Extended Grazing

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Extended grazing and extensive wintering of cattle at the Brookdale Farm

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Speciality:	Farm Production Extension – Livestock, Feeding management and planning
Location (s):	MBFI Brookdale Site, Brandon, Manitoba
Collaborating Partners:	Mitchell Timmerman, MBAG, Nutrient Management Specialist
Start Date:	December 2015 Status: In progress

Background

Extending the grazing season through swath, corn or bale grazing allows livestock to return most of the nutrients they consume directly to the landscape where they are fed. Feed costs can be higher but yardage and feed dispersion costs are lower as are manure removal costs. Manure and feed residues contain valuable nutrients that become available to annual or perennial crops on fields that may not otherwise be fertilized. This improves crop productivity and quality and can extend the grazing season and thereby reduce overall feeding costs.

A 1250 lb bale of alfalfa/grass hay at 14% crude protein (CP) contains approximately 24 lbs of nitrogen (N), 2.5 lbs of phosphorous (P) and 21 lbs potassium (K). Livestock only capture a small percent of these nutrients (10-20%) so most of the nutrients are returned to the land. If 30 bales are fed/acre and the animal utilizes 20% of the nutrients, 570 lbs of N, 51 lbs of P (117 lbs P_2O_5) and 434 lbs of K would be returned to the land. Most of these nutrients are concentrated where the bales are placed in 20% of the area. This concentration would result in a four to five fold nutrient increase where the bales were placed. The value of the nutrients returned to the land would be over $500/acre depending on the price of fertilizer.

For both economical and environmental reasons we want to capture and utilize as much of the imported nutrients as possible. Site selection to minimize leaching and runoff is critical for this to occur. Agriculture and Agri-Food Canada (AAFC) has published two new tools that support sound adoption and management of extensive wintering: a site selection tool and a nutrient loading calculator.

It should be noted that the employment of this practice at the MBFI sites is necessary due to the absence of confinement facilities; therefore this is both a project and a regular farm operational practice. The two new management tools published by AAFC have been and will continue to be used in designing and managing the extensive wintering of cattle at the MBFI sties. This will represent tech transfer and demonstration elements of extension.

Objectives

The project objectives are to determine:

The soil nutrient status and change over time after bale grazing, swath grazing and corn grazing.

The change in forage production and quality after bale grazing and assess the potential impact on livestock production through feed analysis results.

The affect of extended grazing on beef cattle body condition score.

The lower winter feeding costs, yardage and manure removal cost.

Design and Methods

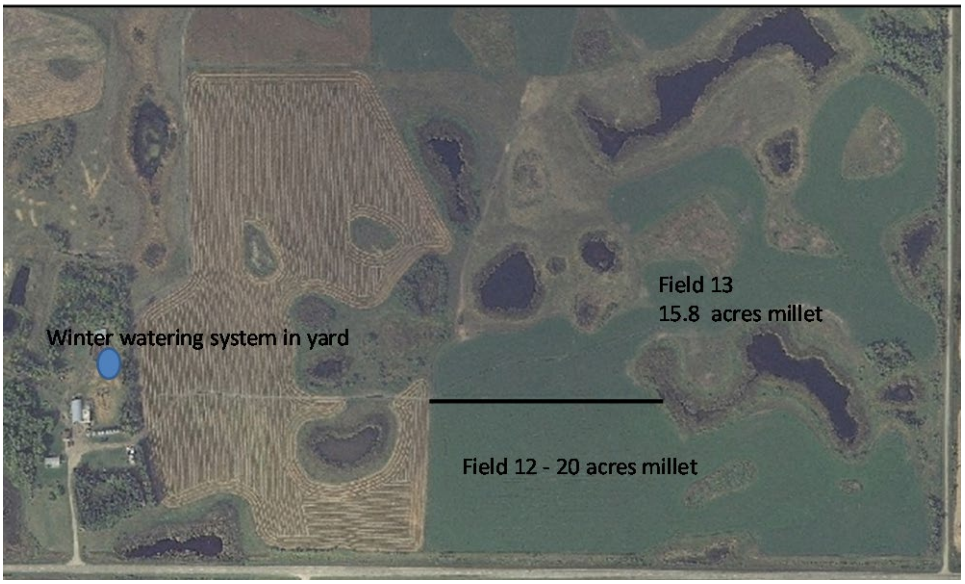
Cow condition and weight was evaluated before and after each method of extended grazing to determine the change in body condition score and weight.

Swath Grazing (December- February)

Thirty-six acres of millet was planted on fields 12 and 13 and swathed in the fall to be used for swath grazing after freeze up. Most annuals should be cut at the early dough stage for highest quality and yield. Access to the swaths was controlled by strip grazing using portable electric fence to ensure higher utilization and minimize waste.

Producers have found that deer will feed less on golden German millet compared to oats or barley and it stays greener in the swath. Nitrates can be a concern in annual crops and are safe up to 0.5%. Swathing prior to frost will help to manage nitrate accumulation.

2015 Swath Grazing Plan



Swath grazing of millet took place in fields 12 & 13 from December 8 to February 19 for 74 days

Corn Grazing (February)

Corn grazing provides the opportunity to grow a high energy, high yielding crop that remains available to cattle until mid to late winter. Due to the high cost of growing corn, yields must be over 4 tonne dry matter (DM)/acre to be economical. When growing corn fertility and weed control are critical to achieving higher yields.

Twenty acres of corn was planted on field 4 in the spring to be used for fall/winter grazing. The corn yield was measured in the fall prior to using it as feed. Corn yield and cow grazing days/acre were measured.

Poor weed control in the corn resulted in lower yields.

The corn was planted on a 24" row spacing with a corn planter 1.25" deep. Fertilizer was added based on soil test recommendations for N, P, K, and S in the spring. Yields were based off of 3 x 1/1000 of an acre weights. The cow grazing days/acre calculation is based on a 1300 lb

cow consuming 2.5% of her body weight in DM and includes 20% waste or feed residue.

Water Source

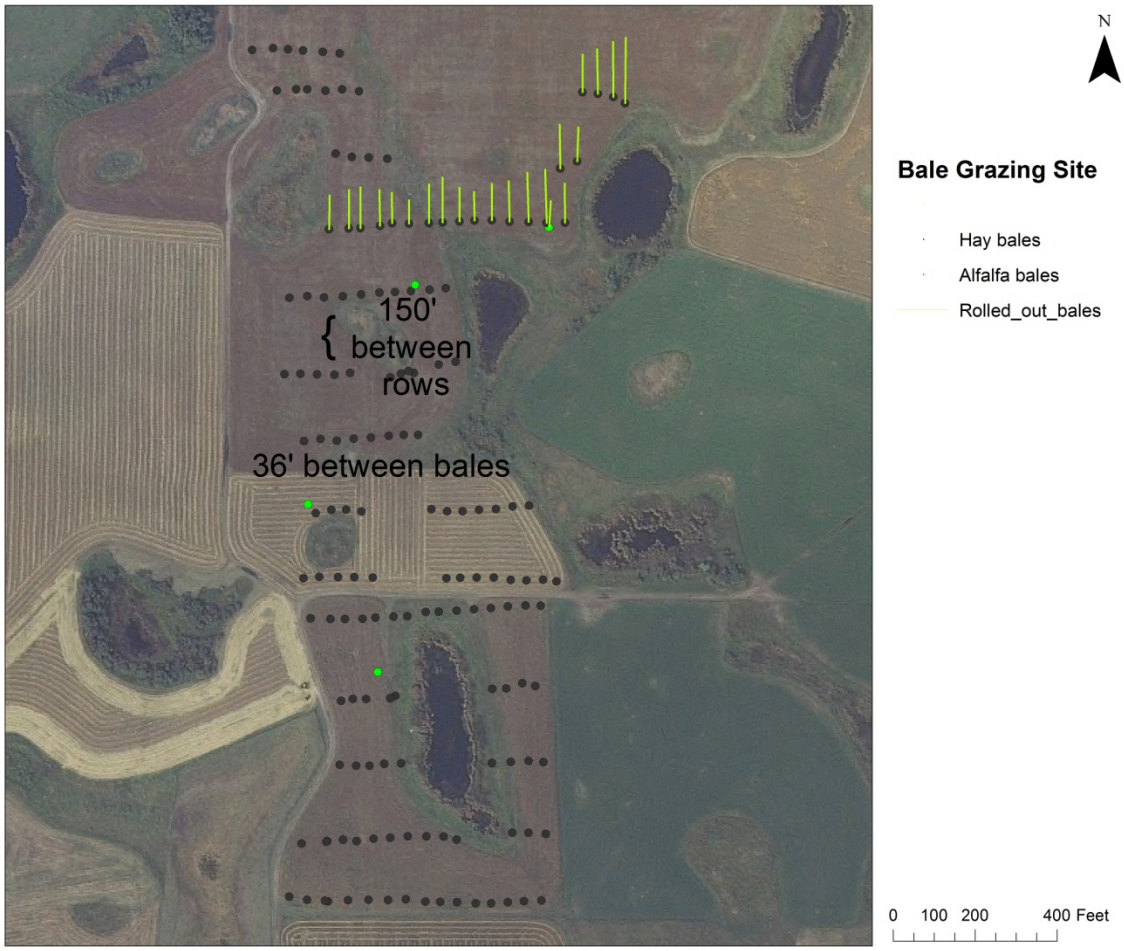
A solar powered watering system was used in the corn grazing. An adequate supply of soft snow can be used as a water source but an alternative water source must be provided if conditions are icy or if snow is lacking. Energy requirements are slightly higher if snow is the water source. Fresh water should be provided to the younger and older cows due to their higher nutritional requirements and or poorer body condition score.

Bale Grazing (March & April)

Bale grazing took place on fields 7, 8 and 9 using a combination of greenfeed and greenfeed under seeded to tame forages. The bales were placed on stubble in the fall 36' apart and 110' spacing between rows (low bale density of 10 bales/acre). In future years bales will be placed in between where they were previously placed. Portable electric reels were used to cross fence the bale rows to control feeding and to minimize waste. The wide bale spacing will allow adequate access by the feeding cows and distribute the nutrients over a larger area.

For bale grazing, we allocated DM based on 3% of the cow's weight. Dry matter intake (DMI) per day = 3% x 1300 lbs = 39 lbs ÷ 0.84 DM = 46 lbs 'as-fed' hay; 55 cows x 46 lbs = 2530 lbs of baled forage is required per day. As well, the cattle were supplemented with a 2:1 mineral to provide enough calcium in the diet.

It is important to monitor the cow's BCS throughout the winter feeding period and adjust or supplement the ration as required.


150'
between
rows
36' between bales
N
Bale Grazing Site
Hay bales
Alfalfa bales
Rolled_out_bales
0 100 200 400 Feet

Most of the bales were grazed whole at a low bale density of 10 bales per acre. Fourteen percent of the bales were unrolled to compare if nutrient dispersion was more uniform.

Soil Testing

The condition of the land where extensive wintering is practiced will be qualitatively monitored in subsequent years. No formal assessment involving sample collection and testing is anticipated. This project will occur over several years in order to analyse long term impacts of winter grazing practices on the landscape and soil fertility.

Prior to extended grazing, soil sampling was done in the fall of 2015 with sampling locations recorded (GPS). Two composite samples per field will be collected for 0-6", 6-24" and 24-48" depths and sent for analysis. Soil testing will be done on a yearly basis to determine the change in soil fertility.

0-6" and 6-24" samples will be analyzed for NPKS, pH, salts OM, CEC, base saturation, Carbonates, Zn, Ca, Mg, Na, Fe, Mn, Cu, B, Cloride

24-48" samples will be analyzed for NPKS, pH, salts, Zn, OM

With all forms of extended grazing, cross fencing can minimize waste and improve utilization. A powerful electric fencer is necessary for optimal livestock control since snow is a good insulator. Using multiple wires including a ground on the cross fence may be required. Portable steel reels with a braided steel cable work well along with a wider poly tape which is more visible.

Results and Discussion

Swath Grazing Results

Fifty-five cows started grazing the millet on December 8th, 2015 until February 19, 2016, for a total of 74 days. Paddock sizes ranged from 0.53 to 4.29 acres and the time spent on each paddock ranged from 2 to 7 days. The inconsistent paddock size and varying amount of grazing days per paddock affected the utilization of the millet by the cattle.

During the swath grazing period, three thinner cows were removed from the main herd for 22 days and were fed grain or pellets (see Table 1). In February, the cattle had difficulty swath grazing due to warm temperatures that caused snow melting, a hard freeze and then more heavy snow over the last 2 sections of millet. As a result, the cows had to work harder to access the feed and waste was higher.

The cows were supplemented with 2.4 lbs/head/day of hay and 1.3 lbs/head/day of greenfeed. Supplementing the cows helped encourage better millet utilization as the cows were on the grazed area longer. The cows consumed 3.9 ounces of a 2:1 mineral/head/day and had free choice salt blocks. There was a total of 35.8 acres grazed made up of 15.8 acres in the north millet field and 20 acres in the south field. In early May 2016 when the amount of residue was hand-clipped, there was 1985 lbs DM/acre residue in field 12 (south) and 1947.5 lbs DM/acre in field 13 (north field). A yield of the millet was not taken in 2015.

Corn Grazing Results

Fifty-five cows started grazing the corn on February 19 and were on the corn until March 4, 2016 for a total of 15 days. The days per paddock ranged from 1 to 3 days; the paddocks were 1.6 to 6 acres in size. The cows were supplemented with 15.5 lbs/head/day of hay plus an average of 6.6 lbs/head/day of greenfeed.

Due to warm temperatures that melted snow and subsequent refreezing, any corn knocked over and frozen down was unattainable and reduced the number of grazing days considerably.

Table 1. Start and end dates for extended grazing practices, supplemental feeding amounts and average start and end weights, body condition scores (BCS) and average daily gains (ADG)

Start Date	End Date	# of Days	Supplement-ation (lbs/hd/day)	Start Weight (lbs)	End Weight (lbs)	Start BCS	End BCS	ADG (lbs/day)
Swath Grazing								
Dec 8/15	Feb 19/16	74	3.7	1304	1316	2.5	2.8	0.15
Corn Grazing								
Feb 19/16	Mar 4/16	15	22.1	1316l	1335	2.8	3.1	1.4
Bale Grazing								
March 3/16	May 1/16	58	5 to 5.5	1335	1349	3.1	2.8	0.23

Corn yield samples were clipped on October 21, 2015 and ranged from 1.7 to 3.1 tonnes DM/acre producing 97 to 175 cow grazing days/acre. Twenty acres of corn x 97 grazing days/acre = 1940 cow grazing days or 35 days grazing for 55 cows.

In early May, 2016 corn residue samples were hand-clipped. There was an estimated 900 lbs DM/acre of corn residue based off of 3 measurements of 9 square feet each; this seemed low based on the poor consumption rate. Additional residue measurements will be taken in the spring of 2017 to accurately reflect the residue left behind.

Bale Grazing Results

On March 3, 2016, 55 cows started grazing the bales and were taken off the bale grazing site on May 1 for a total of 58 days. The cows were moved every 2 to 7 days. Eighteen yearling heifers were

added on April 7, and 32 more were added on April 18 for a total of 50 heifers.

The cows were supplemented with 5 lbs/head/day pellets from March 4 to April 7 which was increased to 5.1 lbs/head/day for the cows and heifers. This amount was increased to 5.5 lbs/head/day on April 22. On average, the cows were fed 1 lb of hay/head/day and 59 lbs greenfeed/head/day along with the 5 lbs of pellets.

A 1300 lb gestating cow (9 months pregnant) requires 30 lbs greenfeed along with 5 lbs of pellets (no waste included). Based on this, approximately half of the greenfeed was not consumed resulting in 50% residue. The maturity and feed quality of the greenfeed affected the palatability and resulted in the higher residue levels. Bale grazing in the spring when the ground is soft and wet results in higher waste or residue.

Key Points

The cattle had the highest average daily gain (ADG) of 1.4 lbs/head/day grazing the corn and gained 0.3 in body condition which was the same as the millet.

The second highest ADG was on the bale grazing while being fed pellets but they lost an average of 0.3 in body condition. Weighing conditions, time of weighing, gut fill, and/or water consumption can affect the cattle weights or shrink and is reflected in the subsequent ADG calculations.

Overall, utilization was low in the millet (1947.5 to 1985.0 lbs DM/acre residue), the bale grazing (50% residue based on amounts fed vs requirements) and the corn. Mid-winter melting and re-freezing resulted in icing over on some of the millet and corn which made grazing very difficult. The lower yield of the corn, the shorter plants and thinner stand made it more susceptible to weathering and wind damage.

Encouraging the cattle to more thoroughly clean up the feed before moving will help improve forage utilization. But care must be taken to ensure body condition doesn't drop. Moving the fence and cattle more often (like every 3 to 4 days) will help prevent trampling and freezing up of swaths and feed.

The lower feed quality (8.8% CP and 54% TDN) and lower palatability of the greenfeed used in the bale grazing, may have led to the higher levels of residue. As well, when temperatures are warmer in the spring and the ground is wet and soft more waste is expected. The use of bale rings may decrease the

level of residue or waste - especially in the spring. Since cattle must learn and adapt to new feeding systems this year's training should allow them to do better next year.

By extending the grazing season instead of confining animals and using stored feed, you can significantly lower winter feeding costs. Some extended grazing options can cut your feed costs but not always. Extended grazing returns nutrients back to the land. It can fertilize pastures resulting in higher grass production, higher livestock gains and possibly a longer grazing season. Add in reduced manure disposal costs and a cut in winter feeding/yardage costs and this is one practice worth considering.

Acknowledgements

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