Activity Patterns of Feedlot Steers

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Story in Brief

One hundred crossbred steers were observed every 30 min during two separate 24 h periods (September and October) to determine how behavior or activity of finishing steers was related to performance. These dates corresponded to days 64 and 108 of a 118-d feeding trial.. Activities of each steer, noted every 30 min, included eating, standing, lying, drinking, ruminating while standing, and ruminating while lying. Steers that were limited to 9 h/day access to feed by restricted delivery of feed spent more time per day eating than steers on other feeding schedules. The same steers also spent more time lying down. Mean time for each activity was regressed against performance of the cattle. Total time spent ruminating while standing was slightly but negatively related to average daily gain based on individual animal data. Even though steers with free choice access to feed had higher ADG for the entire trial, the 9 h/d steers were slightly more efficient on a live weight basis. This increase in efficiency may have been a result of steers spending a longer amount of time to eat their feed, which was shown to improve feed to gain ratios, a greater amount of time lying down, and less time ruminating while standing; together, these factors might increase feed digestibility and reduce the amount of energy expended for maintenance.

(Key Words: Behavior, Steers, Feedlot, Time.)

Introduction

Activity of feedlot steers may be related to performance. Steers that spend less time eating and more time moving around the pen may gain less weight than docile steers that spend more time at the feedbunk. Hicks et al. (1989) reported that steers that spent more time eating, lying, or ruminating tended to gain weight faster. If minimal activity lowers metabolic rate of the animal, maintenance requirements may be lower, leading to more efficient gains. The purpose of this study was to determine how the amount of time feedlot steers spent performing certain activities was related to performance.

Materials and Methods

Animals and Housing. One hundred crossbred steers were received from a single ranch in east central Kansas on July 14, 1997 at the feedlot research facilities in Stillwater, OK. Cattle previously had been vaccinated with modified live IBR-BVD virus and 7-way clostridial vaccines, dewormed, and implanted with a Synovex Plus implant. Upon arrival, steers were individually weighed. Based on these weights, steers were blocked by weight and assigned randomly to pen and feeding treatment. Housing consisted of 20 partially covered pens with cement slatted floors and fenceline feedbunks.

Diets and Feeding Treatments. Steers were fed a dry, whole corn based 87% concentrate finishing diet. Feeding times and treatments were as follows: 1) steers fed at 0800 and allowed free choice access to feed (AL), 2) steers fed at 0800 and restricted to 9 h/d of eating time controlled by a closed gate in front of the feedbunk at 1700 (DG), 3) steers fed at 0800 and restricted to 9 h/d of eating time controlled by restricted delivery of feed resulting from feed calls (DC), 4) steers fed at 1700 and restricted to 9 h/night of eating time controlled by a closed gate in front of the feedbunk at 0200 (NG), 5) steers fed at 1700 and restricted to 15 h/night of eating time controlled by restricted delivery of feed resulting from feed calls (NC).

Activity Measurements. Records of animal activity were taken on days 64 and 65 (September 16 and 17) and d 108 and 109 (October 30 and 31) of the feeding trial. During each of these periods, at 30 min intervals from 0630 of the first day until 0600 of the second day, each steer was classified as eating, standing, lying, drinking, ruminating while standing, or ruminating

while lying. Results from the two periods were averaged. Using stepwise regression, ADG relationships to time spent in each classified activity were examined.

Results and Discussion

Among these groups of steers, those with feed intakes called each day tended to spend more time eating than cattle with ad libitum access to feed. (110 and 101 vs 97 min/d) (Table 1). The least amount of time spent eating of all steers (65 min) was for cattle gate restricted to 9 h of feeding time. Although these steers had 9 h/night to eat, they readily consumed all of their feed usually within the first 60 minutes of being fed. These steers also had the highest dry matter intake (DMI) for the trial. This indicates that these steers ate faster (Table 2) and possibly took larger mouthfuls knowing that a time restriction was being placed on eating. These results agree with those of Shaw (1978) who reported that limiting eating time increased eating rate. In contrast, despite spending the most time per day eating, DC steers had the lowest DMI. This indicates that time of feeding may have altered rate of eating. Among treatment groups, those eating most rapidly had the poorest feed efficiency whereas those eating slowest had the best feed efficiency. This may reflect greater chewing of the whole corn in the diet which, in turn, should increase digestibility.

Steers with the quantity of feed limited spent the most time lying down (a total of 843 min for day fed and 849 min for night fed steers). Hicks et al (1989) reported that for each 1% increase in time spent lying by cattle, ADG increased by .02 lb/day. However, those findings do not match the observations from this trial.

Eating patterns for day and night fed steers were closely related to the time that feed was delivered (Figure 1). However, AL fed steers did not follow a similar eating pattern and ate smaller, more frequent meals throughout the day. As expected, the percentage of steers lying at feed delivery time was small (Figure 2). It was noted that steers tended to react to other steers in close proximity to them. When morning fed steers were fed, night fed steers stood up, even though they did not receive feed. This was true for afternoon feeding as well with day fed steers standing up when night fed steers were fed. Day fed steers, though fed in the morning, tended to ruminate in the evening or night (Figure 3). In contrast, night fed steers consumed their feed and began to ruminate within 3 to 6 h of being fed and continued rumination throughout the next day.

When ADG was compared with activity data, cattle with longer times spent ruminating while standing had a slightly negative effect (R2=.14) on average daily gain. AL steers spent the most time ruminating while standing (39 minutes/day). In contrast, DC steers spent only 26 min a day ruminating while standing. This may partially explain why DC steers were slightly more efficient (live weight basis) than AL steers.

In this trial, limiting the amount of time that steers had to eat tended to increase eating rate for steers fed in the late afternoon but not for steers fed in the morning. If one assigns published caloric costs to eating, standing, walking, and ruminating, treatments differ by a maximum of 84 kcal/d; this would increase daily feed requirements by less than 0.15 lb. Consequently, these alterations in energy needs cannot readily account for any improvements in feed efficiency noted with limit feeding cattle. However, using a whole corn based diet, a faster eating rate proved to be detrimental to feed efficiency. If the same would be true for a more processed grain diet remains undetermined and deserves further attention.

Literature Cited

Hicks, R. B. et al. 1989. Okla. Agr. Exp. Sta. Res. Rep. MP-127:94.

Shaw, R. A. 1978. Anim. Prod. 27:277.

Table 1. Daily activity as a percentage of total day for steers housed in partially covered pens.a

	Time and exposure to feed

	AL	9 h DG	9 h DC	9 h NG	15 h NC
Number of head	20	20	20	20	20
	Fraction of day (%)				
Eating	6.7	6.9	7.6	4.5	7
Lying	48	46	52	50	51
Standing	30	32	29	33	30
Drinking	2.8	3.7	2.8	2.5	2.1
Ruminating while lying	9.5	8.3	6.8	8.3	7.9
Ruminating while standing	2.7	1.8	1.8	1.7	2

a Times represent an average of the two observation periods from days 64 and 65 and days 108 and 109 of the trial.

Table 2. Intake, eating time, and eating rate of steers housed in partially covered pens.

Time fed	Access time	DMI, lba	Eating time, min	Eating rate, min/lb feed	Rumination time, min/lb feed	Feed/Gain
0800	24 h	20.3	97	4.8	8.7	7.72
0800	9 h (gate)	20.3	99	4.9	7.0	7.08
0800	9 h (called)	19.6	110	5.6	7.1	6.66
1700	9 h (gate)	20.7	65	3.1	7.0	9.45
1700	9 h (called)	19.3	101	5.2	6.8	7.93

a Mean DMI from day 57-118 of the trial.

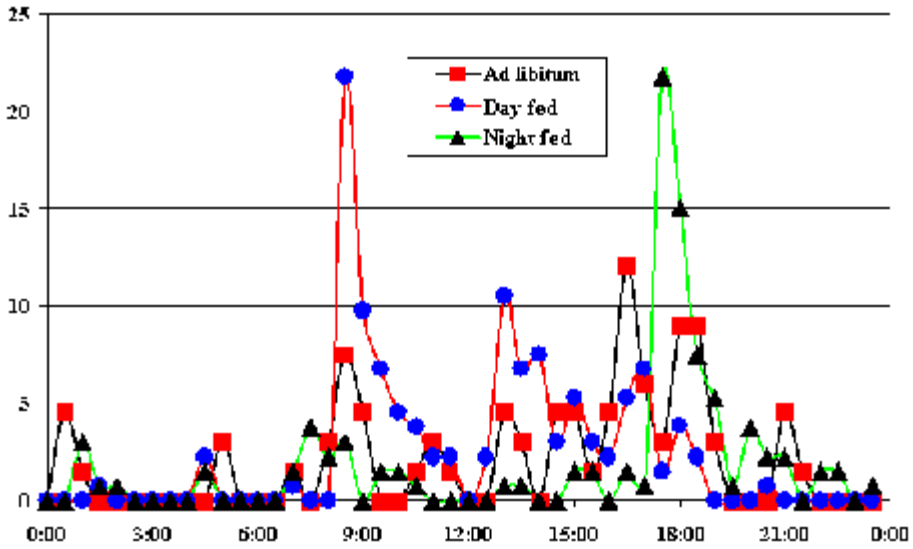

Figure 1. Eating patterns of steers housed in partially covered pens.

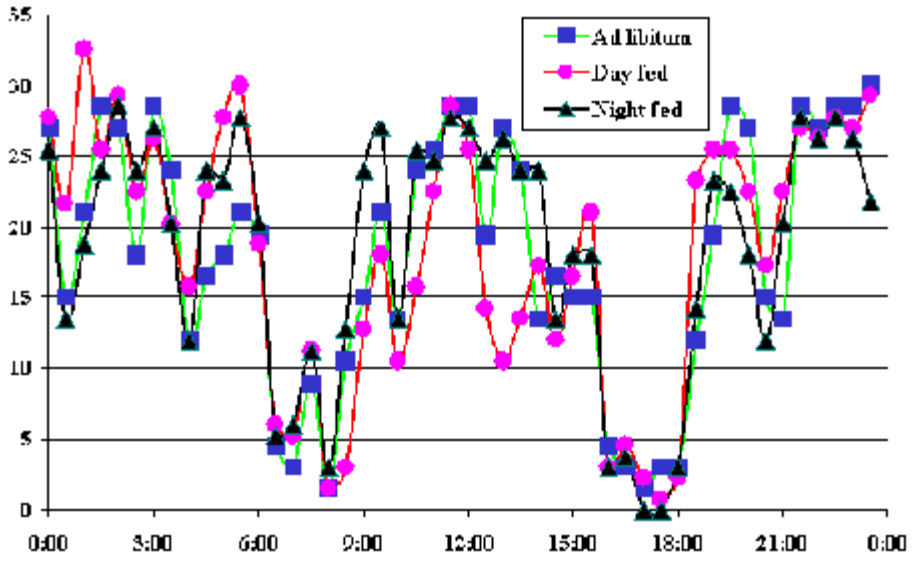

Figure 2. Lying patterns of steers housed in partially covered pens.

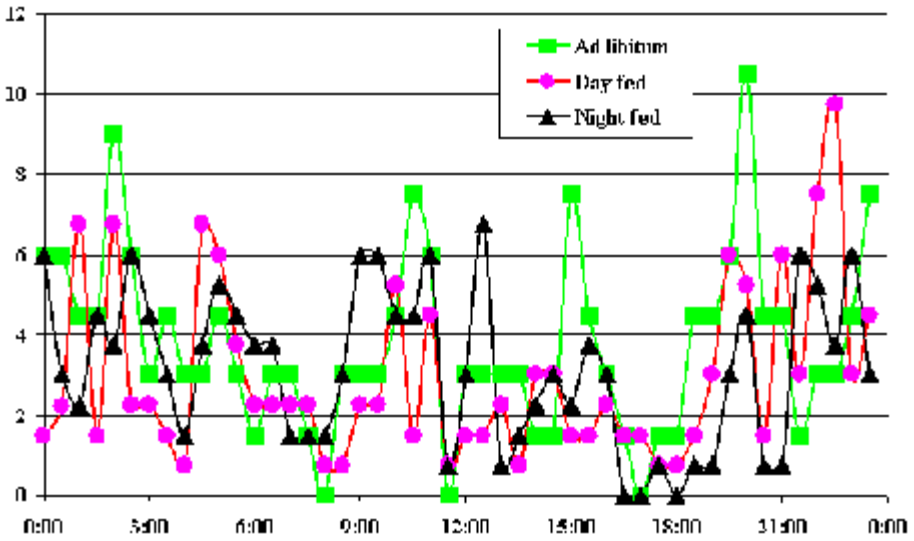

Figure 3. Ruminating patterns of steers housed in partially covered pens.

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