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Abstract

During two winters, 96 beef cows in late gestation were utilized in 60-day precalving feeding trials to evaluate supplementation for cows fed ammoniated wheat straw. Treatments included: control--mineral supplement only (C), 3 lbs milo + mineral (3M), 6 lb milo + mineral (6M), and 2.75 lb milo + .75 lb soybean meal + mineral (SBM). 3M increased (P<.05) cow gain over control but body condition changes were similar. 6M and SBM resulted in similar gains and body weight changes, which were higher than those of cows receiving either C or 3M. Birth weight of calves, percent cycling at the start of breeding, and percent pregnant after a 60-day breeding season were not affected by treatment. Natural protein appears to be a major limiting nutrient in cows fed ammoniated wheat straw.

Keywords

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SUPPLEMENTATION OF AMMONIATED WHEAT STRAW IN WINTERING DIETS OF GESTATING BEEF COWS

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Summary

During two winters, 96 beef cows in late gestation were utilized in 60-day precalving feeding trials to evaluate supplementation for cows fed ammoniated wheat straw. Treatments included: control--mineral supplement only (C), 3 lbs milo + mineral (3M), 6 lb milo + mineral (6M), and 2.75 lb milo + .75 lb soybean meal + mineral (SBM). 3M increased ($P < .05$) cow gain over control but body condition changes were similar. 6M and SBM resulted in similar gains and body weight changes, which were higher than those of cows receiving either C or 3M. Birth weight of calves, percent cycling at the start of breeding, and percent pregnant after a 60-day breeding season were not affected by treatment. Natural protein appears to be a major limiting nutrient in cows fed ammoniated wheat straw.

(Key Words: Ammoniation, Wheat Straw, Cows, Supplementation.)

Introduction

Wheat straw is an abundant forage resource for Kansas cow/calf producers. During drought years, ammoniated wheat straw can serve as a backup feed supply for a cow herd. Prior research has shown that ammoniated wheat straw is very similar to prairie hay in feed value. Ammoniation doubles the crude protein content and increases digestibility and intake by approximately 20%.

Although improved feeding value from ammoniation is well established, appropriate supplementation of ammoniated wheat straw diets for beef cows in late gestation has not been adequately studied. Prior research has shown that the first-limiting nutrient, either energy or protein, differs depending on the supplementation scheme used. Some reproductive performance studies with cows wintered on ammoniated wheat straw have shown reduced cow and calf performance. Therefore, our objectives were to determine cow weight and body condition score changes with ammoniated wheat straw as the sole forage fed in late gestation and to evaluate the effect of either energy or protein supplementation on ammoniated straw utilization and subsequent reproductive performance of the cows.

Experimental Procedures

Big round bales of wheat straw were treated with 3% anhydrous ammonia (wt basis) in late summer in 1988 and 1989. The ammoniated wheat straw, averaging 9% crude protein, was tub-ground through a 3 inch screen and fed ad libitum. In late December of each year, 96 cows were allotted by weight, breed type, and age to 12 drylot pens with 3 pens per treatment for a 60-day feeding trial. Initial and final weights were taken on two consecutive days following an overnight shrink. Supplementation treatments consisted of: .5 lb mineral mixture formulated to meet the cow's mineral requirements (C), 3.0 lb sorghum grain + .5 lb mineral (3M), 6.0 lb sorghum grain + .5 lb mineral (6M), and 2.25 lb sorghum grain + .75 lb soybean meal + .5 lb mineral (SBM). Supplements 3M and SBM were formulated to supply the same amount of energy, whereas 6M and SBM supplied the same amount of protein. Final weights and condition scores were obtained in late February just prior to initiation of calving.

Cows were managed as one group during

and after calving on native (primarily bluestem) pasture and fed approximately 5 lb daily of 25% crude protein cubes during calving. Calves were weighed and tagged at birth. Starting approximately 40 days after the first cows calved, a blood sample was collected every 10 days and analyzed for progesterone levels to determine the number of cows cycling. That procedure was followed until the start of breeding (approximately May 20). On the day of the final blood collection, cows were weighed and condition scored. Calves were weighed and vaccinated, and male calves were castrated and implanted. All cows and calves were managed similarly on native (primarily bluestem) pastures from the start of breeding to weaning in late October. Cows were exposed to bulls for 60 days in both years.

Results and Discussion

All energy and protein supplements increased gain ($P < .01$) over mineral supplementation alone; cows fed 6M and SBM had greater gains ($P < .01$) than those fed 3M (Table 1). Cows fed SBM gained 22 lb more ($P < .01$) than cows fed 3M. Supplements 6M and SBM improved ($P < .01$) body condition score more than C and 3M. Ammoniated wheat straw intake was similar across treatments. Birth weight of calves, percent cycling at the start of breeding, and percent pregnant after a 60-day breeding season were similar for all treatments.

In conclusion, all energy and protein supplements positively influenced gain and body condition score. However, the similarity in cow performance between 6M and SBM, and the improved performance from the supplement supplying more protein (SBM) compared to one with equal energy (3M), suggest that protein was the first-limiting nutrient. The need for additional natural protein appears to be greater than the need for additional energy, despite the fact that ammoniated wheat straw alone exceeded NRC (1984) requirements for crude protein.

Table 1. Effect of Supplementation on the Performance of Cows Fed Ammoniated Wheat Straw Pre-Calving

Item	Treatment				
	C	3M	6M	SBM	SE[g]
Wt change, lb	48[a]	75[b]	101[c]	97[c]	5.82
Body condition score (1-9) change	-.21[a]	-.11[a]	.19[b]	.16[b]	.05
Ammoniated straw intake[d]	23.8	23.9	22.5	22.3	.63
Calf birth wt, lb	80	82	82	81	1.24
Calf ADG, lb	2.27	2.22	2.22	2.17	.16
Percent cycling[e]	58	67	64	59	
Percent pregnant[f]	98	100	95	94	

[abc]Means in the same row with different superscripts differ ($P < .01$).
[d]lb/head/day.
[e]At the start of breeding.
[f]At the end of a 60-day breeding season; cows palpated at weaning.
[g]Standard error.