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Sorting or Topping-off Pens of Feedlot Cattle

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Sorting or topping-off finished cattle within a pen may increase overall pen profitability. Leaner cattle within a pen at slaughter are not necessarily poor performers.

Summary

Two sources of data were analyzed to determine performance differences of cattle with differing degrees of finish within a pen. One source of data was from large-pen commercial feedlots, while the other source of data was from individually fed steers at the University of Nebraska. The results indicate leaner cattle within a pen have lower quality grades and carcass weights, but are gaining faster and more efficiently than their fatter pen-mates at slaughter. Therefore, additional days on feed for the leaner cattle within a pen, in order to increase carcass weight and quality grade, may be economical.

Introduction

In most commercial feedlot situations, large variations exist in animal weight and finish within a pen. A previous marketing project conducted by the University of Nebraska in large-pen commercial feedlots (1999 Nebraska Beef Report, pp. 57-59) found an average of 540 lb variation in final weight and .89 inch variation in 12th rib fat depth within a pen at slaughter. If cattle are sold using a value-based marketing system, sorting or topping-off of cattle in a pen at market time may be beneficial. Sorting off the fatter cattle and marketing them early should help reduce yield grade 4 discounts. Additional time on feed for the remaining cattle in the pen should increase the percentage of carcasses grading USDA Choice and the overall pounds of carcass sold from the pen. Ideally, more pounds of higher grading carcasses would be sold from the pen, resulting in increased profitability.

There are two primary concerns with a system of topping-off pens of finished cattle. The first is the reduced number of cattle occupying a pen after the initial sort. The reduced yardage and efficiency of pen space needs to be weighed against

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the additional profitability of the cattle. The second concern is the quality of cattle remaining in the pen after the first or second sort. These cattle are leaner than pen-mates after the same days on feed. This leads to the questions if these leaner cattle are poor performers. If these cattle are in fact poor performers, then feeding them for additional days may not be economical. We have summarized data from both research and commercial pens of cattle to address this concern.

Procedure

Two sources of data were summarized in order to evaluate performance differences between cattle with differing degrees of finish at market time. One source of data was from large-pen commercial feedlots. Because individual intake and feed efficiencies cannot be determined with the large-pen data, data also were summarized from individually fed finishing steers at the University of Nebraska.

In the large-pen study, eight pens of cattle (1668 total head) in five commercial feedlots in Nebraska were used. Cattle were individually identified and weighed at processing or reimplant time. All pens of cattle were processed and fed according to the respective feedlot's normal procedures. At market time, each pen was sold as an entire pen when each feedlot determined they were finished. Carcass data were gathered on all animals at commercial slaughter facilities. Final weights were determined using carcass weight adjusted to a calculated dressing percentage.

In the individually fed study, 10 research trials were summarized using 431 finishing steers. All steers were individually fed using Calan electronic gates. Trials and treatments within trials were only used if no treatment effects were observed. In all trials at the University of Nebraska, initial weights were measured on two consecutive days. Final weights were calculated using carcass weight adjusted to a calculated dressing percentage.

In both the large-pen and individually fed studies, cattle within a pen or trial, respectively, were ranked by 12th rib fat depth. Cattle then were divided into four groups within each pen or trial. Sort 1 represents the fattest 25% of the cattle, Sort 2 represents the second fattest 25%, Sort 3 represents the third fattest 25%, and Sort 4 represents the leanest 25% of the cattle. Performance and carcass data then were summarized within sort group of each pen or trial. It is important to note that all cattle within a pen or trial were slaughtered at the same time, with the same days on feed. Our objectives were to compare the performance of each sort group and to determine if sorting or topping-off of the pens may have been beneficial. We also wanted to determine if the leanest cattle within a pen are poor performers.

Table 1. Summarized data from large-pen study.

		Sort Group[a]				
	All	1	2	3	4	SEM
Head count	1668	420	419	415	414	—
Fat depth, in.[b]	.42	.62	.46	.36	.23	.04
Processing weight, lb	854	867	860	852	836	27
Carcass wt, lb[b]	769	787	777	764	749	11
Daily gain, lb[c]	3.62	3.46	3.63	3.64	3.77	.15
Yield grade[b]	2.7	3.4	2.8	2.5	2.0	.1
%Choice or higher[b]	46.3	64.0	54.1	39.3	27.6	6.8

[a]All = whole pen averages, 1 = fattest 25% of pen, 2 = second fattest 25%, 3 = third fattest 25% ,and 4 = leanest 25%.
[b]Linear effect across Sort Groups ($P < .01$).
[c]Linear effect across Sort Groups ($P = .16$).

Table 2. Summarized data from individually-fed study.

		Sort Group[a]				
	All	1	2	3	4	SEM
Head count	431	111	109	106	105	—
Fat depth, in.[b]	.40	.57	.43	.34	.25	.03
DM intake, lb[c]	22.4	23.1	22.9	22.0	21.5	.7
Daily gain, lb	3.60	3.57	3.64	3.54	3.97	.28
Feed/gain	6.17	6.45	6.25	6.17	5.85	.01
Adjusted feed/gain[d]	6.22	6.27	6.25	6.29	6.08	—

[a]All = whole trial averages, 1 = fattest 25% of trial, 2 = second fattest 25%, 3 = third fattest 25%, and 4 = leanest 25%.
[b]Linear effect across Sort Groups ($P < .01$).
[c]Linear effect across Sort Groups ($P = .06$).
[d]Feed/gain adjusted to a common .43 inches fat depth.

Results

Results from the large-pen study are shown in Table 1. On average, the eight pens of cattle had a processing weight of 854 lb, were fed for 111 days, and gained 3.62 lb per day. Average carcass characteristics were: 769 lb hot carcass weight, .42 inch 12th rib fat depth, 2.7 yield grade, and 46.3% Choice or higher in quality grade. Feed efficiency is not reported because intake cannot be separated for the respective sort groups. When the data were separated into the four sort groups, average 12th rib fat depths were .62, .46, .36, and .23 inches for Sorts 1, 2, 3 and 4, respectively. Processing weight numerically decreased, while carcass weight, yield grade and percentage Choice decreased linearly ($P < .01$) from Sort 1 to 4. However, average daily gain numerically increased ($P = .16$) from Sort 1 to 4.

The results for the individually fed study are shown in Table 2. On average, the 431 individually fed steers consumed 22.4 lb of feed (DM basis), gained 3.60 lb per day, with a feed conversion of 6.17. When the data were separated into the four sort groups, 12th rib fat depth was .57, .43, .34, and .25 inch for Sort 1, 2, 3, and 4, respectively. Dry matter intake decreased linearly ($P = .06$) from Sort 1 to 4. Average daily gain was not different ($P = .67$) across sort groups.

Feed conversion numerically decreased (P = .22) from Sorts 1 through 4.

Both the large-pen and individually fed studies provide useful information concerning sorting of finished feedlot cattle. The results from the large-pen study suggest leaner cattle within a pen were lighter weight going on feed and at market time. The leaner cattle may have received a premium for yield grade, but would have received substantial discounts for quality grade. Although feed efficiency cannot be calculated, the average daily gains suggest it may have been profitable to feed the leaner groups of cattle for additional days. The results of the individually fed study provides information regarding the feed efficiencies of leaner cattle within a pen. Leaner cattle at slaughter tended to be more efficient, which is logical because fat takes more energy to deposit than lean tissue.

It is important to note although feed efficiency of leaner cattle is greater than their fatter pen-mates at slaughter, the feed efficiency of these leaner cattle will decrease if they are fed longer. In order to estimate the magnitude of this decrease, we summarized data from 57 pens of cattle which were randomly slaughtered at two time points. These data include pens of calf-fed and yearling steers and heifers. On average, cattle were slaughtered at 87 and 124 days on feed. Twelfth rib fat depths were .35 and .46, respectively, resulting in .003 inch/day rate of fattening. Feed/gain was 7.44 and 7.58, respectively. We calculate that whole feeding period feed/gain would increase by .171% or .013 units per one hundredth inch increase in fat depth. Based on these data, whole feeding period feed/gain would increase by .36% or .03 units per additional week on feed.

Adjusted feed conversions for the individually fed study are shown in Table 2. We chose .43 inches fat depth of group 2 as the target and adjusted feed conversion of the other groups, based on the calculations above, as if they had been sorted and fed for different days in order to achieve this fat depth. Based on our calculated rate of fattening, group 1 would have been marketed approximately 47 days prior to group 2, while groups 3 and 4 would have been fed for 30 and 60 days longer than group 2, respectively. The overall feed/gain for the entire pen increased from 6.17 to 6.22. However, assuming same intakes, 36 more live lb per animal in the entire pen would be sold. In addition, averaged across the pen, cattle grading Choice or better would increase by 10 percentage units (2000 Nebraska Beef Report, pp. 20-22).

Overall conclusions are that leaner cattle within a pen are likely performing better than their fatter pen-mates at slaughter, and therefore, may benefit from additional days on feed. In these two data sets, the leanest cattle within a pen do not appear to be poor performers. Therefore, sorting or topping-off a pen a cattle at market time should increase the overall return for the pen if they are sold on a value based marketing system.

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