs when high soil moisture levels freeze and thaw causing tap rooted species, such as alfalfa, to be pushed upwards. This often causes the crowns of the plant to be exposed to cold temperatures leading to increased damage and death of the affected plants. Wet soils in the fall can also prevent plants from reaching their full hardening potential and winter dormancy.

Winterkill is a factor of the weather, which is out of our control. However, we can focus on management strategies that can help to mitigate the risks of winterkill. The key factor behind these management strategies is minimizing stress on the plant prior to winter.

- **Choose appropriate species for the area.** Step one is to choose varieties with good winter hardiness, fall dormancy and high disease ratings that

are suitable for the area in which they will be seeded. Fall dormancy ratings indicate how early in the spring a plant will grow and how late into the fall it will grow. If a species grows too late into the fall, this could put them at increased risk of winterkill. Each species and variety should have a winter hardiness rating and disease rating so speaking to a local seed rep prior to purchase may be beneficial.

- **Crop fertility.** Fertility of a perennial forage stand is just as important as the fertility of an annual crop. In particular, alfalfa can be a heavy user of some nutrients including potassium (K) leading to soils often becoming deficient if not topped up with K. Although many perennial forage stands are used for grazing, assuming that manure is providing a balanced nutrient profile can often lead to nutrient deficient stands. Manure is an excellent source of nutrients, however, most soils often need a top-up. Consequently, providing a spring fertility treatment based on soil test recommendations can be widely beneficial to the longevity of a forage stand.

- **Fall rest period.** Perennial forages need time to recover and harden off between harvest/graze and the first killing frost. Actively growing forages utilize energy through photosynthesis. However, when forages regrow after a grazing or cutting event, they draw energy from their root system to increase top growth and, as a result, the roots die back. At this point, the crop may look phenomenal on the surface, but the root reserves are severely depleted. If the plant is not allowed appropriate time to recover these root reserves, it will not have enough energy to properly harden off leading to increased risk of winterkill.

- **Scout early and often.** Scouting for plant count and stem count early in the growing season will allow for adequate response time if winter kill has occurred through reseed or fertility treatments. Scouting throughout the growing season can also increase stand longevity as many stressors, such as disease, insects or management, can decrease a plant's capacities.



Pea Inoculant

Alberta Pulse Growers

One of the most important inputs for any pulse crop is inoculant, and several input suppliers offer field pea inoculants in a variety of formulations. Proper inoculation for field peas will reduce – or remove – your need to apply nitrogen fertilizer and will help get your crop get off to a good start.

Inoculating pea with the correct strain of rhizobia will help meet the nitrogen requirements of the pea crop. Properly inoculated pea should not require any extra nitrogen fertilizer.

Nodules will begin to appear on pea roots three to five weeks after seeding. When nodules are visibly red or pink when cut in half, the rhizobia are fixing nitrogen. If no nodules have appeared after this time, inoculation was unsuccessful and a broadcast application of nitrogen fertilizer may be considered.

Nodules on field pea roots will begin to die and turn greenish-brown to brown as the plants reach the late flowering to early pod filling stage.

Formulations

Field pea inoculants come in three formulations. Much research has been done on different formulations of inoculants for use with peas.

1. Peat Powder Inoculant: Applied directly to the seed with a non-toxic sticking agent, this formulation is a finely ground peat that contains over a billion rhizobia per gram. Peat powder inoculant is one of the most common types used in Canada.

2. Liquid Inoculant: This formulation, which also

contains over a billion rhizobia per gram, is applied directly to the seed, and because it comes in liquid form, a sticking agent is typically included in the fluid. Liquid inoculant comes in bags that make it easy to distribute evenly onto the seed while it is being augered into a truck box or through a drill fill.

Liquid inoculant produced significant differences at some sites – when averaged over a number of sites, however, liquid inoculant showed a limited response.

3. Granular Soil Inoculant: Unlike peat powder or liquid inoculants, granular soil inoculant is not applied directly to the seed but, rather, with the seed in the seed row. This formulation does, however, contain the same amount of rhizobia as both the powder and liquid inoculants and is gaining in popularity because of its convenience. Under cold or very dry spring seedbed conditions, granular soil inoculation has shown considerable potential for producing large, stable yields of field pea and minimizing the risk of growing the crop. The use of granular inoculant resulted in the highest pea yields in cases where a statistically significant response to inoculation was evident.

Generally, it's advisable to inoculate your seed the day you're seeding, but different brands or types have different storage limits and recommended application timing. Some types of inoculants can also be mixed with fertilizer or pesticides. When choosing the right field pea inoculant, talk to your input supplier and read all labels carefully.



Disease Scouting School

*June 25th
Fort Kent
Research Site
9:00am*



**PLEASE REGISTER
LUNCH WILL BE
INCLUDED!**

***Free for members
or \$20.00 dollars for
non-members***



Registration starting at 9:00am

Topics will include:

- Plant Pathology: common diseases & life cycle
- Scouting: What to look for in the field
- Control and management practices of diseases

**To register call the LARA office at (780) 826-7260
or e-mail: cropping.lara@mcsnet.ca**

**members include farming operations within the MD of Bonnyville,
County of St. Paul , Lac La Biche County and Smoky Lake County*

Sniffing out Clubroot

Alberta Agriculture and Forestry

It was a sight this past September in canola fields near Brooks in Newell County and again in Leduc County, 2 sniffer dogs on the hunt for clubroot galls. They and their trainers were in the province for the final phase, the field trial, of the canine detection of clubroot project.

The project came about when Michael Harding, research scientist of plant pathology with Alberta Agriculture and Forestry (AF), was contacted by dog trainer Mario Bourque in New Brunswick about training sniffer dogs to detect plant disease. Harding suggested clubroot.

“I knew that the concept had been done before (with avocados) and we needed to find the situation that needed the solution,” explained Harding. “Clubroot was the one because all the symptoms are under-

flew to Alberta, trainer Bill Grimmer used clinical scent training for 3 months in New Brunswick. Once they had proven the dogs could detect clubroot in the clinical trials, they were ready for field testing.

During those two days in the field, those participating in the trial saw evidence that the dogs would alert their handlers to areas where clubroot was present without digging up the roots.

“We set out to answer the question can dogs be trained to sniff out clubroot. We have shown that is truly the case both in the clinical setting and in the field setting,” Harding added.

“We learned a lot in those field trials,” said Harding. “The dogs had never been in a canola field before. They had never been on an airplane. It did not go



Affected vs. unaffected plants. *Canola Council of Canada*



Severe clubroot infection. *Canola Council of Canada*.

ground. We have to destructively sample to see them. We needed something that could see the roots without pulling them out of the ground. That is where the dogs’ olfactory senses came into play.”

Harding contacted Farming Smarter’s general manager Ken Coles to support the project.

“In the research world, it is always a struggle to figure out how to get the projects that are interesting to farmers and practical in your area,” said Coles. “We felt that it was a relevant and kind of an out there idea and that’s kind of the premise of Farming Smarter.”

Before the two dogs - Josie, a 2 year old German Shepherd, and Adi, a 13 month old Golden Doodle -

seamlessly because this was a really new environment and a new experience for the dogs. They are used to detecting gall material that is not underground on a canola stubble, so it was the first time for that.”

Harding added that these dogs would need some additional training to be working dogs with a high rate of success at detecting clubroot. “But, we have seen lots of evidence that they can do it.”

“Clubroot costs the industry a lot of money,” said Coles. “For us down south, where we are in that sort of clubroot-free zone, to be able to detect it earlier, we can employ the strategies that have already been successful and maybe keep it out a bit longer.”

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Sniffing out Clubroot

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“If you have a scent dog that can help scout for clubroot, you eliminate the need to pull out 500 roots to find one with a gall,” said Harding. “There is an upfront cost for a sniffer dog, but you do not have to pay them a salary. They are really happy to go. Dogs could be trained to detect resting spores in the soil, so they could detect clubroot infestations in soil on equipment. The dog could verify there is no presence of clubroot spores on equipment up for sale. You could combine with GPS, on the dog’s collar to see where the dog has scouted, what it missed, where it has alerted and where it has not.”

Harding also added the possibility of training the dogs to detect more than clubroot. “You could train a single animal to alert you to fusarium, aphanomyces, blackleg, verticillium wilt, late blight - these dogs have the capability of learning that skill.”

“Now the work starts,” said Cole. “There are just so many approaches and opportunities, and we need to sort them out.”

This project was made possible by the Government of Canada and the Government of Alberta through the Canadian Agricultural Partnership.

LARA Summer Field Day's

2020



Smoky Lake Field Day July 23rd 2020

- ESN Wheat and Barley
- LARA Regional Variety Trial



Fort Kent Field Day July 29th 2020

- Regional Variety Trial
- Regional Silage Trials
- Liming Trial
- Ultra Early vs Regular Seeding



St. Paul Field Day August 5th 2020

- Regional Variety Trials
- Regional Silage Trials
- ESN Wheat and Barley
- Canola Performance Trial



Lac La Biche Field Day August 12th 2020

- Oats Regional Variety Trial
- Hemp Demo
- Canola Demo



* These are a few of the trials being showcased in our Summer Field Days*

Spring Termination of Hay Land

Alberta Agriculture and Forestry

“Traditionally, forage stands have been terminated in the fall by using 1 of 3 approaches - tillage only, herbicide application combined with tillage and herbicide application followed by direct seeding into sod,” says Mark Cutts, crop specialist at the Alberta Ag-Info Centre. “The main advantage of fall termination is the ability to establish a good seedbed with tillage, or in the case of direct seeding, allowing the sod to decompose.”

While spring termination of hay land is an option, producers should be aware of a number of factors that will affect its success.

“One factor that must be managed properly is soil moisture,” he says. “In many areas of the province, conservation of spring moisture is essential for crop establishment.”

Utilizing multiple tillage operations to prepare a seedbed will reduce available soil moisture. The preferred method of establishing annual crops in spring-terminated stands is a herbicide application followed by direct seeding into sod.

Cutts says that producers also need to be aware that spring termination of hay land will delay the date of seeding. He adds that sufficient plant material must be present for herbicide applications to be effective.

Grasses should be at the 3 to 4 leaf stage, and legumes need to be actively growing to allow sufficient herbicide uptake to occur. Delay seeding by 3 to 5 days after the herbicide application to allow for translocation of the herbicide. Compared to a fall-terminated stand, this process will result in seeding delays of 2 to 3 weeks.

Control of the forage species in the hay stand is essential to reduce yield loss due to competition with the growing crop. A high rate of glyphosate, up to 720 g of active ingredient per acre, can be applied to the hay stand once sufficient growth is present. If regrowth of the forage species occurs after emergence of the annual crop, producers then need to assess the weed spectrum and determine if a suitable in-crop herbicide option exists.

“Establishing good soil-to-seed contact is critical to the success of the seeded crop,” he explains.

“With sod seeding, the most consistent results have occurred with cereal crops compared to a smaller seeded crop, such as canola. The larger seed size associated with cereals allows seeds to be placed beneath the thatch layer into soil where good soil-to-seed contact occurs.”

Cutts adds that evaluating the fertility of the soil is important, as nutrient levels are commonly deficient on older hay stands and will need to be addressed when seeding an annual crop. He recommends producers collect a soil sample to properly evaluate fertility requirements.

“Seeding annual crops into spring terminated hay land poses a number of challenges and is a riskier option as compared to seeding into fall terminated hay stands,” he says. “To manage these risks, producers need to recognize these challenges and adopt the appropriate crop management techniques.”



Regenerate for the Next Generation

Kim Deans, Integrity Soils

Restoring soil health through regenerative agricultural practices is the key to success for families who are taking up the challenge to create a future in agriculture for younger generations. Viable pathways for the intergenerational transfer of agricultural businesses have been diminishing and many intelligent, passionate young people have been leaving the industry in recent times. The damage created to soil health by industrial farming practices means these degraded agricultural ecosystems are struggling to support one generation in the business. The strain of further increasing debt loads to facilitate an intergenerational transfer and keep the younger generation on the land is often too much for them to bear. Succession planning can become the straw that breaks the camel's back.

Industrial agricultural practices have created lifeless soils that will not absorb or hold water when it rains. Healthy soils cycle nutrients and plants are nourished by their relationship with soil microbes. Crops and pas-



tures in degraded soils rely on ever increasing amounts of artificial fertilisers for their nutrients because the soil microbial bridge is blown. Agricultural systems with nutrient imbalances which create the perfect condition for pests, weeds and diseases to flourish guarantee an income for the chemical companies every season. None of this is a recipe for financial success for the land managers of the present or the future.

These financial challenges alone are enough to make the younger generations of farming families look for careers outside of agriculture. Watching their parent's lifetime of struggle on the family farm is not something that makes a career in agriculture an attractive option. The focus of conventional agricultural systems on eliminating things (weeds, pests, diseases) at every opportunity and spending their time spraying chemicals around is also hardly an enticing lifestyle to aspire to. Many farming families actively discourage their children from being involved in agriculture as they do not see a desirable future for them in this industry.

The relationship between soil health and succession planning became obvious to me over 20 years ago. My soil health aha moment occurred at a time I was involved in a family farm succession planning process. Witnessing the dramatic impact on crop growth where the fertiliser rig had run out opened my eyes to the unintended consequences our farming practices were having on soil health. These once fertile soils were regarded as being some of the best in the country and yet were not able to support wheat crop establishment without artificial fertilisers.

At this time my now ex-husband and his family were in the early stages of succession planning and I began to question how succession planning could be a viable proposition in the face of declining soil health? How could this be happening when my parents in law were well respected farmers, dedicated to doing the best job

Continued on page 11...



Soil Health Academy

*July 15-17, 2020
County of St. Paul*

In July of 2020, LARA is proud to be hosting a Soil Health Academy. The goal is to move beyond sustainable agriculture to regenerative agriculture. Regenerative agriculture is a system of farming principles and practices to improve all aspects of the operation from increasing biodiversity, soil health and improving water quality; increasing carbon capture, farmer profitability and resilience. The Soil Health Academy is an intense 3 day hands-on course that examines all aspects of regenerative farming and ranching, focusing on soil health, plant health and animal health.



What You Will Learn:

- 1. Principles of Soil Health & Adaptive Stewardship**
- 2. Restoring Vibrant Ecosystems Through Adaptive Grazing**
- 3. Making Grazing Highly Profitable & Desirable**
- 4. Successful Marketing: Strategies for Enhanced Net Margins**
- 5. Nutrient Management**
- 6. Designing Cover Crop Mixes**
- 7. Farm Economics and Whole Farm Planning**

So stay tuned for more information regarding this fantastic opportunity in the Lakeland. We are moving towards a world where consumers are demanding to know their food's story and that requires regenerative practices. General Mills, one of the largest food companies in North America has pledged to have their producers utilizing regenerative agriculture practices on one million acres by 2030. Take advantage of this opportunity to take your farm to the next level and learn about the benefit that regenerative agriculture can have for you.

Call Kellie Nichiporik at the LARA office for more details about this exciting event!

(780) 826-7260

Regenerative Agriculture

Continued from page 9

they could to implement innovative best management practices and were frequently winning crop competitions? How could we bring these tired soils back to life? How could farmers improve soil health to ensure they were leaving a viable business for the next generation?

It became clear to me that in addition to the family relationship and financial challenges that present themselves in the succession planning process, soil health was also a major impediment to successful farm succession. When you see this relationship you simply cannot 'un-see' it. My career later led me into a Rural Financial Counselling role where I continued to witness declining soil health reflected in the financial statements of the hundreds of farmers I worked with. It was obvious to me how declining soil health had farmers on a downward spiral which went hand in hand with declining resilience to natural disasters, market fluctuations and climate variability. These observations led me along the path of exploring and implementing regenerative farming methods in our landscape with my husband Angus, and increased my passion for the vital role that soil and ecosystem health plays on all levels.

Declining soil and ecosystem health are at the core of the reason so many farming families are leaving the land. The ease of blaming the declining profitability of farming on external factors over which we have no control such as droughts, markets, rising costs of inputs, governments etc has made this easy to disguise. By continually addressing the symptoms rather than the cause of these issues, the impact of unintended consequences of agricultural practices have continued to compound. Declining soil carbon reserves, soil compaction, algal blooms in water bodies, biodiversity decline, broken water cycles, high suicide rates in farmers and declining farm profits across the world are just a few of these consequences. Our agricultural ecosystems are presently crumbling under these pressures.

Well intentioned farmers implementing industry best practices have unintentionally damaged soil health and as a result the most important resource on which future generations depend has become extremely degraded. Good intentions can have unintended consequences when we take our eye off the ball and don't focus on the whole picture. Addressing these unintended consequences offers us the opportunity to rec-



ognise that we all do the best we know how at the time and as we know better, we can do better.

When we focus on regenerating soil and ecosystem health, we build resilience to the climatic extremes that bring many farm businesses undone, we gain access to an emerging market advantage by growing chemical free food and we reduce input costs and increase profitability by stepping off the high input treadmill. Our management practices cease making the challenges agriculture throws at our businesses even greater and instead build resilience.

Soil health is the foundation that creates a financially viable and enjoyable agricultural business to pass on to the next generation, building resilience on all levels and increasing the ability of the business to survive the financial strains that can come with intergenerational transfer. A farming system that prioritises soil health offers a more enjoyable lifestyle which becomes something the younger generation actually want to be a part of.

When farming families see the opportunity that improving soil health through regenerative agriculture provides for their business and their life, they fall in love with farming again. As their minds are opened to another possibility for their farm and their family an enterprise is created that becomes attractive to the younger generation to be a part of with the added bonus of increased resilience to climatic extremes, market fluctuations and natural disasters. Farming can again become an attractive and viable option for the younger generation.

Article adapted from <https://www.integritysoils.co.nz/regenerate-for-the-next-generation/>.

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Luc Tellier (*LFA Rep*)

Upcoming Events

See events calendar on page 2!

Don't forget to keep an eye on www.laraonline.ca for more event details as they become available.

Thank you to our municipal and county partners:

