



Bale Grazing Poor-quality Grass Hay With and Without Supplementation

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When bale grazing, ensuring that animals have adequate nutrition is important. For cows receiving poor-quality feed, this can be achieved by supplementation using methods that minimize labor and energy costs. This study examines methods of supplementing cows bale grazing poor-quality hay. Preliminary results suggest that poor-quality grass hay offered to overwintering pregnant cows in early to mid-gestation may not contain adequate energy, protein and phosphorus (P) to meet animal requirements. Further, alfalfa hay or liquid supplements may not provide the extra nutrients required to meet this shortfall.

Summary

This study was conducted to investigate methods of supplementing cows bale grazing poor-quality hay during the winter in North Dakota. Non-lactating pregnant Black Angus cows ($n = 64$; body weight = $1,312 \pm 142$ pounds; body condition score = 5.6 ± 0.31) were assigned to one of eight groups of similar total body weight and kept on pasture in the winter. The following bale grazing treatments were examined: a) poor-quality hay, b) poor-quality hay supplemented with alfalfa hay, c) poor-quality hay supplemented with corn dried distiller's grains with solubles (DDGS) and d) poor-quality hay treated with a liquid supplement.



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Two-day body weights (BW) were taken at the start and end of the study. Two observers assigned body condition scores (BCS) using a 9-point system (1 = emaciated, 9 = obese) at the start and end of the study. Despite heavy snow accumulation resulting from three blizzards, cows were able to bale graze for 70 days before the termination of the study.

Supplementing cows bale grazing poor-quality hay did not significantly influence ($P < 0.05$) final BW or BCS. However, daily gain and BCS change were greater ($P < 0.05$) when cows were supplemented with DDGS. Cows supplemented with alfalfa or liquid supplement lost weight and body condition, which might indicate that these supplements did not supply adequate energy to meet animal demands. Preliminary results suggest a need for higher-energy supplements in winter.

Introduction

Beef cattle in the Northern Plains typically graze poor-quality forages in the winter (Marshall et al. 2013). Poor-quality forages are generally low in energy, protein and minerals, and can impair rumen microbial function, leading to poor forage intake and digestion (Köster et al. 1996). Utilization of poor-quality forages can be improved through supplementation, which is especially important at critical times such as summer plant dormancy or fall and winter months (Caton and Dhuyvetter 1997).

Effective supplementation requires regular supplement intake at levels that do not vary significantly on a daily basis (Garossino et al. 2003). Cost-effective supplement delivery methods minimize feed costs by delivering supplement to grazing cattle less frequently (Schauer et al. 2005; Canesin et al. 2014) or eliminating pasture visits altogether (Klopfenstein and Owen, 1981; Undi et al. 2001).

Although the majority of producers in the Northern Plains keep cattle in dry lot pens in the winter (Asem-Hiablie et al. 2016), producers are interested in extending the grazing season by keeping cattle on pasture in the winter.

The adoption of extended grazing is driven by winter feed cost reductions associated with moving away from dry lots (Kelln et al. 2011). Supplementation techniques that minimize or eliminate pasture visits in extended grazing systems will further the goal of minimizing winter feed costs.

This study was conducted to investigate strategic methods of supplementing cows bale grazing poor-quality hay in winter.

Procedures

This study was conducted from Nov. 4, 2016 to Jan. 12, 2017 at the Central Grasslands Research Extension Center, Streeter, N.D. Non-lactating pregnant Black Angus cows ($n = 64$; BW = $1,312 \pm 142$ pounds; BCS = 5.6 ± 0.31) were assigned to eight groups of similar total body weight and kept on pasture in the winter. The cows were pregnancy-checked prior to the start of the study to eliminate open cows. Cows were treated with IVOMEC (Ivermectin) pour-on during sorting.

The bale grazing site was a 26-acre field that, historically, was cropland with a corn and small-grain rotation. In the last two years before the start of this study, the site was planted to cool-season cover crops, mainly rye, turnips and other brassicas.

The site was burned down with 2,4-D and Round-up in late April, after which meadow brome was planted in early May. The field then was divided into eight three-acre paddocks using four-strand, high-tensile wire electric fencing. One water tank was installed between two paddocks. The site was mowed prior to bale placement to reduce the possibility of cows grazing standing forage.

In early fall, round Conservation Reserve Program (CRP) hay bales (7.5 percent crude protein [CP]; 51.7 percent total digestible nutrients [TDN]) were placed in each paddock in two rows 50 feet apart. Net wrap was removed prior to feeding. Bales were placed on their sides to reduce waste and the loss of liquid supplement.

Cows were allotted four bales at a time, and access to new bales was controlled using portable electric fencing. Cows were moved to a new set of bales when the depth of waste feed remaining across the diameter of each bale was less than 4 inches. Wind breaks were placed in each paddock. Cows had *ad libitum* access to fresh water, mineral supplement and salt blocks.

Bale Grazing Treatments. Bale-grazed cows were assigned to one of four treatments as follows: a) poor-quality hay

(control), b) poor-quality hay supplemented with alfalfa hay, c) poor-quality hay supplemented with corn DDGS and d) poor-quality hay treated with a liquid supplement. Poor-quality hay was obtained from a CRP field of mixed prairie grasses that had not been harvested for several years.

Cows supplemented with DDGS were fed 4 pounds/head/day DDGS twice a week. For the liquid supplement treatment, approximately 9 gallons of liquid supplement (Quality Liquid Feeds Inc. [QLF]) 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 through, after which the bales were flipped on their sides.



Cows had *ad libitum* access to water. Cows on the control, alfalfa hay and liquid-supplemented hay treatments were fed a 6-12+ mineral supplement (CHS Inc., Sioux Falls, S.D.) because these diets were low in P. All cows were offered a salt block.

Two-day body weights were taken at the start and end of the study. Two observers assigned BCS using a 9-point system (1 = emaciated, 9 = obese; Wagner et al. 1988) at the start and end of the study. Animal handling and care procedures were approved by the NDSU Animal Care and Use Committee.

Results

Initial cow BW and BCS were similar ($P > 0.05$) among cow treatments (Table 1). Supplementation did not influence ($P > 0.05$) final body weights or BCS significantly, compared with the control (Table 1). However, cows supplemented with DDGS maintained body weight and condition, while control cows and cows supplemented with alfalfa hay or liquid supplement lost body weight and condition (Table 1).

Table 1. Animal performance of cows bale grazing poor-quality grass hay and poor-quality grass hay supplemented with alfalfa hay, a liquid supplement or DDGS.

	Supplementation				SE	P-value
	Control ¹	Alfalfa hay ²	QLF ³	DDGS ⁴		
Initial BW, lbs.	1,316	1,301	1,314	1,316	51.4	0.99
Final BW, lbs.	1,264	1,269	1,277	1,357	52.4	0.25
Gain, lbs./day	-0.74 ^b	-0.45 ^b	-0.52 ^b	0.58 ^a	0.145	<0.001
Initial BCS	5.6	5.6	5.5	5.5	0.10	0.67
Final BCS	5.4	5.4	5.4	5.5	0.09	0.21
BCS change	-0.24 ^b	-0.17 ^b	-0.16 ^b	0.07 ^a	0.083	0.003
¹ Grass hay, ² Grass hay + alfalfa hay, ³ Liquid supplement-treated hay, ⁴ Grass hay + DDGS						
^{a,b} Means in the same row followed by a different letter differ significantly ($P < 0.05$).						

Discussion

This year, the first year of the study, was marked by three severe blizzards, which led to heavy snow accumulations. Despite snow depths of more than 20 inches in some places, cows were able to bale graze for 70 days before the termination of the study.

Poor-quality grass hay offered to cows was low in energy, protein and P, and supplied 57, 95 and 60 percent, respectively, of the nutrients required by cows at this stage of pregnancy. Body weight and condition losses in cattle supplemented with alfalfa hay or liquid supplement suggest that these supplements did not provide the extra nutrients, particularly energy, required to meet requirements of cows in mid-gestation in winter. Further evaluation of supplements will be conducted in this multiyear study.

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