Influence of Feed Intake Management System on Cattle Intake and Growth Performance

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Erika Lundy-Woolfolk, Extension Beef Specialist, Iowa State University Extension and Outreach
Dan Loy, Professor, Department of Animal Science, Iowa State University
Garland Dahlke, Research Scientist, Iowa Beef Center

Summary and Implications

Variation in feed intake systems and subsequent bunk management between research settings and the beef industry has increased over the last decade. Despite the need for both feed management application systems in the beef industry, a comparison of feed intake, cattle intake behavior, and growth performance between cattle fed in an open bunk system compared to an individual intake system has not been conducted. Therefore, the objective of this study was to evaluate feed intake, growth performance, and carcass characteristics of steers fed in an individual feed intake bunk system (FIMS) compared to a traditional, open bunk system. One hundred twelve crossbred yearling steers (n = 28 hd/pen) were randomly assigned to one of two treatment groups: 1) fed in individual feed intake systems (FIMS) or 2) fed in traditional open bunk system (OPEN) with 2 pens per treatment. Steers fed in FIMS were managed to allow for ad libitum feed access while steers fed in concrete open bunks were managed using the South Dakota State University 4-point bunk scoring system, targeting slick bunks or bunk score of 0 three to five days per week with the remainder of the days being bunk scores of ½ to 1. Over the 103-day feeding period, no difference in body weight or growth performance were observed between the two treatment groups with a tendency for ribeye area to be smaller in steers fed in FIMS. Results of this study demonstrated minimal differences performance and carcass characteristics of steers fed in an open bunk system in comparison to an individual intake bunk system. However, additional research is needed to determine the impact of bunk feeding system on individual steer social behavior to account for variation within pen.

Introduction

Individual animal feed intake systems such as the Feed Intake Monitoring System (FIMS) at the Armstrong Research Farm have become standard technology for beef cattle research. While these systems greatly increase the statistical power and efficiency of research facilities, an ad libitum feed management approach is necessary to allow cattle to have unlimited feed accessibility to express their desired intake.

In the industry, cattle feeders have been adopting a slick or clean bunk feeding systems, targeting no feed remaining 3 – 5 days each week prior to the initial feed delivery for the day. Research has shown that when using this approach, feed conversion can be improved by approximately 2 – 3% compared to an ad libitum management approach in open bunks.

Despite the need for both feed management application systems in the beef industry, a comparison of feed intake, cattle intake behavior, and growth performance between cattle fed in an open bunk system compared to an individual intake system has not been conducted. Therefore, the objective of this study was to evaluate feed intake, growth performance, and carcass characteristics of steers fed in an individual feed intake bunk system (FIMS) compared to a traditional, open bunk system.

Materials and Methods

Based on source, hide color, and initial body weight (BW), 112 crossbred yearling steers (n = 28 hd/pen) were randomly assigned to one of two treatment groups: 1) fed in individual feed intake systems (FIMS) or 2) fed in traditional open bunk system (OPEN) with 2 pens per treatment.

Steers in the FIMS were managed to allow for ad libitum feed access. Steers fed in concrete open bunks were managed using the South Dakota State University 4-point bunk scoring system, targeting slick bunks or bunk score of 0 (no feed remaining) 3 – 5 days per week with the remainder of the days being bunk scores of ½ (scattered feed present, but most of bottom of bunk exposed) to 1 (thin uniform layer of feed across bottom of bunk – typically, about 1 corn kernel deep). Based on pen density and bunk space, steers fed in FIMS had 1 linear inch per head in comparison to 9 linear inches per head for steers fed in OPEN.

Individual animal BW were collected on consecutive days at the beginning of the trial and on d 56. A final carcass adjusted BW was calculated using hot carcass weight and a standard dressing percentage of 63% and utilized in performance calculations. All steers received a common implant on d 0 (Revalor-200, Merck) and were fed a finishing diet containing 57% whole shelled corn, 30%

modified distillers grains, 10% hay, and 3% supplement on a dry matter basis (Table 1). After 103 days on feed, steers were harvested at a commercial packing plant where individual carcass data were collected. For statistical analysis, pen was the experimental unit.

Results and Discussion

No differences in BW were observed due to bunk management system between OPEN vs. FIMS ($P \leq 0.19$; Table 2). Over the duration of the trial, ADG, DMI, and feed conversion were not different ($P \leq 0.14$) between the two treatment groups. However, during the first feeding period, steers fed in OPEN bunks consumed less feed compared to steers fed in FIMS. Worthy of noting is the wide variation of individual performance within pen. The difference in social behaviors between steers fed within the open bunk system where bunk space was adequate for all animals to eat at the same time compared to steers fed in the individual intake bunks where only one steer can eat at a time may influence performance. Additional research is needed to further evaluate animal behavior in varying bunk management systems.

Bunk management system did not influence hot carcass weight, backfat thickness, marbling score, or yield grade ($P \leq 0.11$; Table 3). However, steers fed in OPEN tended to have larger ribeye area ($P = 0.09$) in comparison to steers fed FIMS, likely a reflection of the numerical difference in hot carcass weights.

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Table 1. Ingredient composition of diet fed (%, dry matter basis).[1]

	Diet
Whole shelled corn	57.0
Modified distillers grains	30.0
Ground hay	10.0
Supplement	3.0
Analyzed composition	
Dietary dry matter	75.7
Crude protein	16.1
NEg, Mcal/lb	0.62

Table 2. Growth performance of steers fed in a traditional, open bunk system (OPEN) compared to an individual feed intake monitoring system (FIMS).

	OPEN	FIMS	SEM	*P*-Value
Body weight[1], lbs/hd/d				
d 0	896	899	5.6	0.63
d 56	1193	1185	9.7	0.47
d 103	1374	1360	7.7	0.19
Average daily gain, lbs/hd/d				
d 0 – 56	5.40	5.19	0.140	0.27
d 57 – 103	3.86	3.66	0.085	0.14
d 0 – 103	4.60	4.43	0.070	0.14
Dry matter intake, lbs/hd/d				
d 0 – 56	31.56	31.74	0.019	0.01
d 57 – 103	34.14	34.42	0.876	0.78
d 0 – 103	32.40	32.63	0.401	0.64
Feed to gain (F:G), lbs/hd/d				
d 0 – 56	6.212	6.508	0.2130	0.30
d 57 – 103	8.523	8.747	0.2354	0.44
d 0 – 103	7.137	7.448	0.1776	0.22

[1]d0 and d56 = live body weights with 4% shrink applied. d103 = Carcass adjusted final body weight utilizing hot carcass weight and standard 63% dressing percentage.

Table 3. Carcass characteristics of steers fed in a traditional, open bunk system (OPEN) compared to an individual feed intake monitoring system (FIMS).

	Open	FIMS	SEM	*P*-Value
Hot carcass weight, lbs	866	851	5.29	0.11
Ribeye area, sq. in.	13.07	12.69	0.117	0.09
12th rib backfat, in.	0.65	0.65	0.036	0.93
Marbling score[1]	1105	1104	34.9	0.99
Calculated yield grade	3.6	3.7	0.14	0.60

[1]1000 = low Choice; 1100 = average Choice; 1200 = high Choice.