

Effect of Eating and Rumination on Gain and Fecal Characteristics of Steers

F. N. Owens¹ and M. C. Ferrell²

Story in Brief

Rumination and eating behavior of 139 steers fed a 95 percent concentrate, whole shelled corn diet were checked each half hour during a 24-hour period. Over 80 percent of the steers were observed to be ruminating during this time. Steers ruminating more frequently gained weight more rapidly ($P < .05$). Number of meals decreased with increased rumination. Fecal pH and dressing percentage tended to decline with frequency of eating.

Introduction

Generally, gain, feed intake and feed efficiency are the only measurements obtained from feedlot cattle on research trials. Eating and rumination behavior may alter performance and digestion. One earlier study (Gill, 1981) indicated that non-ruminating animals gained faster than ruminating steers. This study was conducted to observe the relationship between eating and rumination behavior and gain, fecal measurements, and certain carcass characteristics.

Materials and Methods

One hundred thirty-nine steers consumed feed ad libitum and were observed every half hour during a 24-hour period on day 120 of a feeding trial reported elsewhere in this publication (Ferrell, 1983). One person identified which animals were eating, ruminating or lying down in each of 20 pens of 7 head each. Fecal samples were obtained from 90 of the 140 steers after behavior was monitored. Performance and fecal measurements were regressed against frequency of eating and rumination following removal of potassium and ionophore source effects.

Results and Discussion

Rumination behavior of steers in this trial is presented in Table 1. During the 48 observations, 84 percent of the steers were detected ruminating one or more times. Even with 95 percent concentrate in the diet, the abrasiveness of the whole corn apparently stimulated rumination. For statistical analysis, the effects of ionophore and K level were removed. Steers which ruminated more times gained weight more rapidly in this trial, however, gain may have reached a plateau at higher frequencies of rumination. Number of meals per

¹Professor, Animal Science ²Graduate Assistant

Table 1. Rumination behavior

Item	Times observed ruminating						
	0	1	2	3	4	5	6
No. of steers	26	37	29	29	17	6	9
ADG, lb/day	2.67	2.65	2.78	2.71	2.80	3.19	2.47
Eating, %	3.7	3.0	3.6	3.4	3.3	3.2	2.4
Fecal pH	6.18	6.27	6.21	6.41	6.07	5.89	6.13
Fecal ash, %	7.0	7.5	6.4	6.9	6.0	5.2	5.3
Fecal DM, %	26.9	24.0	28.1	27.2	26.6	30.3	30.4
Fecal starch, %	21.4	19.5	21.2	19.6	19.8	30.3	27.3

day tended to decline with frequency of rumination while fecal dry matter and starch tended to increase with more frequent rumination.

Eating behavior of steers is presented in Table 2. Steers eating more meals per day may be consuming more feed, however with more than 6 meals observed during the 48 observations, rate of gain and frequency of rumination declined. Fecal pH also tended to decline with more frequent meals while dressing percentage tended to decline with meal frequency except at the highest meal frequency. If gastrointestinal fill was greater with less frequent and presumably larger meals, the reverse effect on dressing percent would be expected. Fat thickness over the rib tended to increase with meal frequency. This is the opposite of some research in humans, pigs, chicks and rats where "meal eating" results in greater fat deposition than a "nibbling" feeding pattern.

Literature Cited

Gill, D. R. et al. 1981. Okla. Agr. Exp. Sta. Res. Rep. MP-108:141.

Table 2. Eating behavior

Item	Times observed eating								
	0	1	2	3	4	5	6	7	8
No. of steers	12	16	39	23	21	21	12	5	7
ADG, lb/day	2.36	2.49	2.64	2.87	2.73	2.91	3.00	2.48	2.80
Ruminating, %	3.2	1.9	2.2	2.1	2.2	2.7	2.3	0.6	1.3
Fecal pH	6.20	6.29	6.22	6.54	6.13	6.26	6.01	6.04	6.08
Fecal ash, %	6.6	6.2	6.5	7.8	6.9	6.6	6.6	7.9	6.4
Fecal DM, %	26.2	22.5	27.0	25.5	26.5	28.8	28.2	25.0	28.4
Fecal starch, %	20.5	22.2	22.0	18.0	18.3	21.9	24.0	21.5	28.5
Dressing, %	62.5	62.1	61.3	62.0	60.8	61.0	61.4	60.3	62.5
Fat thickness, in.	.38	.35	.42	.41	.37	.36	.52	.28	.54