# **Central Grasslands Forum**



NDSU Central Grasslands Research Extension Center Streeter, North Dakota 58483

> NDSU NORTH DAKOTA STATE UNIVERSITY

### Spring 2019

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### A Walk Through the Pasture: News from CGREC

Kevin, Sedivec, Interim Director, CGREC

The winter of 2018/2019 reminded me a lot of my first winter at the center in 2016/2017 – but worse. This winter has been cold and snowy, with the center receiving 97.5 inches of snow. Calving season started earlier than scheduled – seems to be the norm with these calving ease bulls – with the first calf coming March 13 (17 days early). This winter has been windy; snow drifts are high and long. We lost one of our greenhouses due to the heavy weight caused by a drift.

As many of you know, this year is a legislative year. So, we made many trips to the capitol to provide testimony on the value of agriculture and natural resource research and extension programming. We started in the House, with the main station and RECs receiving a 6 to 7 percent budget cut in the bill they passed – we received a 13.5 percent budget cut during the 2017/2019 session. On to the Senate – they passed the bill that reinstated the cuts from the House and passed the SBARE initiatives related to Agrobiome and Precision Ag. They will go to committee and come up with a final budget by the end of April or early May.

Today (April 16) we tagged calf number 300, so we are about 75 percent complete. Cows and calves go out on the grazing research studies the week of May 20. These grazing trials (patch-burn grazing – 2 different treatments, twice-over, rest rotation, and season-long grazing) need 386 cow/calf pairs, so it looks like we should be good to go on time this year. Please see our 2018 Annual Report for updates on all the studies happening at the center.

We hired Tim Long in March as our beef herdsman. Tim is no stranger to the North and South Dakota livestock industry. Tim has almost 30 years of experience as a livestock nutritionist, most recently serving south central North Dakota as a nutrition consultant with Cenex Harvest States. Tim and his wife live near Napoleon and have three children.

The field season of 2019 will bring some new forage and range research trials. Scott Alm's forage program will shift our research focus from plot size studies conducted in the past to larger-scale research that demonstrates forages under grazing while complementing these projects with plot size

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# NDSU NORTH DAKOTA AGRICULTURAL

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experiments. We will conduct a follow-up swath corn study conducted in 2018 looking at four different forage corns. Our main objective is to assess the costs of feeding corn as forage and determine which varieties perform better.

A second grazing forage trial will be conducted collaboratively with Dr. Undi and Scott Alm. After harvesting spring triticale from nine 10-acre fields for hay, each field will be planted to winter rye, winter wheat or winter triticale (3 replicates of each) in early August. Pregnant, non-lactating cows will graze these fields from late October through early December. These fields will be grazed again in the spring of 2020 with growing heifers. The objectives are to compare winter cereal types for production, winter survival, livestock performance, economics and soil health.

After we graze the winter cereal crops in the spring of 2020, we will terminate the crop and plant a full season cover crop. Grazing treatments will be implemented on the cover crop and will include the following: no graze, limit graze seasonlong, and twice-over rotation to compared soil health, livestock performance and economics.

A third forage trial will compare production and economic return of the popular forage cereal crops used by producers. These cereal crops include four varieties each of forage barley, forage oats and spring triticale. We will compare production and economic return of winter rye, winter wheat, winter triticale, and winter oats. maximizing regrowth on spring burned rangeland and within the different grazing pressures (light, full, and heavy) of the twice-over rest rotation treatment. The primary goal is to create more grazable grass and capture it by the cow – thus increasing harvest efficiency and stocking rate, creating more income from the land base.

It should be another busy and fun research season in 2018. Progress reports can be found in the 2018 annual report for all current projects and can be found on our web site (<u>https://</u><u>www.ag.ndsu.edu/centralgrasslandsrec/central-grasslandsresearch-extension-center</u>).

In closing, spring is "slowly" approaching. Here's to warmer weather, spring rains and green grass. If you ever have any advice or just want to visit about the research and extension programs conducted at the Central Grasslands Research Extension Center, drop me an email (kevin.sedivec@ndsu.edu) or give me a call (701-799-4689). Until our next walk through the pasture, enjoy the splendors that spring brings the Dakotas. Take time to listen and watch the spring migration of the birds. Here's to a successful and productive calving season. Take time to enjoy your family, take a walk (or ride a horse) through North Dakota's beautiful prairies.



Lastly, Erin Gaugler will look at grazing efficiency and

# Never too Early to Plan for Late-Season Grazing Options

Kevin Sedivec, Interim Director, CGREC

Although spring has finally arrived, planning your late-season grazing strategies should occur now. If you plan to graze a cover crop or annual forage, purchasing seed early may be needed as some forages are in short supply this year – particularly foxtail millet.

My goal for this article is to provide a short synopsis of lateseason grazing options livestock producers may consider for late-season grazing. I will address some pros and cons of each practice, what is needed to incorporate the strategies, and best research findings on economic costs from the option.

#### **Crop Residue Grazing**

The easiest late-season grazing option is residue grazing of harvested crops. This is also the most common practice used by livestock producers who also have crop land. The most

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common crops used for late-season grazing after harvest is corn, small grains, and peas.

<u>Pros:</u> There is typically no added expense with livestock grazing regrowth and/or standing stubble. In years with good late-summer moisture, small grain crops and peas will green up from germinated spent grain and tiller regrowth. The regrowth will be high in protein (12-16 percent), high in TDN (60-64 percent), low in fiber, and high in vitamins and minerals. Corn stubble provides a high volume of grazable forage, but is typically low in protein (5-8 percent) and moderate to high in TDN (50-60 percent), depending on amounts of grain and cobs in the field. Labor costs are low and soil nutrients added back to the field from deposited manure and urine. This late-season grazing technique will be the most economical practice due to low input costs.

<u>Cons</u>: The most limiting factor with grazing crop residue is lack of livestock drinking water. Livestock producers will need to plan their residue grazing on lands that either have water present or in close proximity to areas that cattle can travel to. If a producer projects the future use of lands for crop residue or the types of grazing, adding a long-term water source can be cost effective.



Grazing corn residue at the Dickinson Research Extension Center in 2014.

In dry years, regrowth can be minimal and nutritional forage limited, with the primary grazable forage as the stubble. Small grain stubble is traditionally low in protein (2-5 percent), low in TDN (38-45 percent), and low in vitamins and minerals. Supplementing with protein, vitamins and minerals will be required to maintain body condition. Lastly, small grain regrowth can be high in nitrates and toxic to cattle. If the grain crop was fertilized with high rates of nitrogen and the harvested grain lighter than expected, regrowth will contain high levels of nitrates in the plant material. Test the regrowth for nitrate levels before grazing is highly recommended to assure the feed is a safe forage.

#### Swath Grazing

Creating swaths from harvested hay or pasture land can provide a high quality feed with a lower amount of inputs. Common hay and pasture land fields used for swath grazing include brome grass, crested wheatgrass, or Kentucky bluegrass dominated field. These fields may include unharvested lands or regrowth fields that received high moisture. Warm-season annual forage crop also provide an excellent option for late-season swath grazing, including corn, foxtail millet, sorghum-sudan, sudangrass, and pearl millet. The only added expense is cutting of the grass and rowed into swaths.

Fields should be cut and windrowed by mid-September to retain quality and reduce loss of leaf tissue. However, do not cut too early as risk of spoilage increases with increased exposure to rain events. Corn should be seeded in mid-June; sorghum-sudan, sudangrass, and pearl millet seeded in late June; and foxtail millet seeded in mid-July to create high quality feed that optimizes quantity and quality when swathed in mid-September.

Limit access to the field by adding a temporary fence. Allow access to the field for 3-6 days of grazing, moving the fence to fresh swaths once forage is consumed. Limiting access to the entire field will increase harvest efficiency by 30 to 50 percent.

<u>Pros:</u> Swath grazing has lower input costs and labor than baling the hay and transporting to areas to be fed. The swaths will retain the nutrient content achieved at time of cutting through much of late fall, early winter time period. Studies at the Central Grasslands Research and Extension Center showed crude protein content of crested wheatgrass cut and swathed in mid-September at 8-11 percent through early December,

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depending on fall moisture. They also found crude protein content of foxtail millet was at 11-14 percent when seeded in mid-July and swathed in mid-September. The Central Grasslands Research and Extension Center also did a swath corn trial in 2018 using forage corn varieties and produced over 7.5 tons of dry matter in swaths when seeded in mid-June and swathed early September in the milk stage of development. The cost to feed pregnant, dry cows was \$1.02/ day after all input costs were accounted for.

Labor and fuel costs are reduced compared to feeding bales and nutrients are added back to the field through natural depositing of manure and urine, and unharvested feed.

<u>Cons:</u> Similar to crop residue grazing, livestock drinking water may be limited or lacking. Harvesting cool-season perennial grasses in mid-September can be nutritionally limited versus grazing or haying from late-May through July. In most years, nutritional quality of these grasses in mid-September will be below the requirements of a lactating cow and older calves. However, nutritional quality of the swaths is usually at or above the requirements of a dry cow.

It is not recommended to swath graze the same field of perennial grasses for multiple years. The cows will also graze any grass regrowth while swath grazing, stressing the plants and reducing plant vigor after multiple years.

Lastly, wind can be your greatest enemy in the first few days after swathing. The swaths can take 1 to 2 weeks to settle, leaving them vulnerable to high winds that can blow the



Swath grazing at CGREC in 2018.

swaths across a field into the fence lines, causing damage to the fence and a loss of forage.

#### **Bale Grazing**

Bale grazing has become a popular practice in recent years in North Dakota. This practice of feeding harvested bales in a field has been a common practice in Canada for decades, but with limited use in North Dakota until the past 5 to 10 years. Bale grazing typically occurs on hay land, introduced grass pastures, and cropland. It is NOT recommend to bale graze on rangelands.

Bale grazing involves moving bales to a desired location of the field and laid out in a grid design, placing the bales approximately 25 to 40 feet apart. The cows have limited access to the bales, providing sufficient amounts of feed for a planned time period (i.e. 5 days). Typically a temporary fence is used to limit access. For each grazing period, cattle should have access to some high quality bales to maintain the nutrient demand of the cow. Often times, producers will provide a mixture of high (20 percent), moderate (60 percent) and low (20 percent) quality hay bales within each grazing period. This practice reduces the overall costs of the forage while providing sufficient nutrients to the cows within the specific grazing period. Once the first grazing period is complete, temporary fence is moved and cows are allowed access to new bales.

<u>Pros:</u> Bale grazing doesn't reduce the costs associated with harvesting hay and transporting to a feeding area (drylot, hay field). However, is does reduce the cost of daily feeding cows during the winter months (fuel, machinery, labor). Once the bale grazing grid is laid out, the only labor is moving the temporary fence to fresh bales.

Unlike crop residue and swath grazing, bale grazing can occur during the winter months when snow is deep. During the winter of 2016-2017, Central Grasslands Research and Extension Center grazed bales over a period when over 50 inches of snow had occurred. Cattle will trample the snow

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due to tight confinement of bales and always have access to feed.

Bale grazing will create a heavy load of manure and urine, providing a high nutrient source for the soils. In a study conducted on four ranches in south central North Dakota, the NDSU Extension Service and Central Grasslands Research and Extension Center showed N, P, and K increased by 5, 3 and 3 fold; respectively, in the soil after bale grazing. They also showed a 50 percent increase in forage production at 10 to 20 feet area around a bale the summer following bale grazing, and 80 to 130 percent increase in forage production 5 to 20 feet around the bale the second growing season following the bale grazing event. This increase in herbage production is directly related to the increased nitrogen in the soil.

<u>Cons</u>: Bale grazing can create greater losses of forage intake compared to feeding with a bale feeder or processing the bales and feed in a bunk. Although harvest efficiency is reduced using this technique, organic carbon is added to the land surface, increasing plant material for soil microbes.

Similar to crop residue and swath grazing, livestock drinking water may be limited or lacking. It is also not recommended to bale graze the same portion of the field more than once in a 5 to 10 year period, depending on your location in the state.



Due to the high nutrient load from the manure and urine, plants that can utilize these nutrients will increase and thrive. These plants include smooth bromegrass, crested wheatgrass, Kentucky bluegrass, and quackgrass. So, do not use this practice on rangelands, as native plant species will decrease and introduced cool-season grasses will increase.

#### **Cover Crop Grazing**

Cover crops can provide high quantity and quality of grazable forages for late-season grazing. However, they may involve the most monetary input and require cropland. Cover crops have become very popular in North Dakota over the past 10 years, planted solely as a grazing crop or planted following a harvested cash crop. Cover crops often provide multiple benefits, including grazable forage, soil health building material, soil cover, water uptake, and pollinator plants. Cover crops often include numerous plant species, ranging from 2 to 40 plant species mixtures. Most cover crop mixtures include 5 to 10 species, and should be selected to fit your goals for the land.

High nitrogen containing plants will increase the decomposition rate of fibrous crop residues. Plants that fall into this category include legumes, brassicas (turnips, rape, radish, canola, mustard), and immature small grains. Be careful with seed mixtures dominated by brassicas and small grains as they will eliminate much of the residue, leaving bare soils in the spring.

High fiber containing plants will increase residue on the soil, increasing organic carbon. Plants that fall into this category include millets, sorghum, sudangrass, corn, sunflower, and mature small grains.

Plant mixtures should be developed to achieve your soil health goals while providing a high quality, productive feed for livestock. If plans are to graze during the late-season, the cover crops can be planted from mid-July through early August.

Limit access to the field by adding a temporary fence. Allow access to the field for 3-7 days of grazing, moving the fence to fresh growth once forage is consumed to your desired amount. Limiting access to the entire field will increase harvest efficiency by up to 50 percent depending on crop.

<u>Pros:</u> Cover crops will provide the highest quality, and often quantity, of feed for late-season grazing. Cover crop mixtures

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that contain brassicas often have a crude protein content of 11-16 percent in October through December.

Cover crops provide living plants throughout the growing season and into the dormant season, creating an active soil microbial population and adding organic carbon throughout the season. Cover crops will also uptake and respire excess water in the soil profile, improving infiltration and water management.

Legumes and high volume producing plants will increase nitrogen and other nutrients in the soil profile, reducing fertilizer costs in subsequent years.

<u>Cons:</u> Cover crops require summer moisture to grow, so if moisture is limited, plant growth will be low and may not be cost-effective.

Seed costs can be high, so be selective to keep seed costs low. Starter fertilizer is often required to attain high production stands.

When using a no till system, seed germination competition with annual weeds and cash crop regrowth often limits

productivity of cover crop mixture. Applying a herbicide burn down treatment just prior to seeding may be needed to optimize forage production of the cover crop.

Lastly, high nitrate levels have been reported in turnip foliage in dry years. These levels may be toxic to grazing animals, so test the turnip foliage for nitrate levels when plants are stressed due to drought.



Grazing different cover crops at CGREC in 2011 (limit access using a single strand, temporary electric fence to increase harvest efficiency).

# Supplementing Beef Cattle, Bale Grazing Grass Hay in Winter

Michael Undi, Animal Scientist, CGREC

Bale grazing involves setting bales out on pasture and letting cattle feed themselves in winter. Since cattle feed themselves, bale grazing can save money by reducing labor, tractor operating costs, and manure hauling costs. Ensuring that pregnant cows have adequate nutrition is important when bale grazing late in the season. Adequate nutrition promotes proper body condition and calf growth and development. There is, therefore, a need to ensure that cows are fed good quality hay during bale grazing. In cases where hay quality is poor, cows should be supplemented to meet nutrient requirements. The supplementation strategy adopted should fit into the overall goal of minimizing winter feeding costs.

A bale grazing study at Central Grasslands Research Extension Center has been examining methods of supplementing cows bale grazing poor-quality hay in winter. The supplementation methods being examined minimize or eliminate field visits to the bale grazing site. The study started in 2016 and will end in the summer of 2020. The bale grazing site is a 26-acre field that historically was cropland, using a corn and small-grain rotation. The site was divided into eight three-acre paddocks using three-strand, high-tensile wire electric fencing. Forty round hay bales were placed in each paddock in two rows in the fall. Net wrap was removed prior to feeding. Bales were placed on their sides to reduce waste and loss of liquid supplement. Cows were allotted four bales at a time, and access to new bales was controlled using one portable electric wire. Windbreaks were placed in each paddock for protection.

We are examining three strategies of supplementing cows during bale grazing. The strategies are as follows: a) Feed one bale of alfalfa hay for every three bales of poor-quality hay, b)

### Supplementing Beef Cattle, Bale Grazing Grass Hay in Winter

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Supplement cows that are grazing poor-quality hay with 4 pounds of DDGS per head per day, and, c) Feed cows that are grazing poor-quality hay treated with a liquid supplement. Approximately 9 gallons of liquid supplement (Quality Liquid Feeds Inc.) was poured onto upright bales. This amount of liquid supplement was calculated to increase hay protein content by approximately 3 percentage points. Bales were allowed to sit upright after pouring until the supplement had seeped into the bale, after which the bales were flipped on their sides. Poor-quality hay used in this study was obtained from a Conservation Reserve Program (CRP) field of mixed cool-season grasses that had not been harvested for several years.

The study also examines the role of bale grazing on soil nutrient accumulation by collecting soil samples at two depths, 0 to 6 inches and 6 to 12 inches, and from three distance points, bale center, 10 feet from the bale center and 20 feet from the bale center. As well, we compare soil nutrient accumulation between bale grazed and ungrazed areas.

In the first year (2016), cows supplemented with DDGS had positive daily gains, while supplementation with alfalfa hay or liquid resulted in weight loss. During the winter of 2016, three blizzards led to heavy snow accumulation in the paddocks. Despite snow depths greater than 20 inches in select places, cows were able to bale graze for 70 days before the termination of the study. The trial was terminated because cows no longer were able to reach the water source due to the heavy snowfall. In the second year, more favorable environmental conditions resulted in similar performance in supplemented cows, whereas in the third year, DDGS supplementation clearly was superior to the other supplementation strategies.

The first of soil analysis shows that supplementing bale grazing cows did not influence soil organic matter, nitrate-N, ammonium-N, phosphorus (P) and potassium (K) at two soil depths. Ammonium-N, P and K accumulation were not influenced by distance from the center of the bale. However, nitrate-N content decreased linearly with increasing distance from the bale center. We found no difference in soil nutrients between bale grazed and ungrazed areas.



This study is showing that response to supplementation depends on the type of supplement used, as well as environmental conditions. When winters are harsh, poorquality grass does not contain adequate amounts of energy, protein and phosphorus to meet nutritional requirement of cows in early to mid-gestation. Under such conditions, supplementation with good-quality alfalfa hay or liquid supplement is not adequate and high-energy supplements such as corn DDGS will be required to meet the nutrient shortfall. Supplementation with good-quality alfalfa hay or grass hay treated with a liquid supplement may be an option during mild winters.



Beef cattle eating DDGS at CGREC.

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### **Upcoming Events**

May 22	The Rangelands Partnership Tour of the CGREC
May 23	NDSU Extension In-Service Training – Range
	and Environmental Stewardship Programs
June 18-21	ND Range Youth Camp. Located at the
	Logging Camp Ranch near Amidon – Open
	to all youth ages 13-18.
July 8	Central Grasslands Research Extension
	Center Annual Field Day Tour: 3 – 7 pm at
	the Research Center
August 20	America's Grassland Conference Tour of the CGREC



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