

## FEEDING FREQUENCY OF HIGH GRAIN SUPPLEMENTS WITH LOW QUALITY NATIVE GRASS HAY

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### Story in Brief

Two levels of a corn-based supplement were fed daily or on alternate days (2 x daily amount) to 12 Hereford cows and 4 Hereford x Angus heifers maintained on coarsely chopped native grass hay (5.0 percent CP) to determine the effect of feeding frequency of grain supplements on forage utilization. Feeding frequency did not influence hay (P<.62) or dry matter (P<.62) intake. Alternate day feeding tended to depress both hay (P<.22) and dry matter (P<.20) digestibility. Digestible dry matter intake was decreased (P<.03) by .5 lb by alternate day feeding. Alternate day feeding of high grain supplements appears to alter rumen environment to a greater extent than daily feeding. If grain-based supplements are to be fed, small quantities (less than 2 lb) provided on a daily basis may minimize deleterious effects on forage utilization.

### Introduction

Infrequent feeding (2 or 3 feedings/week) of high protein supplements to wintering beef cows has been shown to maintain performance as effectively as daily feeding. Certainly, feeding high grain supplements on alternate days would also be an appealing production practice. There is little data, however, on the effect of infrequent feeding of grain-based supplements on forage utilization. Daily feeding of more than 2 lb of corn has been shown to decrease forage digestibility and intake. Continuous feeding of high starch supplements may produce a rumen environment deleterious to forage digestion. Feeding twice the daily allowance on alternate days may decrease this effect on days when no grain is fed, allowing better overall forage utilization. Thus, the objective of this study was to determine the effect of daily or alternate day feeding of corn-based supplements on digestibility and intake of low quality native grass hay by beef cows.

### Materials and Methods

Twelve Hereford cows (876 lb) were blocked by weight into three groups. Four ruminally cannulated Angus x Hereford heifers (754 lb) comprised a fourth group. The four groups were utilized in four simultaneous 4 x 4 Latin squares with treatments arranged in a 2 x 2 factorial design. Two isonitrogenous corn based supplements (levels) provided either 1.8 or 3.8 lb corn/d (table 1). Supplements were fed daily or on alternate days (2 x daily amount). Thus, 1.8 lb of corn was fed daily (Low-daily) or twice that amount (3.6 lb) fed on alternate days (Low-alternate) while 3.8 lb was fed daily (High-daily) or 7.6 lb on alternate days (High-alternate, table 2). All cows were offered free choice

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Table 1. Supplement intake and nutrient supply (DM basis).

Item	Corn level	
	Low	High
Average daily intake, lb		
Corn, ground	1.8	3.8
Cottonseed meal <sup>a</sup>	.9	.4
Mineral premix <sup>a</sup>	.3	.3
Total	3.0	4.5
Average nutrient supply, lb/d		
Crude protein	.56	.55
Starch	1.2	2.6
TDN <sup>b</sup>	2.3	3.7

<sup>a</sup>Mineral premix contained 63.4% dicalcium phosphate, 15.1% potassium chloride, 20% trace mineralized salt and .6% Vitamin A (20,000 IU/d).

<sup>b</sup>Estimated.

Table 2. Supplementation schedule.

Schedule	Day						
	1	2	3	4	...	13	14
	----- Corn intake, lb/d -----						
Low-daily	1.8	1.8	1.8	1.8		1.8	1.8
Low-alternate	3.6	---	3.6	---		3.6	---
High-daily	3.8	3.8	3.8	3.8		3.8	3.8
High-alternate	7.6	---	7.6	---		7.6	---

coarsely chopped (2 in screen) low quality native grass hay (5.0 percent CP, 46.2 percent ADF).

Each 14 day period included eight days for diet adaptation and six days of fecal sampling twice daily (0800 and 2000 h). Supplement and hay, offered and refused, were weighed and sampled daily. All samples were composited by animal, dried and ground through a 1 mm screen before analysis. Dry matter and acid detergent fiber digestibility were estimated using acid-insoluble ash as an indigestible marker. Hay digestibility, assuming supplement digestibility of 80 percent, was estimated by difference. The data were subjected to least squares analysis. Because the Level x Frequency interaction was not significant ( $P = .19$  or greater) for any variable, simple effect means were averaged and main effect means presented.

## Results and Discussion

### Level of Feeding

Supplements providing a daily average of 3.8 lb corn decreased ( $P < .0001$ ) hay intake from 21.1 to 19.3 lb/d (table 3). Much of the depression in hay intake is attributable to decreased hay ( $P < .02$ ) and acid detergent fiber ( $P < .009$ ) digestibilities. Although less severe than in previous studies, digestible dry matter intake was slightly decreased by feeding 3.8 lb corn/d. Certainly, the additional corn did not improve the digestible dry matter intake of the cows as might be expected.

Table 3. Daily intake and digestibility of hay and supplements.

Item	Level			Frequency		
	Low	High	$p^a$	Daily	Alternate	$p^a$
Hay intake, lb	21.1	19.3	.0001	20.3	20.1	.62
Hay digestibility, %	47.8	44.8	.02	47.0	45.6	.22
Acid detergent fiber digestibility, %	42.3	39.0	.009	41.3	40.1	.32
Dry matter intake, lb	24.2	23.8	.29	24.0	23.9	.62
Apparent Dry matter digestibility, %	52.0	51.8	.83	52.5	51.2	.20
Digestible dry matter intake, lb	12.5	12.3	.33	12.7	12.2	.03

<sup>a</sup>Probability.

### Feeding Frequency

Feeding frequency had no effect ( $P < .62$ ) on hay intake (table 3). Although not significant, alternate day feeding tended to decrease acid detergent fiber and hay digestibility. Apparent dry matter digestibility was also depressed ( $P < .20$ ) by alternate day feeding resulting in reduced ( $P < .03$ ) digestible dry matter intake.

Feeding large quantities of grain on alternate days appears to create a ruminal environment that is more deleterious to forage digestion than daily feeding (figure 1). These conditions apparently carry over into the second (no grain feeding) day. The resulting depression in apparent dry matter digestibility produced a small but significant decrease in digestible dry matter intake. A .5 lb depression in digestible dry matter intake, however, may not be large enough to justify the added expense of daily supplementation.

This study suggests that the most efficient method of providing grain supplements to cows wintered on low quality native grass is in small quantities fed frequently. Unfortunately, daily supplement feeding results in interrupted grazing patterns, unequal supplement consumption and increased labor. Perhaps self-feeding grain supplements with the use of intake regulators such as salt would allow frequent consumption with minimal labor inputs.

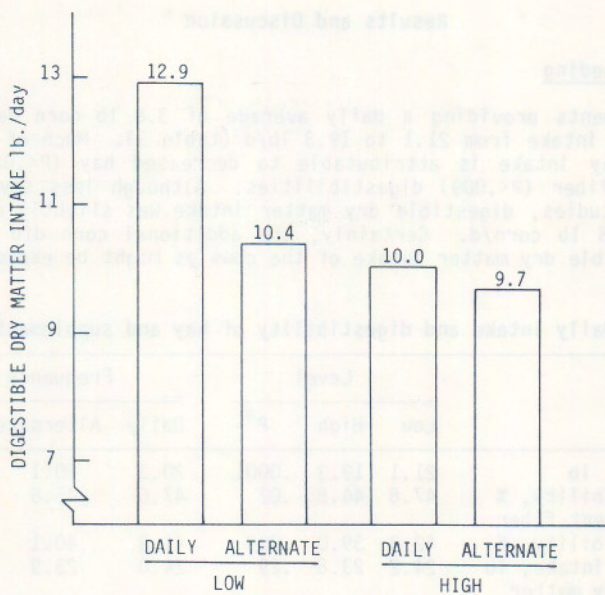


Figure 1. Effect of feeding frequency on digestible dry matter intake.