The Blade

Monthly Newsletter of the

Grey Wooded Forage Association

JULY 2020

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Cover Photo: Olivia Handel

In This Issue:

The Grey Wooded Forage Association is a member of the Agricultural Research and Extension Council of Alberta

ARECA

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Alberta

Office Report

By Brenda Kossowan, Business Manager

Special thanks to our summer technician, Olivia Handel , who has been doing the lion's share of sampling for our contribution to the province-wide Soil Health Benchmarking Project. Spearheaded by the Chinook Agricultural Research Association's soil health lab at Oyen, the project will look at the impact of various management practices on various types of soils in various areas of the province.

We have a tendency to get a bit clinical when we look at a forage crop or a pasture. In her journeys, Olivia has taken along her love for photography and captured some nice images along the way. She has truly captured the colours of July in the image chosen for the cover of this month's edition of *The Blade.* Olivia shares more of the insight she has gained during these past few weeks in a report on Page 7. It is my hope that our industry will gain a new scientist as she continues in her studies at the University of Alberta.

AFIN
ALBERTA FORAGE INDUSTRY NETWORK

Of course, an image showing a healthy stand of sainfoin—in Alberta at least—almost instantly brings to mind the work performed by Lethbridge researcher Surya Acharya, Chair of the Alberta Forage Industry Network. AFIN was approved and offered start-up funding earlier this year to take control of the General Store web page that was previously operated by Alberta Agriculture and Forestry. Amber Kenyon of Busby is now in charge of the site, renamed "Farming the Web," and officially launched on July 31.

The marketplace is broken into six categories: Feed and minerals, livestock and working animals, land for rent or lease, farm equipment, services and contracting, and other. The site includes a chat function and an opportunity to connect with a real human being if you're having problems. Visit www.farmingtheweb.com for a look at this awesome project.

Congratulations to everyone at AFIN who was involved in taking on this massive task. Work continues on creating a similar replacement for Ropin' The Web, Alberta Agriculture and Forestry's highly informative website, including the interactive tools that had been developed along with it. That's a work in progress and we will keep you apprised of developments as they occur.

Our series on Water Systems continues this issue with a discussion of the various types of solids that can effect water quality. We are grateful to the Beef Cattle Research Council for granting permission to publish this and other articles that are pertinent to livestock and forage producers. Visit beefresearch.ca for an abundance of information, including research projects, webinars and conferences.

While pointing to other websites, it is probably pertinent to discuss our own site, which is currently experiencing some age-related issues. We are aware of these problems and have asked former summer staff Erin Willsie to tackle them. She has been somewhat hampered by an obsolete template that can no longer be updated. We hope to find a solution very soon.

Thanks also go to Alan Hall at Agricultural Research Council of Alberta for his continuing contributions to *The Blade.* This edition, Alan talks about the thousands of orphaned wells that have yet to be properly abandoned. Alan and I took part in a conference call with the Orphan Well Association and learned the difference in those two terms. An orphan well is one whose operators have gone bankrupt or otherwise disappeared without sealing off and reclaiming the site. An abandoned well, on the other hand, refers to a site that has been properly shut down and reclaimed to provincial standards. Please have a look at Alan's article to see the implications and opportunities for producers and landowners as OWA begins dealing with a rapid increase in the number of wells that have been orphaned in response to heavy losses in Alberta's oilpatch.

This edition also includes a University of Arkansas researcher's overview on nitrogen movement in forage stands and the management decisions that can affect the amount of nitrogen available to forages.

As part of her work when it's too wet to take samples, Olivia has tabulated your comments and suggestions from membership forms and event evaluations. We will use your suggestions in setting up workshops webinars to help share more information with you. There is no schedule yet, but we hope to start offering various sessions this fall, including the showcase that was postponed because of restrictions related to the covid-19 pandemic.

In closing, I would like to invite you to share your favourite photos with me for publication in The Blade. Images to be considered for publication should be well composed and in focus and offered at a high resolution that will not get noisy or blurry in print. Thanks in advance! Stay safe and be well.

Nitrogen Movement in Forage Stands: It's not what you think

By John Jennings, professor and extension forage specialist, University of Arkansas Division of Agriculture

Reprinted with permission, from the April/May 2020 edition of Hay & Forage Grower.

Legumes have been used as pasture and hay crops throughout history. They are high-quality forages that improve livestock weight gain, reduce fescue endophyte problems, extend the grazing season, and reduce nitrogen fertilizer inputs due to nitrogen (N) fixation. The unique association of legumes with rhizobia bacteria to fix N is an often promoted but also widely misunderstood process.

The total amount of N fixed depends on the legume species and the population in the field. The reported amount of N fixed from full stands by different legume species varies widely. For example, N fixed by hairy vetch ranges from 50 to 150 pounds per acre and for alfalfa the reported range is 128 to 250 pounds per acre (Table 1). Annual legumes such as crimson or arrow leaf clover fix N at a higher rate than perennial legumes, but longer growing seasons allow perennial legumes to fix a higher total amount of N.

Table 1. Estimated N fixed by various legume species

Species	Potential N fixed/year (lbs./acre)	Value of N fixed @ $0.50/lb. of N
Alfalfa	128 to 250	$64 to $125
White clover	75 to 150	$38 to $75
Red clover	75 to 200	$38 to $100
Crimson clover	50 to 150	$25 to $75
Arrowleaf clover	50 to 150	$25 to $75
Hairy vetch	50 to 150	$25 to $75
Annual lespedeza	50 to 100	$25 to $50

Because of the high potential amount of N available from fixation, legumes are promoted as a source of free N fertilizer.

Work done in Arkansas showed that in fescue-clover stands, forage yield was similar across several fertilizer N rates (Table 2).

Table 2. Yield of fescue-clover in response to N fertilizer

Fertilizer rate (N-P-K, lbs./acre)	Mean DM yield (1980-84)
0-0-0	3.01
0-80-80	2.78
0-160-160	3.19
0-240-240	3.40
100-80-80	3.08
100-160-160	3.77
100-240-240	3.66

University of Arkansas, Huneycutt et al., 1988

Results like this and similar studies have led to the commonly mistaken belief that legumes fix nitrogen and release it into the soil for use by companion grasses in the mixture. However, legumes do not freely share N with grasses because doing so would create more competition that would threaten the survival of the legume plant.

An expensive process

Symbiotic N fixation allows legumes to grow in an N-deficient environment. Nitrogen fixation is a biologically expensive process for both the legume plant and the rhizobia bacteria responsible for N fixation. The bacteria infect the legume roots, which causes the root to form a nodule where the rhizobia live and do their work.

The rhizobia bacteria fix N from air that's in the soil and the legume gains benefit from the fixed N. In turn, the legume provides carbohydrates and sugars from photosynthesis to the rhizobia. Each organism gains necessary nutrients from the association. Nitrogen fixation directly promotes legume growth without the need for N fertilization. Enhanced grass growth is only an indirect effect of N fixation.

Plants use N from various sources including snow or rain, which can contribute 5 to 10 pounds of N per acre annually; soil organic matter (OM), which can contribute 10 to 30 pounds of N per acre annually for each percentage unit of OM in the soil; fertilizer or animal manure, which varies by application rate; and N fixed by legumes.

When N is applied through animal manure or fertilizer, N fixation shuts down because legumes will use free N from other sources just as grasses do. However, grasses are more competitive for N than legumes. Legumes generally have horizontally oriented leaves, whereas grasses are more vertically oriented. As grasses grow taller resulting from added N, they shade the legume plants. Heavy shade also reduces N fixation rates.

So, adding N does not have a direct negative impact on the legume plant, but the net effect is greater competition from the grasses, which crowds the legumes from the sward. A study from Arkansas showed the percent clover in a bermudagrass-clover sod dropped by half for each additional increment of N fertilizer used (Table 3, next page).

Most is in the top growth

It is important to note that the root nodules are the factory, but not the N warehouse. Research done in Texas by Gerald Evers showed that up to 90 per cent of the N is in the top

growth of annual legumes. In perennial legumes, about 70 per cent to 80 per cent of the N is in the plant's top growth. Legume top growth typically contains about 2.5 per cent to 4 per cent N, which equals about 50 to 80 pounds of N per ton of forage dry matter (DM).

Work done in Virginia showed that a 53 per cent stand of red clover or 59 per cent stand of alfalfa grown with tall fescue fixed enough N for a total DM yield of 4.7 and 5.8 tons per acre, respectively. Top growth of the legumes contained 2.8 per cent to 2.9 per cent N.

Table 3. Effect of N applied to bermudagrass sod on clover percentage

N rate (lbs./acre)	White clover stand (%)
0	25
50	16
100	9
200	4

University of Arkansas, Spooner and Clary, 1962

Three modes of transfer

If the fixed N is in the plant top growth and is not freely shared with companion grasses in the stand, how does it reach grasses and other plants in the sward?

There are three primary mechanisms for N transfer. The smallest of these three pathways is through root-to-root contact and mycorrhiza fungi associations. The other two primary pathways are by plant-animal cycling through grazing and by plant decay. By far, the largest transfer pathway is cycling the plant material through grazing animals, mostly aboveground, but also by belowground herbivores.

Only a small proportional amount of the N is retained in the grazing animal's body. Up to 80 per cent to 90 per cent of the ingested N is excreted in the urine and feces. About 50 per cent of the N in the urine is lost through volatilization.

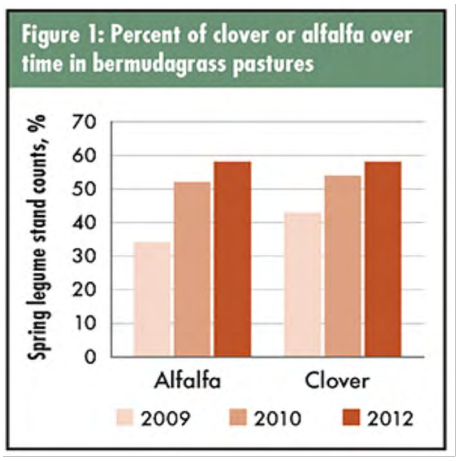
Clearly, the system is somewhat leaky and not all the fixed N is captured in the soil. Further, use of the excreted N by grasses is dependent on distribution of the excreta across the pasture. Researchers have shown that only about 14 per cent to 22 per cent of the pasture area is covered by this transfer annually.

Grazing management and stocking rate influence distribution. More manure and urine tend to be concentrated near water and shade at low stocking rates and in continuous grazing systems. More of the N is distributed across the pasture at high stocking rates and in rotational systems.

It's different in hayfields

In hay systems, most of the N-containing top growth is removed so a secondary transfer mechanism comes into play. The second largest pathway of N transfer after grazing is through plant decomposition. As plants are grazed or harvested for hay, roots die back resulting in sloughed nodules. Normal plant maturation and damage also results in dead crowns, leaves, and stems. These plant parts must decay by action of bacteria and fungi to release N over time.

This pathway can be a significant N source in warm-season grass systems where a grass such as bermudagrass is over-seeded with annual legumes. As the annual legume matures and dies in late spring, the plant residue breaks down, releasing N for use by the warm-season grass during summer.



A Texas study showed that a combination of winter annual clovers over-seeded in bermudagrass yielded as much DM as bermudagrass fertilized with the equivalent of 113 to 142 pounds per acre of N.

Nitrogen fixation takes time

There is a lag time after planting for nodulation and N fixation to begin. This period is about three weeks after plant emergence. Nitrogen fixation is lowest during the establishment year for perennials and reaches over 90 per cent by the second or third year.

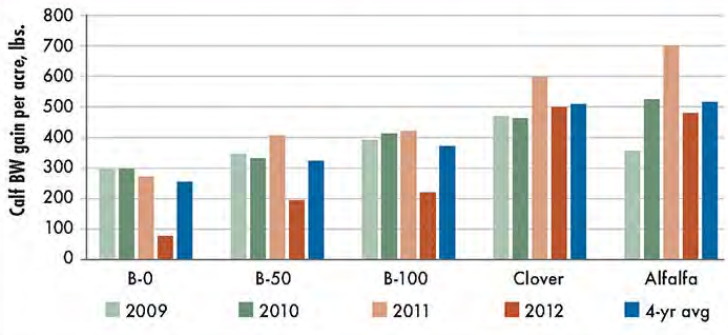
An Arkansas study showed that the percent clover or alfalfa increased over four years when these legumes were interseeded into bermudagrass pastures. Calf body weight gain per acre tended to improve as legume percentage grew over

Replacing Synthetic N in Bermudagrass Pastures *(continued from previous page)*

the course of the four-year study, especially for alfalfa, but gains were generally lower in nonlegume treatments where N fertilizer was applied. Interestingly, calf gains per acre dropped drastically during a severe drought year for the N fertilizer treatments but stayed more stable across years in the legume-grass treatments (Figures 1 and 2).

Legumes are important forages and reduce the need for N inputs. Knowing how N cycling works in forage systems is critical to making effective use of these forages. An important concept to understand is this: Growing forage from N fixation is a process, whereas growing forage from N fertilization is a one-time event.

Figure 2: Replacing synthetic N with clovers or alfalfa in bermudagrass pastures



Getting the Dirt on Soil Sampling

By Olivia Handel, Summer Technician

My time collecting soil samples thus far has better than I would have expected. Coming into this job, I thought I would simply just be taking soil out of the ground, packing it in a bag, and moving on to the next site; which in a way is true, but I have been learning so much just by visiting different farms and getting such different results everywhere I go. No site is the same and I love that! I constantly find myself questioning the data I get and wondering how the results correlate to how the land is being managed.

I've genuinely become intrigued and curious about all things soil, which I never thought I would say after taking my soils class at the university. I have a new-found appreciation for soil, and can't wait to learn more about it in the fall.

Soil aside, I love how physical this job is too. Who knew walking through hay fields could be such a workout! Although my wrists and forearms might have taken a beating at the beginning of the season when I didn't think it would be hard to pound a core into the ground, I am definitely stronger now and more willing to sample the most clay-y and rocky soil.

However, a rainy day here or there gives my body a chance to recover, and I am thankful for that as well.

This job has also been a great introduction in learning how to self-manage and being responsible for getting everything lined up in a timely manner. It has forced me to get comfortable and confident with calling strangers out of the blue, which is such a valuable skill.

Also, I have only ever had field partners, so I was a little nervous to be out by myself, but it turns out I have the best field partners you could ask for: Cows and dogs. Although their work ethic is sub-par, and either involves knocking over all my equipment or bringing me gophers, I do enjoy the company.

Overall, I would say this has been a wonderful and valuable experience. My confidence for data collection, self-management, and field work has gone up and I would recommend this position to anyone in my program.

ARECA Rangeland Carbon Project

ARECA has become my rainy day project. I have been in contact with Devon a few times about what she wants from the interviews, and learning exactly what type of information she needs.

This project is again helping me grow my confidence with calling strangers and taking time out of their day.

It has also been interesting to learn about her project, as it is something I could see myself researching in the future, and I will be able to take away some valuable information from her finished project.

Admin Work

Aside from tracking all my hours, kilometers, and expenses, I have also helped Brenda out with some administrative work. This has involved processing GWFA memberships and compiling the membership information to create visual results that will hopefully help GWFA in the future.

The only thing I do not enjoy about admin work is the technology involved. The laptop I was given takes a very long time to load things, and it is hard to get work done.

Olivia Handel photos

SOIL CONSERVATION COUNCIL OF CANADA
CONSEIL CANADIEN DE CONSERVATION DES SOLS

The face and voice of soil conservation in Canada
Le visage et la voix de la conservation des sols au Canada

Operation Pollinator a success on Canadian farms

One third of the food we eat comes from pollination and that is why programs like Operation Pollinator are so important to the Canadian landscape. Syngenta Canada is a long-term sustainability leader in Canada and the Operation Pollinator program is a key component of the company's work. The program's mandate is to support activities that enhance biodiversity, habitat and other practical initiatives that contribute to healthy pollinator populations. Partnering with the Soil Conservation Council of Canada (SCCC), Operation Pollinator is focused on research and additional partnerships to promote the health and well-being of bees and other pollinating insects, providing participants the opportunity to redirect land considered to be lower in productivity to the establishment of pollinator-friendly habitats.

Launched in 2017, the three-year program had many successes despite some regions suffering from extreme drought conditions. Over 130 sites were successfully established, for a total of 499 acres of pollinator habitat across the Prairies and in Ontario.

"It was great to see the enthusiasm and engagement from all our program participants across the four provinces," says SCCC executive director, Jim Tokarchuk. "I know they will look at their acres with crop production challenges in a new light from now on as they provide an important ecosystem function to their farms and neighbouring fields."

"The program has brought together individual farmers and organizations that are interested in creating habitat on the farm for pollinators and other wildlife," says Paul Hoekstra, Government & Industry Relations Manager with Syngenta Canada. "By focusing on creating natural areas for bees and other pollinating insects, Operation Pollinator offers a practical and meaningful way to improve biodiversity on the farm."

Operation Pollinator is a positive success story, which shows there is an appetite for pragmatic programs and initiatives around sound, sustainable management practices.

POLLINATOR PARTICIPANT SURVEY

A short survey was sent out to program participants in 2019 and here are some of the results:

- 80% of respondents indicated they wanted to "provide another food source for bees and pollinating insects on my farm" as the reason why they participated in the program.
- Over 70% of respondents have future plans to enhance biodiversity on their land beyond participating in the Operation Pollinator program.
- When asked what aspects of sustainable agriculture are important on their farm, pollinator health, soil health, and water conservation and quality were the top three reasons cited.

"We're quite proud of this program and the accomplishments of our provincial partners, and specifically, the farmers who participated," says Tokarchuk. "We would like to express our sincere thanks to Syngenta Canada for their leadership and efforts over the last three years."

OPERATION POLLINATOR ON CANADIAN FARMS:

- **PROMOTES THE WELL-BEING OF BEES AND OTHER POLLINATORS IN AGRICULTURAL LANDSCAPES**
- **PROGRAM CONDUCTED IN PARTNERSHIP WITH THE SCCC AND PROVINCIAL PARTNERS IN PRAIRIE CANADA AND ONTARIO**
- **SEED PROVIDED TO DEVELOP POLLINATOR-FRIENDLY HABITAT ON 1-2 ACRE SITES PER FARM, WITH SOME FARMS PURCHASING ADDITIONAL SEED TO PLANT EXPANDED ACREAGE**
- **OVER 130 SITES ESTABLISHED 499 ACRES IN TOTAL ACROSS FOUR PROVINCES**

SASKATCHEWAN PRODUCER TESTIMONIAL:

"WE ALL HAVE LITTLE PIECES OF LAND THAT WE TRY TO GET INTO WITH A DRILL AND CAN BARELY TURN AROUND. IT SEEMED LIKE A GOOD FIT TO USE SOME OF THOSE AREAS IN A WAY THAT PROMOTES CONSERVATION."

-DUSTIN HANNAH, FARMER, FOAM LAKE, SK

MANITOBA PRODUCER TESTIMONIAL:

"PLANTING POLLINATOR HABITAT ON MARGINAL LANDS WAS A GREAT WAY TO USE THOSE UNPRODUCTIVE ACRES. WE WERE QUITE EXCITED TO BE PART OF THE PROGRAM AND IT WAS A GREAT FIT FOR OUR FARM."

-KAREN KLASSEN, FARMER, MANITOU, MB

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Inside ARECA: What to do with 10,000 orphaned wells

By Alan Hall, Executive Director, Agricultural Research and Extension Council of Alberta

Orphan wells, unfortunately are becoming all to common.

The tough times in the oil and gas business has seen all too many companies cease their operations.

In talking with the Orphan Well Association (OWA), the not-for-profit company charged with the responsibility for reclaiming orphan wells, they define an orphan well as an oil, gas or methane well who's owner has gone bankrupt or otherwise is no longer in business.

OWA is thinking that they may be cleaning up over 10,000 orphan wells over the next three to five years. The volume of wells in this situation will hinge on what other well owning companies cease operations in the coming months and years. OWA has the funding in place to handle this volume. Their revenues are a combination of levies that companies pay on all wells, and recently announced support from federal and provincial governments. OWA is quickly ramping up their operations to take on up to 3,000 orphan well reclamations each year for the next few years.

Typically, the process is that OWA gets in touch with the landowner who has an orphan well on their property. The discussion is around what needs to be done to permanently seal the well, remove the well head if it is still there, remove or neutralize any contaminants, and reclaim the well site and access roads to the condition the landowner wants them in.

This can take anywhere from a year to three or four years, depending on the unique situation of the individual orphan well. There may be bankruptcy proceedings on going, resolving salvage and ownership of any equipment, time needed to complete removal or neutralization of contaminants, etc all add time to the process.

In other situations, things may be pretty straight forward and the reclamations move along like a hot knife through butter.

OWA is a small company that relies on numerous contractors throughout the province to do the reclamation work. If you as the landowner would like to be involved with your equipment in handling some of the contracting like landscaping, earth moving, seeding down, etc., OWA will provide you that opportunity.

Not to muddy the waters, but the vast majority of wells that are at the end of their productive life, are owned by companies still in business. OWA has nothing to do with these situations. They are handled by the Alberta Energy Regulator working with the well owners. There will be a lot of reclamation work going on with these wells, too.

The bottom line is, reclamation of expired wells is ramping up big time. Orphan wells are a significant part of this. Associations like Grey Wooded Forage Association and ARECA have been in discussions with OWA on how forage and applied research associations around the province can help OWA with getting information into the hands of farmers, ranchers and landowners who will be involved.

Over the coming months, as this clean up initiative takes shape, keep an eye out for some detailed information coming your way. Associations will be working closely with OWA to get good detail out to all farmers, ranchers and landowners affected.

There will be articles written and distributed through our newsletters, websites, town hall meetings, webinars, general media, etc. These should start showing up on your doorstep starting this fall, and continue on for as long as useful to you over the coming months and years.

You may see an article more than once, but we think that is better than not seeing it at all.

More to come, and may your summer and fall go well.

ARECA

Green Acreages and ALUS Project Profile: Jim and Gail Wiseman

By Ken Lewis, Conservation Coordinator, Red Deer County

What do you get when you combine a passion for nature with a home in one of Central Alberta's most beautiful spots?

You get a piece of paradise, cared for by Jim and Gail Wiseman over the last few decades.

Jim and Gail have done an amazing amount of work enhancing the environment on their place east of Delburne.

In 2020, with funding support from Red Deer County's Green Acreages Program and ALUS Program, they planted native trees, shrubs, and flowering plants.

This is helping them create habitat for beneficial insects, native pollinators, songbirds, waterfowl, birds of prey, and so much more.

I had the pleasure of visiting their place in July of 2020. As a result of their work and stewardship, the place was absolutely teeming with life.

To find out how you can participate in the County's ALUS Program (on agricultural land) or Green Acreages Program (on acreages), please contact me anytime at 403-342-8653 or klewis@rdcounty.ca

ALUS Canada
A Weston Family Initiative

Counterclockwise from the top:
1. Jim and Gail Wiseman at one of their wetlands.
2. The amazing biodiversity you see around this little wetland has all come naturally, thanks to the management choices that the Wisemans have made the last 20 years.
3. Rock gardens filled with flowering plants, including native species, are excellent habitat for our native pollinating insects like bumblebees.
4. In 2020 Jim and Gail planted new eco-buffers consisting of native trees and shrubs to further enhance ecosystem services production on their property.

Water Systems For Beef Cattle

This is the second installment from an online information page published by the Beef Cattle Research Council and reprinted here with permission. The article is being published as a series in *The Blade.* It can be viewed in its entirety at beefresearch.ca

Water Quality and Potential Issues

As a key nutrient required by cattle, water of suitable quality must be provided consistently to meet drinking needs. While cattle can be maintained on lower quality water sources, their health and performance can be negatively affected. Conducting baseline water tests to determine important parameters of water quality will assist producers in identifying whether a water source is suitable.

While cattle can often tolerate or adapt to certain factors that reduce water quality, periodic testing of the water will assist with identifying the factors and indicate levels that may be problematic. Total Dissolved Solids (TDS) measured in milligrams/litre (mg/L) or parts per million (ppm) is the main indicator of water quality and is a measure of the total concentration of dissolved inorganic salts in water. Factors that can impact TDS and compromise water quality include excessive mineral levels, high or low pH levels, sulphates, nitrates, salinity, algae and bacteria. Weather events, such as excessive rainfall and flooding, or periods of drought can impact water quality. Evaporation of water can exacerbate these factors and create issues with increased bacteria, algae, or concentrated TDS levels which can impact cattle health, weight gain and immune function.

Alkalinity - is usually expressed as pH, with readings of 7.0 being neutral, levels below that classified as acidic and levels above that classified as alkaline. Alkalinity measures water's ability to neutralize an acid. Water pH in a range of 6.0 - 8.5 is acceptable for cattle. While water pH below 5.5 can cause acidosis, reducing feed intake and performance, most water used by livestock is mildly alkaline. When water pH becomes highly alkaline, nearing pH of 10, physiological and digestive upset can occur3.

Algae - Stagnant, slow moving bodies of water, high in nutrients, particularly phosphorous or nitrogen, are more prone to increased growth of algae. It is important to control nutrient accumulations in water by providing off-site watering systems that limit direct livestock access to the water source, aeration to keep the water moving, and reducing run-off into water bodies. Regular monitoring of water sources is essential.

Blue-Green Algae (Cyanobacteria) – Blue-green algae is not an algae but rather a bacteria called cyanobacteria. Certain types of this bacteria can produce toxins that can cause liver damage, gastroenteritis, loss of coordination and sometimes death in livestock. With large amounts of consumed toxin, paralysis and respiratory failure occurs rapidly, within minutes, as the cattle suffocate4. Proper identification is key before treatment as it is often mistaken for duck weed, which is a beneficial aquatic plant. Heavy blooms appear to be solid green across the water; some species look like pea soup or grass clippings. The bacteria lives within the water column so it flows with the water when letting water run through your hands. Watershed management helps minimize cyanobacteria. Prevent nutrient inputs such as phosphorus, nitrogen, animal waste, fertilizers, soil particles, and silt. Each of these acts as a fertilizer for algae and aquatic plants. Preventing direct access to water sources through the use of remote livestock watering systems can reduce problems. Treatment options include dyes, aeration, or a variety of registered copper sulphate products. After treatment, access for livestock should be restricted for 12 -14 days, as the toxin is released in higher amounts when the bacteria dies.

Nitrates - can be converted into nitrites by bacteria in the rumen. Nitrate toxicity from water is not common; however the combination of nitrates in feed together with those in water can create nitrites which diffuse into the blood stream causing respiratory distress and even death. When nitrate levels climb above 100 mg/L and are combined with feed containing nitrates, cattle may be at risk4. Run-off from farmed fields may create additional risk of accumulation in water bodies.

When high nitrate feed and water are consumed in combination, toxic levels can be reached resulting in death three to five hours after consumption.

Salinity - is the concentration of dissolved salts, such as calcium, magnesium and sodium chloride. It refers to the mineral content of water. The salinity of a water source can change over time. Salinity can increase with evaporation during hot, summer months. Young animals and lactating cows are at greater risk of harm from salinity. Cattle can adapt to certain concentrations of salinity over time; however abrupt exposure to high salinity water sources can be problematic. Cattle will generally avoid drinking water that is too salty, but if it is the only water source available, they will eventually become too thirsty and over-consume, which can lead to death.

Sulphates - are common in groundwater on the Prairies and have also been found in spring-fed dugouts and surface sources that drained from saline soils. Sulphates can affect trace mineral metabolism, causing a deficiency of copper, zinc, iron and manganese. These deficiencies can lead to depressed growth rate, infertility, skin integrity and poor immune response. Sulphates can cause diarrhea when levels reach 500 ppm, and at higher levels, can cause animals to reduce their water consumption. At levels of 500 to 1000 ppm (parts per million), trace mineral deficiencies can be induced which may reduce growth and fertility. At sulphate levels over 2000 ppm, cattle may develop polioencephalomalacia (PEM) which is characterized by blindness, difficulty walking and seizures. Note that research is currently underway to further refine sulphate recommendations and better understand the production impacts of varying levels of sulphates.

GREY WOODED FORAGE ASSOCIATION

greywoodedforageassociation.com | 403-844-2645

2020/21 Membership Application Form

Membership in the GWFA is open to anyone interested in forage production, grazing management and environment sustainability

The fee is $40 per year, running from April 1 to March 31

For information, call 403-844-2645 or email office@greywoodedforageassociation.com

Benefits of joining GWFA:

- Discounts on courses, seminars, workshops and tours.
- An automatic subscription to *The Blade,* published monthly online. Hard copy is available on request.
- Assistance with your Environmental Farm Plan.
- Equipment rental (deposit required).
- Access to our reference library.
- Access to our members-only Facebook group.
- Networking with like-minded producers and advisors.
- Farm consultation services (farm calls are 55 cents per kilometre, each way).
- A copy of the GWFA Annual Report.

Please mail your completed form and cheque to:
Grey Wooded Forage Association
PO Box 1448, Rocky Mountain House, AB T4T 1B1,
Or scan and email the completed form and send an e-transfer to *office@greywoodedforageassociation.com*

Renewal ☐ New member ☐ How should we send your copy of *The Blade*: Email ☐ Canada Post ☐

Name: Email:

Mailing address:

Landline: Cell:

***How do you describe your operation (tick all that apply)**

- ☐ Beef producer
- ☐ Sheep/goat\ producer
- ☐ Dairy producer
- ☐ Annual crops producer
- ☐ Forage producer
- ☐ Other_____

***How many head of livestock do you manage:**

Beef cows/heifers_____
Dairy cows_____
Feeders_____
Ewes_____
Does_____
Other_____

***How many acres of land do you manage:**

Pasture_____
Hay_____
Crop_____
Other_____

**These questions are voluntary. We do not share your information*

How can we improve our service to you?

Please suggest topics you would like to learn more about: