EFFECT OF INDIVIDUAL OR GROUP PENNING ON PERFORMANCE OF FEEDLOT STEERS

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Story in Brief

Seventeen crossbred yearling steers were fed either individually (4 steers) or in groups of three or four head per pen (13 steers). Daily gains were reduced only slightly (6.3%) with individual feeding (4.57 vs. 4.88 lb/day) and feed intake was reduced slightly also (22.53 vs. 23.87 lb/day), while feed efficiency was reduced by only 2% (4.98 vs 4.88 lb feed/lb gain). Considerable day to day fluctuation in intake was apparent for both individually and group fed steers. Individual feeding appeared to reduce daily gain but these steers still performed exceptionally well.

(Key Words: Feedlot Steers, Group Fed, Individually Fed, Cyclic Intake.)

Introduction

Little information is published concerning the effect of individual or group penning on the performance of feedlot cattle. Garrett (1987) reported that individually fed steers in two trials had 7.4% higher daily gains despite 6.3% greater dry matter intakes than group fed steers. Feed efficiency was improved by 1% by individual feeding. Garrett also noted that the maintenance requirement of individually fed steers was reduced by 1.7%. This lower maintenance requirement possibly is the result of less activity which could be due to lack of competition, no drive or need to establish a peck order or other environmental factors associated with differences between pen types (Garrett, 1987). Perhaps other environmental differences existed as well. If individual feeding does not alter animal performance, fewer head could be used in feeding trials without loss in statistical precision. The objective of this experiment was to compare the performance of individually fed steers and group fed steers.

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Materials and Methods

A group of 17 English crossbred yearling steers were weighed individually and implanted with Synovex-S on October 28, 1987. Four of the steers were fed individually in 30 x 8 feet pens. The remaining steers were divided into three pens of three head and one pen of four head and fed in 30 x 8 feet pens. One steer in one of the pens of three was removed from the experiment at 50 days due to injury. Each pen had slatted floors and was partially covered.

All steers were ad libitum fed a dry rolled corn concentrate ration twice daily for the entire 85-day trial. The amount of feed offered was not allowed to increase by more than 2 lb/head each day to avoid acidosis. Roughage content of the diet (dehydrated alfalfa pellets and cottonseed hulls) was decreased sequentially in four steps until steers were on the final 91% concentrate diet at 28 days (Table 1). Every morning the amount of residual feed in the bunks from the previous day was weighed so that daily intakes could be calculated.

The individually fed steers were slaughtered on day 83 at the Oklahoma State University Meats Laboratory. Group fed steers were slaughtered at a

Table 1. Ration composition, dry matter basis.[a]

	Ration sequence				
Ingredient	1	2	3	4	5[a]
	----------%				----------
Corn, dry rolled	39.3	49.7	59.5	69.7	80.9
Cottonseed hulls	25.4	20.3	15.3	10.2	5.0
Alfalfa, dehy-pellets	25.4	20.3	15.3	10.2	4.0
Cane molasses	3.5	3.5	3.5	3.5	3.5
Pelleted supplement	6.5	6.5	6.5	6.5	6.5
	Supplement composition, % of DM				
Cottonseed meal			2.01		
Soybean meal			2.85		
Calcium carbonate			.80		
Salt			.30		
Urea			.40		
Dicalcium phosphate			.07		
Vitamin A, 30000 IU/g			.01		
Vitamin E			.01		
Monensin, 60 g/lb			.02		
Tylan, 40 g/lb			.01		
Trace mineral			.01		

[a]Formulated to contain 94.7 mcal NEm/cwt, 61.0 mcal NEg/cwt, 12.3% crude protein, .69% potassium, .45% calcium and .31% phosphorus.

commercial packing plant in Booker, TX on day 85. The data were analyzed using a general linear model with type of feeding (individual vs. group) as a main effect. Initial weight was included as a covariate in the model.

Results and Discussion

Gains and performance of both individual and group fed steers were excellent (Table 2). Daily gains were greater for group fed steers throughout the feeding period. Daily gains over the entire trial were reduced slightly (6.3%) with individual feeding (4.57 vs. 4.88 lb/day, P=.22). Daily dry matter intake was 5.6% lower with individual feeding (22.5 vs. 23.9 lb/day, P=.14). Feed efficiency was reduced by only 2% with individual feeding (4.98 vs. 4.88 lb DM/lb gain, P=.72). The poorer performance of the individually fed steers could possibly be due to lack of competition, although results of my study are not conslusive due to the low number of animals. We anticipated much lower intakes and gain for animals in a non-competitive environment.

Carcass characteristics of these steers are presented in Table 3. Fat thickness over the twelfth rib (P<.10) and marbling scores (P<.05) were greater for individually fed steers. While rib eye area (P=.10), USDA yield grade (P<.05) and cutability (P<.05) were greater for group fed steers. All

Table 2. Effect of group feeding on performance (Least squares means).

Item	Individual	Group
No. of pens	4	4
No. of head	4	13
Weight, lb		
Initial (actual pen means)	886	850
Initial	868	868
Day 42	1083	1102
Final[a]	1258	1300
Daily gain, lb		
0-42 days	4.90	5.34
43-slaughter	4.21	4.43
0-slaugher	4.57	4.88
DM intake, lb/day		
0-42 days	20.70	21.17
43-slaughter	23.16	24.80
0-slaughter	22.53	23.87
Feed/gain		
0-42 days	4.23	3.95
43-slaughter	5.60	5.59
0-slaughter	4.98	4.88

[a]83 days for individuals and 85 days for group fed.

Table 3. Effect of group feeding on carcass characteristics (Least squares means).

Item	Individual	Group
Carcass weight, lb	756	769
Dressing percent	62.88	61.57
Rib eye area, sq in	12.04	13.39
KPH, %	2.06	1.77
Fat thickness, in	.50[d]	.38[c]
Marbling score	16.18[b]	12.46[a]
Percent choice	100.0	64.6
USDA yield grade	3.20[b]	2.45[a]
Cutability, %	49.34[a]	51.07[b]

[a,b]Means in the same row with different superscripts differ (P<.05).
[c,d]Means in the same row with different superscripts differ (P<.10).

of the individually fed steers graded choice, whereas only 65% (8 head) of the group fed steers graded choice. With this limited number of animals, it is difficult to draw conclusions regarding carcass characteristics, but performance and intake patterns remain of interest.

Plots of dry matter intake vs days on feed for individually and group fed animals are illustrated in Figures 1 and 2. Considerable day to day fluctuation in intake was apparent for both individual and group fed steers. Coefficients of variation (CV) for daily feed intake for the individually fed steers were 18.9, 23.4 23.4 and 28.9%. Whereas, for the group fed steers pen CV were 14.7, 15.1, 11.9 and 20.5%. Mean CV for individually and group fed steers were 23.6 and 15.6% (P=.07). In typical feeding trials with eight to ten head per pen, variation generally is much less. With more head per pen, day to day variation presumably is reduced because different animals are on different points of a cyclic intake pattern (Stroup et al., 1987). An extreme drop in intake occurred at about day 50 (Dec. 16) in individually fed steers which can be attributed to cold, snowy weather. In contrast, intakes of the group fed pens were not appreciably altered at this time. With both individually and group fed steers, intake often climbed continuously for about 10 days followed by a decline for about five days and then was followed by another climbing period. This slow increase may be due to our imposed limits on increases in intake to no more than 2 lb/day. Hence, intake might have shown less day to day variation if animals would have had unlimited access to feed at all times. More cyclic intake patterns may be due partially to subacute acidosis (Britton and Stock, 1987).

Presumably, a constant energy intake would lead to more efficient production because the waste of fluctuating metabolism would be reduced. Fluctating energy intake also would be expected to increase the likelihood of

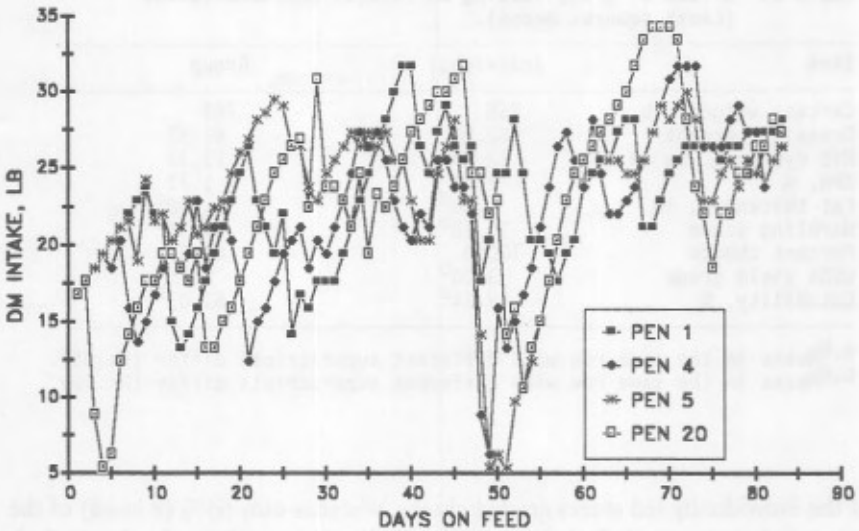

Figure 1. Dry matter intake versus days on feed for individually fed steers.

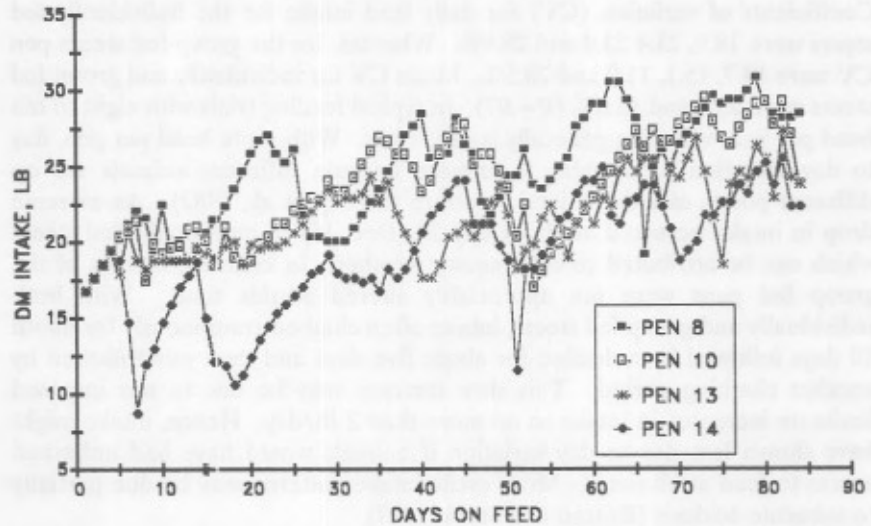

Figure 2. Dry matter intake versus days on feed for group fed steers.

acidosis and metabolic disorders. Regular feeding practices, as noted with limit feeding, may increase energetic efficiency by reducing these fluctuations.

In conclusion, lack of competition or companionship among steers in a pen did not markedly reduce gain or feed intake matching results from one previous study (Garrett, 1987). These results disagree with the concept that most workers stress that competition in the feedlot has large practical importance in feeding trials with cattle (Maynard and Loosli, 1969). Day to day variation in intake of steers was 16 to 24% with one to four steers per pen. These values are larger than would be observed in feedlot pens due to the low number of animals, but similar individual variation might be expected. If daily variation were reduced, efficiency of gain and marbling score might increase and external fat might decrease. Comparison of carcass characteristions of cattle with constant versus fluctuating fixed intake levels requires further study.

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