

2013

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Recommended Citation

Bennett, B.W.; Waggoner, Justin W.; Jaeger, John R.; Sexten, Andrea K.; and Olson, K. C. (2013) "Effects of infrequent dried distillers grain supplementation on spring-calving cow performance," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. <https://doi.org/10.4148/2378-5977.1444>

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Effects of infrequent dried distillers grain supplementation on spring-calving cow performance

Abstract

Feed and supplement costs and the expenses associated with delivery of winter supplements account for a large proportion of the total operating expenditures for cow-calf producers. Cattle grazing low-quality dormant native range (<6% crude protein) typically are unable to consume sufficient protein from the forage base, which limits microbial activity and forage digestion. Supplemental protein often is required to maintain cow body weight and body condition score during the last trimester of pregnancy. Low cow body condition scores at calving are common and may negatively affect lactation, rebreeding rates, and calf weaning weight. Failure to maintain proper nutritional status during this period severely affects short-term cow performance, reduces overall herd productivity, and limits profit potential. The most effective means of supplying supplemental protein to cows consuming dormant native range is to provide a small amount of high-protein feedstuff (>30% crude protein). Dried distillers grains with solubles (DDGS) are a by-product of the ethanol refining process. Distillers grains supply the recommended 30% crude protein level, are readily available, and often are favorably priced compared with more traditional feedstuffs. With the rising costs of inputs in today's cow-calf sector, reducing cost is necessary to maintain viability of the national cowherd. Reducing the frequency of supplementation results in less labor and fuel use, effectively reducing input costs; however, this is viable only as long as cow performance is maintained at acceptable levels. Therefore, the objective of this study was to examine the effects of infrequent supplementation of dried distillers grains with solubles on cow body weight and body condition score.

Keywords

Kansas Agricultural Experiment Station contribution; no. 13-162-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1083; Cattle; Dried distillers grains with solubles (DDGS); Cow performance; Nutrient composition

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Effects of Infrequent Dried Distillers Grain Supplementation on Spring-Calving Cow Performance

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Introduction

Feed and supplement costs and the expenses associated with delivery of winter supplements account for a large proportion of the total operating expenditures for cow-calf producers. Cattle grazing low-quality dormant native range (<6% crude protein) typically are unable to consume sufficient protein from the forage base, which limits microbial activity and forage digestion. Supplemental protein often is required to maintain cow body weight and body condition score during the last trimester of pregnancy. Low cow body condition scores at calving are common and may negatively affect lactation, rebreeding rates, and calf weaning weight. Failure to maintain proper nutritional status during this period severely affects short-term cow performance, reduces overall herd productivity, and limits profit potential.

The most effective means of supplying supplemental protein to cows consuming dormant native range is to provide a small amount of high-protein feedstuff (>30% crude protein). Dried distillers grains with solubles (DDGS) are a by-product of the ethanol refining process. Distillers grains supply the recommended 30% crude protein level, are readily available, and often are favorably priced compared with more traditional feedstuffs.

With the rising costs of inputs in today's cow-calf sector, reducing cost is necessary to maintain viability of the national cowherd. Reducing the frequency of supplementation results in less labor and fuel use, effectively reducing input costs; however, this is viable only as long as cow performance is maintained at acceptable levels. Therefore, the objective of this study was to examine the effects of infrequent supplementation of dried distillers grains with solubles on cow body weight and body condition score.

Experimental Procedures

Pregnant Angus-cross cows ($n = 120$; initial body weight = $1,239 \text{ lb} \pm 170 \text{ lb}$; initial body condition score [scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese] = 5.0 ± 0.5) were maintained on common native range pastures (7.5% crude protein, Table 1) for 84 days. The range site mainly comprised the following species: sideoats grama (*Bouteloua curtipendula*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), Japanese brome (*Bromus japonicus*), and buffalo grass (*Bouteloua dactyloides*). Range samples for nutritional analysis were obtained prior to starting the trial. Sorghum hay (6.9% crude protein, Table 1) was processed daily and provided at 50% of the expected maximum forage intake each day to ensure adequate forage availability. Free choice mineral (Suther's Prairie Cow 4P; Suther's Feeds, Frankfort, KS) and salt were available throughout the study. Dried distillers grains with solubles

(29.5% crude protein, Table 1) originated from a single location and were stored in bulk for use throughout the treatment period.

Cows were stratified by age, body condition score, and weight and assigned randomly to one of three supplement treatments. Treatments consisted of (1) DDGS daily supplemented (Daily), (2) DDGS supplemented every 3 days (3Day), and (3) DDGS supplemented every 6 days (6Day). Cows were sorted daily into treatment groups, and supplements were delivered at approximately 8:30 a.m. Due to facility limitations, only one set of bunks was available, so on days when multiple supplement treatments were fed, each group was given ample time to finish the supplement before being moved out of the feeding area. Cows were allotted 28 linear inches of bunk space/cow. Dried distillers grains with solubles was offered to supply 0.5 lb/cow daily of crude protein (1.8 lb DDGS/cow daily); for example, cattle receiving supplement once every 6 days received 3 lb of crude protein (10.8 lb DDGS/cow) on the day of supplementation.

Treatments were administered from December 27, 2011, until March 20, 2012, approximately 1 week prior to the expected onset of calving. On day 84, treatments were terminated and cows were moved to a different native range pasture, offered free-choice sorghum hay, and supplemented with DDGS daily at the same rate for the duration of the calving season. Cows were weighed and body condition was scored every 28 days throughout the duration of the study, immediately following calving (within 12 hours), and on day 132 (prior to turnout). Body condition scores were assigned by two independent, qualified observers.

Performance data were analyzed using the GLM procedure of SAS (SAS Institute, Cary, NC). Initial body weight and body weight at calving, body weight change, initial and calving body condition score, body condition score change, calf birth weight, and average calving date were used as the dependent variables. Values were determined to be statistically different when $P \leq 0.05$.

Results and Discussion

Initial body weight and body condition score were not different among treatments ($P > 0.05$, Table 2). Body weight and body condition score at calving also did not differ among treatments. As a result, changes in body weight and body condition score throughout the experiment were not significant ($P = 0.82$ and $P = 0.74$, respectively). Supplementation frequency did not affect calf birth weight or average calving date, and cow body weights at turnout were similar ($P > 0.05$) among treatment groups.

Implications

Dried distillers grains with solubles may be supplemented as infrequently as once every 6 days without adversely affecting performance of spring-calving cows. The labor and fuel savings associated with reducing supplementation frequency will result in lower overall supplementation costs.

Table 1. Nutrient composition (dry matter basis) of native range, dried distillers grains with solubles (DDGS), and sorghum hay

Item	Native range	DDGS	Sorghum hay
Dry matter, %	74.43	89.24	86.61
Crude protein, %	7.49	29.53	6.93
Net energy for maintenance, Mcal/lb	0.32	0.88	0.48
Net energy for gain, Mcal/lb	0.08	0.55	0.23
Neutral detergent fiber, %	59.18	30.39	59.30
Acid detergent fiber, %	44.43	17.08	36.89
Total digestible nutrients, %	42.57	76.59	52.75
Calcium, %	0.58	0.08	0.49
Phosphorus, %	0.11	0.80	0.15
Sulfur, %	0.09	0.43	0.10

Table 2. Performance of cows receiving dried distillers grains with solubles daily (Daily), at 3-day intervals (3Day), or at 6-day intervals (6Day)

Item	Supplementation interval			SEM	<i>P</i> -value ¹
	Daily	3Day	6Day		
Number of cows	38	31	37		
Initial weight, lb	1241.7	1256.4	1239.6	16.3	0.91
Calving weight, lb	1243.3	1256.5	1247.0	16.7	0.95
Weight change, lb	1.5	0.3	7.4	4.9	0.82
Turnout weight, lb ²	1312.8	1329.2	1301.2	16.5	0.80
Body condition score ³					
Initial	5.07	5.18	4.97	0.05	0.23
Calving	5.28	5.31	5.16	0.04	0.37
Change	0.21	0.13	0.19	0.04	0.74
Calf weight, lb	84.6	86.9	83.4	0.97	0.33
Average calving date	03/24/2012	03/22/2012	03/22/2012	0.44	0.20

¹No statistically significant differences among the means of each treatment ($P \geq 0.05$).

²Weight at turnout onto summer native range pasture (May 7, 2012).

³Scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese.