Increasing Pasture Production

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Low cost management techniques to improve pasture production

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Speciality:	Farm Production Extension, Range management and forage selection
Location (s):	MBFI First Street Pasture, Brandon, Manitoba
Collaborating Partners:	Mae Elsinger, AAFC, Range Management Specialist
Start Date:	June 2015 Status: In progress

Background

The 1st Street Pasture is made up of 403 acres of pastureland that has inherently poor productivity due to sandy soils. Historically this pasture was grazed as a single unit with one water source in the SW corner. The distance to water has caused overgrazing near the water source and underutilized the farthest reaches. This land is also infested with leafy spurge which is densest near the water source. Leafy spurge has an inverse relationship with forage production, as it increases in density and spreads throughout the pasture it decreases forage production. Studies have shown that an 80 percent infestation of leafy spurge reduces carrying capacity to near zero. The 1st Street Pasture has qualities similar to a great deal of pastures in Manitoba. This project will look at low cost infrastructure and management changes to see if they can improve the production on this type of land.

Objectives

This project aims to increase production through implementing low cost changes to management and infrastructure. It is hypothesized that production increases will be obtained through:

1. Rotational grazing
2. Introduction of legumes
3. Reduction in leafy spurge

Given the objectives of the project, we will demonstrate the use of single strand electric fence, no gates, and shallow buried water lines; in an effort to facilitate better grazing management for low cost options. An economic analysis of infrastructure and labor costs will be done at the end of the project to determine if production increases are enough to offset the extra costs of the added management and infrastructure.

In 2015, only the rotational grazing objective was implemented, the introduction of legumes and training cattle to eat leafy spurge will begin in 2016.

Design and Methods

Cattle will be rotationally grazed with specific care given to obtaining good distribution and moderate grazing levels, as determined through collecting litter samples.

The pasture was divided into 10 paddocks using single strand electric wire. Shallow buried water lines were installed to service the paddocks with five spigots, quick couplers and movable troughs. A limited number of gates were installed to reduce the cost of the fencing.

In June of 2015, soil tests were taken to 12 inches in paddocks A, D, E, G and I. In paddock D, E, and I soil was tested in an upland and lowland aspect. In paddock G, soil was tested from an old bale feeding site and a non-feeding site. In paddocks D and H, soil testing was done in a 1 acre exclosures and in paddock A an upland aspect soil test was taken.

Monitoring

For the purpose of collecting yearly data, 3 grazing cages were placed in each of paddocks A and H; six cages were placed in paddock G (3 on previous bale fed area and 3 on no-bales-fed area). This data will be combined with the yield data collected from Mae Elsinger's project on the same pasture which uses the same cattle and grazing rotation. Average yields will be measured from all the cages, related to their landscape position or previous use (combined total of 30 cages). All the cages will be moved to new locations each spring and clipped in the fall. This will provide a record of average pasture yield and some individual paddock yields.

Results

Fifty cow/calf pairs started grazing on June 13th, 2015. The grazing plan was developed based on an estimated carrying capacity since there was no data available. A rotation grazing plan was developed which had the herd pass through each pasture twice during the grazing season. Only some of the paddocks received a second grazing as regrowth was poor and feed quality was also declining.

Cattle were weighed on entry, 40 days on pasture and 81 days on pasture at which time they were removed from the pasture system. Most of the pasture had not been grazed for approximately 3 years so there was old standing biomass mixed with current year forage growth and resulted in some selection away from areas with heavy forage growth.

Figure 7.2-4 Boards used as gate lifters to send cattle between pastures on the 1st Street site.

To reduce costs a method of eliminating gates was used; an inexpensive 6 ft board was put up to lift the single strand electric wire. The cattle were trained to go under the wire to the next paddock (Figure 7.2-4). This method saves on gate hardware costs and reduces the number of connections where power can be lost in the electrical system. Cattle were herded to the location where the wire had been lifted and led through with a truck or coaxed with feed tubs in the early stages of training. Once the cattle caught on to the system and realized that they were always going to better pasture it presented few problems and very little time to rotate to a new pasture.

In Table 7.2-3 pasture soil tests show the poor soil fertility of this pastureland. Throughout the growing season, precipitation in the Brandon area was below average but came in timely periods that were favorable for forage growth. Potassium is the only nutrient that consistently falls in the medium to high range. Nitrogen and phosphorous are generally very deficient. Nitrogen ranged from 9 to 12 lbs/ac in the top 12 inches of soil and may account for the poor yields and regrowth, Table 7.2-4.

Table 7.2-3 Soil fertility, organic matter and pH on six paddocks of the 1st Street site, tested on June 17, 2015.

	A	E	G	H	H	I
Description	Upland	Lowland	Bale fed	Upland	Exclosure[3]	Upland
Nitrogen (lbs/acre)[1]	9	11	12	9	10	9
Phosphorus (ppm)	6	3	9	11	4	3

Potassium (ppm)	191	209	251	206	198	121
Organic matter (%)	3.4	5.6	3.4	2.5	3.2	4.8
pH[2]	7.6	6.6	7.2	7.9	7.1	7.6

[1] Depth of testing was 0-12"

[2] Depth of testing was 0-6"

[3]An exclosure is an area in which cattle are fenced out. Exclosures are used as a control for the collection of data against data collected on areas with grazing.

Table -1 Average forage yields at 1st Street pasture for two terrain types and bale verses no bale grazing treatment.

Landscape Type	Yield (lbs/ac)[1]
Dry upland and no bale sites (n[18])	1202
Moist lower depression (n[9])	3937
Previous bale graze site (n[3])	1426
[1] This project is for demonstration purposes only and the yields may not be statistically different	

Forage production is dependent on fertility and moisture availability on the site. Higher moisture areas have the advantage of better quality soils, higher organic matter and more moisture. Bale grazing, which occurred on uplands more than 5 years ago, may still be playing a small role by increasing forage production as shown by the slightly higher forage production and visual cues i.e. greener, thicker and taller plants. The upland sites have the poorest production and make up the majority of the pasture acres, Table 7.2-4.

Figure 1 One of the First Street pastures clearly showing signs of leafy spurge growth around grazed areas.

In Figure 2 it is clear that cattle select forage from outside of the leafy spurge infestation; note the green and yellow leafy spurge surrounding the grazed area. Also note that the forage has gone dormant during the drier mid-summer heat instead of re-growing.

Livestock gains are shown in Table 3. The herd, which was provided by a local producer, was made up of cattle of various breeds, ages and body conditions. When looking at daily gains there is a wide range of performance between the different animals,

with some animals well above the average and others far below. The cows did best in the first 40 days on pasture; during the second half of the grazing season, many of them were losing weight or just maintaining their body weight. This may be caused by declining forage quality, insect pressure and/or increasing demands by the calf. The calves had about the same daily gain throughout the season. On average, the animal gains were comparable with industry standards for cattle on pasture. However, the grazing days fell below the estimated 135 days due to an over estimation of forage productivity and poor pasture condition i.e.standing dead litter. As the pasture improves it is expected that we will obtain a longer grazing season and more pounds gained per acre.

The 30 grazing cages that have been placed on the pasture, and are clipped each fall, this will help to develop a data base that will be used for estimating forage production for the site. Using the database it will be easier to determine the best stocking rate for the pasture and help determine whether management practices are improving production.

Table 2 Livestock gains in pounds per day over 81 grazing days and total pounds gained per acre.

Livestock	Average daily gain 1st 40 days (lbs/day)	Average daily gain 2nd 41 days (lbs/day)	Average daily gain over season 81 days (lbs/day)	Total pounds gained (lbs)	Total pounds gained per acre (lbs/ac)
Cows	2.1	0.83	1.65	6305	15.65
Calves	2.23	2.3	2.27	8493	21.1
Total				14,798	36.72

Key Messages

The information collected during this first year, of a three year project confirmed that the site has poor forage productivity production primarily due to poor soil fertility and texture. Cattle performed adequately as they were stocked at 8 acres per head providing the ability for the cattle to select the best forage. The grazing season was shorter than expected due to an over estimation of forage production, poor forage regrowth and standing old growth.

The cattle quickly learned how to move under a lifted single strand electric wire making gates unnecessary. However, lack of gates did make travel on quad or truck more cumbersome and required two staff to travel together when using the truck. Improving soil fertility and reducing leafy spurge density are goals of this project and will be addressed in years 2 and 3 of the project.