

Grow With Us

Lakeland Agricultural Research Association

March / April 2022

Regional Silage Trial: Alternative Crops Stephanie Bilodeau ~ LARA

crops, has been a rising trend in forage production issues. here in the Lakeland for a number of years. The incorporation of these forages in your livestock ration can LARA received funding in 2019 to begin investigating be highly beneficial. Alternatives such as Chicory and some of these alternative species as monocultures in Plantain are an excellent source of energy and protein the region. The purpose of this trial is to provide curand are also easily digestible.

Alternative crops can also promote soil health as their for silage, greenfeed and grazing. The long-term goal root systems decompose over time allowing the material to break down into organic matter. Tap rooted species such as turnips and radishes can help with The Regional Silage Trial Alternative Crops was seedcompacted soils as the plants large roots can help with breaking up the soil. Other species, including some millets, have a root system that can help prevent erosion and can be used as a smother crop to control weeds.

Kevin Elmy with Cover Crops Canada in his recent webinar "Cover Crops and Cows", hosted by LARA, pointed out some considerations when including these

The use of alternative crops, also known as cover tive and regrow in spring, creating potential control

rent and comprehensive regional yield and quality data on annual 'Alternative' forage species and varieties is to improve on-farm feed production and efficiency.

ed on June 1st, 2021 in Fort Kent with 10 different species grown in a randomized complete block design with four replications to reduce error. The trial was hand weeded when necessary. At the recommended harvest stage, plant heights and plot yields were taken and a sample was collected and sent to A & L Canada Laboratories for nutritional analysis.

pointed out some et	mana	- crops in your rotation	Some Table	e 1 illu	strates tl	ne yield a	and nutri	tional da	ta from	
In This Issue:		species, such as pla can become highly con	antain, the 2 mpeti- Repo	021 tri rt.	al. A ful	l report is	s availabl	le in our	Annual	
Grazing Planning	4	Table 1. Yield and Quality Data, 2021.						Continued on page 3		
Sainfoin Longevity in the Lakeland		Variety:	Yield		СР	ADF	NDF	TDN	Ca	
	5		(ton/acre)		(%)	(%)	(%)	(%)	(%)	
		Millet	1.84	а	12.2	35.8	56.6	61.1	0.3	
Soil Benchmark Project Update	6	Max Radish	1.43	b	14.3	39.3	45.6	58.3	1.1	
		Phacelia	1.21	b	12	41.8	47.2	56.3	2.7	
		Forage Radish	0.86	cde	9.72	44.8	55.4	54	0.3	
The Trouble with Wild Oats	7	Sorghum Sudan Grass	0.76	cde	10.2	48	51.3	51.5	0.5	
	'	Plantain	0.68	cde	11.1	47.3	50.2	52.1	0.4	
		Chicory	0.58	cde	18.5	30.9	40.8	64.8	1.2	
Garden 2022	8	Forage Brassica	0.45	de	8.55	41.9	54.2	56.3	0.3	
	0	Forage Turnip	0.39	de	12.7	32.3	36.6	63.8	0	
Unpredictable soil	10	Forage Kale	0.35	e	10.7	44.9	54.7	54	0.4	
		Average	0.85		11.99	40.69	49.26	57.21	0.71	
INHOgen										

2022 Calendar of Events								
Apivar Resistance	Ap	ril 5, 2022	Webinar					
How To Grow Hemp	Ар	ril 7, 2022	Webinar					
Soil Healthy With Nicole Masters	Apr	il 20, 2022	Webinar					
Fort Kent Field Day	Jul	y 21, 2022	LARA Research Site					
Lac La Biche Field Day	Jul	y 27, 2022	Lac La Biche County					
St. Paul Field Day	August 4, 2022		County of St. Paul					
Smoky Lake Field Day	August 11, 2022		Smoky Lake County					
Call the LARA Off help with: Age Verification, Feed Tes vironmental Farm Plar Canadian Agriculture Part applications and more 780.826.7260	ice for ting, En- ns, mership e.	Feed Testing We offer two free feed tests to all pro- ducers 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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When comparing the data from the 2021 growing season with yield data from previous years, we saw much lower yields this past year. This is not unexpected and is likely due to the dry conditions experienced in 2021.

All of the varieties, except the forage brassica and forage radish, are adequate to meet cattle Crude Protein (CP) requirements through gestation and into lactation. In contrast, Total Digestible Nutrients (TDN), which is the easiest method of estimating energy content of a feed, are adequate to meet requirements in mid gestation only, with many species *I* lacking energy requirements as cattle move into late gestation and lactation.

Due to the high nutritive quality of many of these forages, it is recommended to include them in cattle rations in combination with at least one cereal crop.

Resources:

"Cover Crops and Cows" webinar with Kevin Elmy. \ Lakeland Agricultural Research Association 2021 Annual Report.



PROFITABILITY THROUGH SOIL HEALTH AND REDUCED INPUTS

- Making Microbes Work For You

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Things to Think About When Planning Your Grazing Season Alvssa Krawchuk ~ LARA

The challenging growing conditions experienced in main in a vegetative growth phase during the growing 2021 created a severe shortage in feed supplies for season, which can offer a high-quality forage that will cattle producers across the province and much of continue to grow provided moisture and nutrient rewestern Canada. This left many producers scrambling quirements are met. Winter cereals can be fairly easy to secure enough feedstuffs to maintain their herd over to establish and may be more responsive to early seathe winter. It seems like no component of the annual son or periodic precipitation than perennials or other feeding program was at normal production levels as annual crops. the drought conditions and heat stress impacted native rangelands, seeded pasture and hay land as well as Intercropping with a spring cereal may also provide an annual crop acres for greenfeed, silage and grazing.

acres are buried under record snowfall, that land is by LARA comparing spring/winter cereal intercrops still under stress and trying to recover. As we head for forage with monocultures of barley, oats and tritiinto the 2022 grazing season, focus will not only need cale has shown that, on average, there is no significant to be on rejuvenation methods to allow land and for- yield loss when spring and winter cereals are interages to recover, but also on exploring options for an- cropped and harvested at the recommended harvest nual and perennial forages for grazing and stored feed. stage for silage.

Fall and Winter Cereals

One option for forage and grazing will be the use of Annual crop mixtures, also known as "cover crops", annual forage crops. Seeding of fall and winter cereals can also provide a significant amount of forage mate in early spring can provide a significant feed source for livestock. These annuals seeded in spring will re-

added increase in forage production by allowing a silage crop to be taken while leaving the vegetative Although it may be hard to think about while these winter cereals to regrow for fall grazing. Work done

Cover Crop Mixtures

Continued on page 9...



Sainfoin Longevity in Northeastern Alberta Alvssa Krawchuk ~ LARA

Forage legumes are widely grown across the Canadian Prairies due to their beneficial nutritional value for livestock as well as their nitrogen fixing capabilities. Although alfalfa is the most widely grown legume, a major deterrent to grazing it is the risk of bloat, which can cause significant animal death if not managed and treated promptly.

To help mitigate this risk, research has focused on pursuing legumes that are considered bloat-safe. One of these legumes is Sainfoin, which can be grazed as either a monoculture or as a mixture with either

risk of bloat considerably on alfalfa pastures.

Lakeland Agricultural Research Association (LARA) trial. has been growing AC Moutainview sainfoin as a monoculture and mixture with various grasses since 2016. An additional method of improving sainfoin stand Although the initial project focused on establishment longevity is that stands shouldn't be grazed within 50 and growth of the bloat safe legume, an extension pro- days of the first killing frost to allow for root reserves ject funded by the Canadian Agricultural Partnership to replenish. Improving sainfoin stand longevity re-(CAP), has allowed data to be collected in years 4, 5 mains a top priority of current research programs and and 6 after seeding. Table 1 illustrates the stand lon- some newer sainfoin cultivars are approaching alfalgevity of 8 grass/legume mixtures seeded in 2016.

Historically, sainfoin tends to have poor stand persis- A new variety, AAC Glenview, developed from a tence, particularly when mixed with either grass or high-yielding population with rapid regrowth under legumes. This has held true for the sainfoin mixtures grazing conditions, was released in 2018. This past in LARA's Perennial Forage Project as shown by the year, 2021, LARA established a new legume variety results in table 1. Two years after establishment, all of trial that includes AAC Glenview sainfoin. We are the sainfoin mixtures had excellent establishment with excited to see the results of this new variety in 2022 all plots being over 60% legume in 2018. This dramat- and to see how it compares to the older sainfoin varieically changed by 2021 where the majority of the sain- ties for longevity in Lakeland.



foin has died out completely or been significantly reduced with grasses making up over 90% of all sainfoin mixtures plots.

In contrast, the grass/alfalfa mixture plots remained fairly consistent since seeding in 2016, with alfalfa continuing to make up over 30% of the plots.

It is recommended to allow sainfoin stands to reach seed shatter in year two after seeding and once every two years to allow seed shed which can help main-

grass and/or alfalfa. Studies have shown that inclusion tain stand density. This was not done in the Perennial of sainfoin at 20-25% of dry matter can reduce the Forage Project as harvest was taken at the recommended stage each year of the trial. As a result, this could have contributed to poor stand longevity in the

fa's persistence.

	% Composition					
Mixture	201	8	2021			
	Legumes	Grasses	Legumes	Grasses		
Fleet MD/Yellowhead Alfalfa	27	73	46	54		
AC Knowles/Yellowhead Alfalfa	53	47	34	66		
Success HB/Yellowhead Alfalfa	44	56	44	56		
Fleet MB/Spredor 5 Alfalfa	27	73	30	70		
AC Knowles/Spredor 5 Alfalfa	34	66	21	84		
Success HB/Spredor 5 Alfalfa	48	52	40	60		
Fleet MB/AC Mountainview Sainfoin	80	20	0	100		
AC Knowles/AC Mountainview Sainfoin	86	14	0	100		
Success HB/AC Mountainview Sainfoin	66	34	5	95		

 Table 1. Botanical Composition of grass/legume mixtures seeded in spring 2016.

Soil Health Benchmark Study Update Dianne Westerlund ~ CARA

The Chinook Applied Research Association is head- ation and landowners. The report captures a picture of ing a provincial initiative funded by the Canada Agri- the soil health and is a point of reference for comparicultural Partnership (CAP) designed to generate a data son to future sampling or following management base of soil parameters related to physical, biological changes. It includes measurements of the individual and chemical indicators. Benchmark study is led by CARA's Soil Health and measurement is an area of concern or constraint for Crop Management Specialist Dr. Yamily Zavala. Dr. over-all soil productivity. Zavala was instrumental in the development of CARA's Soil Health Lab (CARASHLab), the first farmer-focused lab evaluating physical and biological soil qualities in western Canada. The lab utilizes protocols from Cornell University and the former Canadian Soil Food Web Lab.

Eleven of Alberta's applied research and forage associations participate in the soil health benchmark study,

working with farmers and ranchers in several soil zones throughout the province. Each group documents field history and management information and uses the same protocols when collecting soil samples. Samples are received and processed through CARA's Soil Health Lab. Dr. Zavala supervises analysis of biological and bio-physical characteristics, including soil respiration rate, texture and wet aggregation stability, the level of active carbon rate and total and potential biological biomass. Analysis of chemical components are currently contracted to A & L Labs and the University of Alberta's soil lab determines the total organic carbon, carbon and nitrogen levels. All information is being summarized into a data base which will help generate strategic management practices targeting specific regional soil constraints in the future. Monitoring (revisiting) sample sites will help determine if those managements are working or not. Funding for the Benchmark project wraps up in 2022, but further verification of management practices at over 200 of the original benchmark sites will made through a new project supported by Results Driven Agricultural Research (RDAR).

The CARASHLab generates a comprehensive report for each site sampled, which is compiled and shared with the local associ-

The Alberta Soil Health soil indicators as well as a ranking of whether the

Suggestions for mitigation or improvement of problem soil components may also be added to the soil score card.

Discussion of the soil health report cards have been the focus of several extension activities held by participating producer associations.

Continued on next page...



Soil Health Benchmark Study Update Continued from previous page

processed or added to the data bank, Dr. Zavala has to producers into the future. observed a few trends from samples collected to date. Compaction and poor water infiltration are common concerns at many sites and are often associated with lower biological components. She has observed a great diversity of beneficial soil creatures including, protozoa functional groups, fungal hyphae and nema-

Although not all samples collected to date have been it continue to grow and provide valuable information

Note: 1525 soil samples, from 1138 fields managed by 434 farmers have been received to date under Soil Health Benchmark study. Data from analysis of samples submitted by individual farmers or as part of other studies will also be included in the data base.

tode feeding groups as well as predatory species. Each soil sample evaluated has it own 'biological signature' with no two samples having the same biological 'fingerprint'. The biology in some soils just needs to be 'woken up' whether from adding diversity to the forage mix or crop rotation, maintaining green growth longer during the growing season or adding biological amendments to the soil. Specific stramanagement tegic practices and recommendations will be identified during the final phases of the Benchmark Study as well as the management verification project which is just beginning. The Benchmark Study is intended to be a working tool that helps managers better understand soil health, how various management practices impact it and which practice might contribute to improving land resilience. It is Dr. Zavala's intention that



Garden 2022: Tomatoes LARA Staff

Rapunzel is an indeterminate tomato culti- **<u>Primo Red</u>** Best early beefsteak. Primo Red has var that produces long, cascading stems with up to 40 large, firm, deep, 8.5oz red fruit with smooth, mild small, round, red cherry tomatoes on each stem. Can flavour. This determinate hybrid grows on a compact be grown in a container. Staking or caging is recom- open plant and will supply you with numerous unimended to support the weight of the fruiting stems.

Bobcat Beautiful, firm beefsteak tomatoes on a plant.

very healthy and vigorous determinate plant. This hybrid sets juicy red tomatoes of uniform shape and size. ... Determinate plants are shorter and do not require staking, although they do benefit from some support or cages. They have a much more concentrated harvest.

Cherry Falls Cascading vines. Cherry Falls produces bright red, sweet, juicy cherry tomatoes on productive vines. Its vigorous growth habit will give

you extremely high yields and the trailing vines make it ideal for container or basket growing. Does not need staking or pinching. This determinate tomato produces C<u>elebrity</u> The Celebrity tomato cultivar is a hyfruit all summer.

Tough Boy Gold Consistent beautiful fruit! Tough Boy Gold produces great yields of golden fruit the growing season. weighing 100-150g. This slicer is crack resistant and stores well short term.

With low acidity and great flavor, Tough Boy Gold Manitoba A very dependable and early tomato will brighten any sandwich! Indeterminate. Matures in variety that is excellent for the Prairies. Enjoy the 75-80 days from transplant.

Plum Regal Excellent Late Blight Resistance. A determinate that is great for sauces and salsa. This 4oz hybrid has a bright red interior and exterior that is superior in flavor. It also has a great texture with good crack resistance. With its great disease resistance package it stays healthy in the garden, making it a they almost makes the leaves disappear. Perfect for great choice for home gardeners and organic growers. It has resistance to late blight, Verticillium and Fusarium wilt, early blight and tomato spotted wilt virus. 68 days to maturity.



formly sized tomatoes that make for an easy harvest. Resistance to Verticillium and Fusarium wilt and Tobacco Mosaic Virus. Matures in 68 days from trans-

> Lemon Boy is a hybrid, indeterminate tomato variety that produces bright yellow fruits with the perfect balance of sweet and tangy flavors. This variety is the yellow version of the popular Better Boy tomato variety

> <u>Beefsteak</u> produce large, meaty, solid fruit that is slightly flattened and globe-shaped. With a mild and flavorful taste, it is great for salads and table use.

brid that produces long fruit-bearing stems holding 20 or more very plump, robust tomatoes. Fruits weigh approximately 8 oz., and are 4 inches across. Plants need caging or staking, and produce fruit throughout

bright red, juicy fruit earlier in the season than other varieties.

Bonsai 75 days. Determinate. These fabulous little Bonsai tomato plants are a highlight in any garden. Short in stature (barely making 12 inches), they become covered in so many one inch cherry tomatoes planters and balconies. Oh and the fruits taste fantastic!

Things to Think About When Planning Your Grazing Season *Continue from page 4*

rial for livestock. Work done by Chinook Applied Re- tions last summer and, in many cases, livestock were search Association (CARA) has shown that crop mix- grazed longer than ideal last fall to try and extend tures can produce more biomass than individual crop winter forage supplies. Many perennial pastures will stands. Some cover crop species can be ready to graze still be recovering from the 2021 grazing season and in as little as one month after establishment.

These crops are typically considered highly nutrient dense, with research done by LARA showing species Here are a few considerations for grazing perennial such as Chicory can have as high as 18% crude pro- forages this summer: tein. As such, it is recommended to seed these species in combination with a spring cereal.

care will need to be taken to allow recovery and improve the stands longevity.

Be patient, don't turn livestock out too soon. It is best to wait until grasses have at least 3 full leaves before turning your animals out. This is where early seeded winter cereals or fall seeded winter cereals can provide an early season grazing opportuni-

ty while you wait for perennial pastures to be ready.

Allow adequate rest and • recovery time after grazing. Overgrazing occurs when livestock are left in a pasture too long and regrowth is grazed right away or when livestock are returned to a pasture before the plants have recovered. Allow adequate time for grazed pastures to recover before regrazing.

Try and leave a thatch cover after grazing. Also known as "armor" for the soil, thatch protects the soil from sun, increases moisture retention and improves overall soil health.

Increase group size and • move the herd more often. This allows plants to be grazed more uniformly and in a shorter period of time thus preventing overgrazing by increasing rest times.

If possible, further delay grazing on pastures that were heavily grazed last year and allow only light use of forages in order to maintain current plant health status and increase thatch after grazing.

Perennial Forages

Perennial forages can be highly resilient, but even they have been significantly stressed by the dry condi-



My pasture has a good cover of litter.

I reduced stocking rate in the 2021 grazing season and removed livestock early.

Despite the dry conditions, some grass grew because of adaptive management and litter protection.

If dry conditions continue, I will need to apply adaptive management in protecting my forages.

If normal moisture returns, this winter and next spring, I may be able to plan on grazing in 2022, but at reduced rates, and expect to see a faster recovery in my grass production.

I have grazed my pastures heavier than I should have in 2021.

My pasture is showing signs of stress; plant vigor and litter reserve are reduced. Bare patches with little plant cover are visible.

If dry conditions continue, then limited grazing opportunities will exist in 2022.

If normal moisture returns this winter and next spring, reduced stocking rates will be required for a number of years to rebuild litter reserves, ground cover and plant vigor.



The pasture looks barren.

Most or all of the old grass and litter reserves are gone and there may be increases in bare patches.

RANGE GALIGE

If dry conditions continue, continued grazing will further damage my pastures. None or very limited grazing opportunities will be available in 2022.

When normal moisture returns this winter and next spring, multiple years of rest and careful management will be required to restore pasture health.

Adapted from "Grazing Lease Management During Drought" by Alberta Sustainable Resource Development: Public Lands 2001.

Last Season's Drought could cause unpredictable soil Nitrogen The Western Producer

thrown off by residual fertilizer left from crops compared to what is plant available in the spring. that never were

A good portion of the plant nutrients applied last lot of available nitrogen. Because if there are really spring still sits in prairie soils.

Some agronomists have even found granular pellets to do a bit of checking," Schoenau said. of fertilizer still intact when taking soil tests this fall.

In most areas, there was enough moisture to dissolve He said once nitrogen levels get up around 30 lb. per fertilizer applied in the spring. However, drought con- acre, including residual and applied nitrogen, there ditions prevented crops from using these inputs across will begin to be a reduction in the amount of nitrogen wide swaths of the Prairies last summer.

producers will be eager to include high levels of re- likely a better economic decision to plant crops that

sidual nutrients when penciling in their fertility program.

This is especially the case with nitrogen that's approximately double the price now compared to a year ago.

Even though nitrogen is not permanently lost, it will likely be hidden from the soil test and from earlv season crop growth.



Drought conditions, like the ones that injured yields in this wheat crop near Flaxcombe, Sask., left large amounts of unused nutrients in prairie fields this year. | Michael Robin photo

Western Canadian crop rotations are being nitrogen apparent on field in fall could be different

"You do want to be cognizant that you didn't lose a wet conditions in the spring, things may change a little bit, and so for that reason I think it's always good

derived from fixation from pulse crops.

With fertilizer prices shooting for the moon, many So, on fields with high levels of residual nitrogen it's

can't fix their own nitrogen including a cereal or oilseed.

Schoenau said there can be negative outcomes when growing pulses on fields with high levels of residual nitrogen.

"I've seen pulses growing on soils with high available N, on a fallow is a good example, you get this really heavy vegetative growth that tends to fall over and lodge, in some cases with increased disease incidents," Schoenau said.

Charles Geddes, research scientist at Ag Canada, presented at the same Pulse Agronomy workshop, and he said growers should keep in mind how high residual nutrient

levels can affect weed populations.

Pulse crops like lentils don't need a lot of additional nitrogen in the soil to do produce yields. If there is Some of the work Geddes performed for his PhD extoo much it can inhibit seed production, creating too amined volunteer canola in soybeans and he found much top growth causing lodging and creating opportunities for disease to flourish. | Mike Raine photo If straw was baled and taken off there will be even less material to take part in any immobilization of ni- As nitrogen levels increased, yield losses imposed by trogen.

Jeff Schoenau, professor of soil fertility in the department of soil science at the University of Saskatche- higher nitrogen environments, especially in our arable wan, participated in the Sask. Pulse 2021 Pulse cropping systems," Geddes said. Agronomy Workshop. He said the levels of residual

nitrogen levels in the soil was one of the driving factors for interference from volunteer canola.

volunteer canola also increased.

"Most weeds are nitrophilous, where they do prefer

Continued on next page...

Last Season's Drought could cause unpredictable soil Nitrogen *Continued from previous page*

"So, if you're planting the legume or pulse crop on a "There's 160 lb. of nitrogen, 30 of phosphate, quite a field with lower residual nitrogen you can just give bit of potassium. If I just look at the nitrogen and that crop a bit of a competitive advantage because it's, phosphate cost, that is a lot of dollars' worth of nitroin part, fixing its own nitrogen, whereas the weeds gen and phosphorus." will be nitrogen starved."

Another factor to consider when it comes to residual he said that the canola regrowth he examined used nutrients was the regrowth that was a common sight in around \$135 per acre of these nutrients. many growing regions last fall.

Heard said in a wet environment regrowth could act as or volunteer nutrients (cycling). We know that full a cover crop and provide some benefits including re- amount isn't available next year. It still needs to break ducing nitrogen losses to leaching or denitrification.

But in dry environments this regrowth can use up valents that could have been used by the crop the follow- high levels of regrowth this fall. ing year.

Established nitrogen uptake patterns can be used to mass), and we looked at the uptake. There's about 80 calculate how much nitrogen is taken up by crop regrowth.

For wheat and canola, a good portion of the nitrogen uptake occurs relatively early in the crop's life cycle Article adapted from: Last season's drought could cause compared to other crops.

"Between tillering and stem elongation, three to five Written By: Robin Booker weeks after seeding or germinating or regrowing.... For cereals, it could be anywhere between 25 and 80 lb. of nitrogen per acre," Heard said.

"With canola getting up to the early rosette stage, 15 to 70 lb. So, that could be quite a bit of nitrogen, using a back of the envelope calculation."

To gauge how much nutrients pilfered in the volunteer canola regrowth researchers entered a canola field that wasn't worth harvesting near Brunkild, Man.,, but had significant regrowth later in the fall.

Heard said there was on average 1.9 tons per acre of biomass and up to 21.6 tons per acre in some of the heavy areas.

"The nutrient concentration in this foliage was quite high and probably a bunch of that was a nitrate carry over and so it was readily taken up," Heard said

At current market price for nitrogen and phosphorus,

"We really don't know how to account for cover crops down and decompose," Heard said.

uable water and reduce the amount of residual nutri- Researchers also went into a harvested oat field with

"In this case that's about a tonne per acre (of biolb. of nitrogen and 85 lb. of potash.... They're not even quite at the boot stage yet and again, some high dollar value of nutrients in that crop."

unpredictable soil N | The Western Producer



Lakeland Agricultural Research Association

Mission Statement:

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

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This publication is made possible in part by:

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