Performance and Economics of Sorting Yearling Steers by Feedlot Initial Body Weight

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Summary

Four groups of long yearling steers were used to evaluate the effect of sorting by feedlot initial body weight on performance and feedlot economic variables during the feeding period. Steers were sorted into the lightest 25%, middle 50%, and heaviest 25%, along with a non-sorted control. Steers were marketed by sort treatment: heavy two weeks prior, middle one week after, and light three weeks after the unsorted control steers. Sorting did not affect dry matter intake, average daily gain, marbling, 12th rib fat thickness, USDA yield and quality grades, or economic analysis; however, sorting did increase days on feed, feedlot final BW, and hot carcass weight.

Introduction

Yearling production systems can be plagued with overweight carcasses because cattle are larger at arrival and perform well during finishing. MacDonald et al. (*2003 Nebraska Beef Report*, pp.65-68) utilized a two-way sorting system to sort yearling steers to decrease overweight carcasses and increase carcass uniformity. While in their study, overweight carcasses were not reduced, sorting did result in increased carcass uniformity. However, there was no increase in overall carcass weight or profitability. In addition, MacDonald et al. (*2003 Nebraska Beef Report*, pp. 61-65) found the best correlation (r = .83) to predict the final BW of long yearling feedlot fed steers was feedlot initial BW compared to winter initial BW and grass initial BW.

Cooper et al. (*1999 Nebraska Beef Report*, pp. 57-59) found re-implant BW to be a good indicator of carcass weight for long-fed steers. In addition, Cooper et al. (*2000 Nebraska Beef Report*, pp. 43-45) analyzed data from individually fed animals. Ranking these animals from leanest to fattest at slaughter, they found leaner animals to be lighter but gaining well at the time of slaughter, which suggests light animals may benefit from additional days on feed.

In terms of carcass finish, Brethour (*2000 Journal of Animal Science*, 78:2005) utilized serial ultrasound measurements to estimate development of 12th rib back-fat thickness. Results indicated 25% of cattle were fed too long and another 25% were not fed long enough.

Objectives of this research were to compare the performance and feedlot economics of sorting steers by feedlot initial BW to an unsorted control in a long yearling production system.

Procedures

Yearling Steer Development

Two experiments were conducted over a two-year period. In the fall of each year 200 steer calves were purchased. One hundred steers each were placed into one of two different long yearling steer production systems. The systems are described in another article (Folmer et al., *2005 Nebraska Beef Report*, pp. 68-72).

Sorting

In both systems, after their respective summer grazing periods, steers were weighed and stratified into two BW groups of 50 steers, with equal average initial BW, variation, and standard deviation. Then steers in the sorting treatment were assigned to a group by dividing the steers into one of two replications. Steers were then put into one of three sort groups: heavy sort treatment contained 12 steers or 6 steers per replication, middle sort treatment contained 26 steers or 13 steers per replication, light sort treatment contained 12 steers or 6 steers per replication, and the unsorted control contained 50 steers or 25 steers per replication. Steers in the unsorted control were fed for an average of 91 days. Steers in the heavy sort group were fed for an average of 77 days and were marketed two weeks prior to the unsorted control steers. Because the heaviest steers were removed, the middle sort group were fed an average of 98 days and marketed one week after unsorted controls. Steers in the light sort group were fed for an average 112 days and were marketed three weeks later than the unsorted controls.

Economic Analysis

Feedlot finishing economics were based on a finishing diet cost of $115.38/ton (DM; using 10-year average prices for ingredients) and days on feed. Feedlot in price was $76.21/cwt for 900-1000 lb steers and was calculated from 7-year average prices for July to September (Feuz and Burgener, *2004 University of Nebraska Cooperative Extension Bulletin*, PHREC 04-21). Live sale price ($70.08/cwt) was calculated from 7-year averages for the months of September through December (Feuz and Burgener, *2004 University of Nebraska Cooperative Extension Bulletin*, PHREC 04-21). Feedlot break-even was calculated by dividing total cost by the final live BW. Live profit or loss was calculated by subtracting the live break-even from

Table 1. Feedlot performance of sorted and unsorted steers.

Item	Control	Sorted	Difference	SE	*P*-value
Initial BW, lb	971	9798.0	16.6	0.39	
Final BW, lb	1352	1378	26.0	6.06	0.01
DMI, lb	28.6	28.2	0.4	0.63	0.18
Daily gain, lb	4.16	4.09	0.07	0.13	0.49
Feed/gain	6.91	6.93	0.02	0.35	0.86
Days fed	92	98	6.0	2.73	0.12

Table 2. Carcass characteristics of sorted and unsorted steers.

Item	Control	Sorted	Difference	SE	*P*-value
Carcass wt., lb	852	868	16.0	3.81	0.01
Yield grade	2.43	2.41	0.02	0.07	0.73
Fat thickness, in.	0.42	0.46	0.04	0.03	0.14
Marbling[a]	491	498	7.0	6.95	0.50
Longissmus, sq. in.	14.3	14.1	0.2	0.40	0.45
% Choice	43.9	44.1	0.2	5.86	0.97
% Select	56.3	55.9	0.4	5.87	0.96
% Yield grade 4+	1.0	0.9	0.1	0.77	0.91
% Heavy	9.1	1.5	7.6	2.48	< 0.01

[a]Marbling score = 400 = Slight^0, 500 = Small^0 etc.

Table 3. Feedlot economics of sorted and unsorted steers.

Item	Control	Sorted	Difference	SE	*P*-value
Live break, $[ab]	73.58	73.69	0.1	0.42	0.76
Live p/l, $[c]	-37.76	-39.93	2.17	5.51	0.66
Carcass break, $	116.78	116.97	0.19	0.67	0.75
Quality p/l, $d	-39.78	-37.37	2.41	5.87	0.77
Yield p/l, $	-28.53	-26.70	1.83	6.46	0.79
Commodity p/l, $	-38.98	-37.14	1.84	5.69	0.81

[a]All prices on a cwt basis.
[b]Calculated from an initial price of 7-year average price of $76.21/cwt for 900-1000 lb steers, and $115.38 /ton (DM) ration cost.
[c]Live sale price $70.08/cwt; p/l = profit or loss.
[d]Carcass Base Price of $112.27/cwt.

the 7-year average price.

In addition to live sale economics, a marketing grid profitability analysis was performed. Based on three different carcass grid-pricing scenarios, profit or loss for each treatment on each grid was calculated. The analysis used three different grids, consisting of a quality-rewarding grid, a yield-rewarding grid, and a commodity grid, as proposed by Feuz (*2002 Nebraska Beef Report* pp.39-41). Premiums and discounts for each grid are reported in another article (Folmer et al., *2005 Nebraska Beef Report*, pp. 68-72). Profitability was calculated from a 7-year average (Feuz and Burgener, *2004 University of Nebraska Cooperative Extension Bulletin*, PHREC 04-21) dress base price ($112.27 /cwt) with individual grid premiums and discounts applied. Grid profit or loss was calculated from a carcass breakeven calculated as with live breakeven, with hot carcass weight instead of final BW as the multiplier.

Results

Performance

Steer performance results are presented in Table 1. Initial BW for the feedlot phase was not different ($P = 0.39$), however feedlot final BW was significantly greater ($P < 0.01$) for sorted steers (1378 lb) compared to unsorted control steers (1352 lb). Dry matter intake ($P = 0.18$), feed conversion ($P = 0.49$), and daily gain ($P = 0.86$) did not differ between sorting treatments. Due to the nature of the marketing strategy, days on feed increased from 92 days for the unsorted control compared to 98 days for sorted steers.

Steer carcass characteristics are presented in Table 2. Carcasses of steers in the unsorted control and sorted treatments did not differ in USDA yield grade ($P = 0.50$), 12th rib fat thickness ($P = 0.78$), marbling score ($P = 0.60$), or ribeye area ($P = 0.45$). However, due to the increases in ADG and final BW, hot carcass weight was significantly ($P < 0.01$) increased by 16 lb for the sorting treatment. Sorting steers also had no effect on the percentage of USDA choice, select, or yield grade 4 and 5 carcasses. However, sorting steers by feedlot initial BW and marketing them accordingly, significantly ($P < 0.01$) reduced heavy weight carcasses from 9.1% for the unsorted control steers to 1.5% for the sorting treatment.

Economics

Feedlot economics are summarized in Table 3. Due to increased days on feed, feedlot yardage and feed costs increased for the sorted treatment. Increased costs for the sorting treatment resulted in no differences in live breakeven ($P = 0.70$) or live feedlot profitability ($P = 0.62$). In addition, the increased costs of the sorting treatment, along with no differences in carcass characteristics, resulted in no differences in carcass breakeven ($P = 0.70$) and no differences in profitability when marketed on the quality rewarding ($P = 0.78$), yield rewarding ($P = 0.80$), or the commodity ($P = 0.80$) marketing grids.

Results of this experiment indicate sorting long yearling steers by initial feedlot BW may allow for increased average days on feed, and increased sale weights, while avoiding discounts. However, due to an increase in days on feed, and costs incurred with increased days on feed, sorting did not translate into an economic advantage in this study.

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