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## SOUTH DAKOTA RETAINED OWNERSHIP DEMONSTRATION

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### CATTLE 93-18

#### Summary

Three hundred eighty-eight calves representing 59 cow-calf producers were consigned to a custom feedlot. Steer calves consigned in October weighed 601 lb initially, gained 3.03 lb per head daily, and averaged 1148 lb at slaughter after an average of 182 days on feed. Average cost of gain and profitability were \$53.94 per cwt and \$90.38 per head, respectively. Steers consigned in January weighed 775 lb initially, gained 3.31 lb per head daily, and averaged 1245 lb at slaughter after 142 days on feed. Average cost of gain and profitability were \$50.67 per cwt and \$55.66 per head, respectively. Heifers consigned in January weighed 718 lb initially, gained 3.10 lb per head daily, and averaged 1123 lb at slaughter after 131 days on feed. Average cost of gain and profitability were \$52.39 per cwt and \$64.59 per head, respectively. Average daily gain, dressing percentage, quality grade, and cost of gain appeared to impact profitability. Quality grade was especially important for cattle consigned in January. These cattle were sold later in the season when the choice-select price margin was wider as compared to the spread of early marketed cattle consigned in October.

Key Words: Retained Ownership, Feedlot Performance, Feedlot Profitability

#### Introduction

Retained ownership of feeder calves has been shown to consistently improve profitability of cow-calf operations. Average profit for cattle enrolled in the first 2 years of the South Dakota Retained Ownership Demonstration were \$26.00 per head. The range in profitability for all of the groups of five was from -\$63.72 to \$131.36. An understanding of factors influencing the profitability of retained ownership is essential in order to successfully use retained ownership as a market alternative.

The overall objective of this multi-year program is to evaluate retained ownership as a marketing alternative for cow-calf producers. This report summarizes data from the third year of the project.

#### Materials and Methods

Eighteen cow-calf producers consigned 31 groups of five steer calves to a custom feedlot<sup>4</sup> in mid-October of 1992.

Thirty-one cow-calf producers consigned 34 groups of five steer calves to the feedlot at the end of January 1993. Twelve cow-calf producers consigned 13 groups of five heifer calves to the feedlot at the end of January 1993. These cattle had been weaned in the fall and backgrounded at home prior to feedlot arrival.

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Processing procedures included weighing, measuring hip height, and determining initial fat thickness with an ultrasound unit on all cattle that arrived in the fall. Cattle that arrived in the winter were not measured for hip height or initial fat thickness.

All cattle were treated with Ivomec<sup>5</sup> to control parasites and implanted with Synovex-S<sup>6</sup> (steers) or Synovex-H<sup>6</sup> (heifers). All calves received 7-way clostridial bacterin and were vaccinated for IBR, BVD, PI<sub>3</sub>, BRSV, and Hemophilus somnus. Cattle that arrived in the fall were given the appropriate booster

vaccinations on day 21 in the lot and were reimplanted in late January. Cattle that arrived in late January were not given booster vaccinations and were not reimplanted.

Following processing all cattle were fed long stem alfalfa grass hay and the October calves were fed a commercial receiving feed<sup>7</sup>. The winter cattle received a growing ration (Table 1). Over a several day period as the fall cattle became accustomed to eating at the bunk, the hay was removed and the receiving feed was increased until cattle were eating about 3% of their body weight. At this point, a growing ration

Table 1. Composition of diets fed to cattle

Item	Diet		
	Grower	Winter finisher	Final finisher
Ingredient <sup>a</sup>			
Mixed silage <sup>b</sup>	63.68	28.24	23.44
High moisture corn	--	13.43	14.35
Rolled corn	33.06	53.73	57.40
Supplement <sup>c</sup>	3.07	4.41	4.62
Mineral	.19	.19	.19
Nutrient <sup>d</sup>			
Crude protein, %	13.24	12.94	12.88
Ne <sub>m</sub> , Mcal/cwt	85.26	92.83	94.85
NE <sub>g</sub> , Mcal/cwt	53.00	60.47	62.47
Calcium, %	.75	.62	.59
Phosphorus, %	.36	.37	.38
Vitamin A, IU/lb	4485	3549	3323
Rumensin, g/ton	21.5	22.5	23.0

<sup>a</sup>Percentage, as fed.

<sup>b</sup>Approximate as fed composition: corn 33.3%, cane 33.3%, and alfalfa 33.3%.

<sup>c</sup>Sup-R-Lix, Purina Mills, Inc.

<sup>d</sup>Dry matter basis.

<sup>5</sup>Product of MSDAGVET, Rahway, NJ.

<sup>6</sup>Product of Syntex Animal Health, West Des Moines, IA.

<sup>7</sup>Pre-Con, product of Purina Mills, Inc., St. Louis, MO.

gradually replaced the receiving feed. Calves were then stepped up through a series of intermediate diets until the cattle were on a winter finishing ration (Table 1) by day 30 in the feedlot. They received this ration until early March when they were switched to the final finishing ration. Over a couple of day period as intake by the winter cattle increased, the hay was removed from the diet and cattle were stepped up through a series of intermediate rations to the winter finisher diet. In early March these cattle were also switched to the final finishing ration.

Since all cattle were fed in one of three pens, individual feed bills were calculated from performance data according to equations published by the National Research Council. Cattle were weighed approximately every 6 weeks. Ration energy density was calculated for each feeding program from the average performance for each pen. An estimate of individual intake was calculated for each calf using calf weight, daily gain, and ration energy density.

Feed, yardage, and veterinary bills were financed through a commercial bank<sup>8</sup>. Death loss for each pen was shared by all participants in the pen. Producers were sent periodic progress reports and copies of their feed bills. Each group of five cattle was slaughtered when three from the group appeared to reach .4 inch of fat over the 12th rib.

### Results and Discussion

A wide variety of cattle types were represented in the program. Initial weight, hip height, and fat thickness are displayed in Table 2. Cattle placed on feed in October averaged 601 lb and ranged from 414 to 844 lb. They averaged 45.59 inches tall at the hip and carried .16 inch of backfat. Cattle placed on feed in January had been weaned in the fall and backgrounded at the ranch prior to feedlot

arrival. Steers averaged 775 lb, while heifers averaged 718 lb.

Feedlot performance information is shown in Table 3. Cattle were weighed full the day prior to slaughter. Slaughter weight for each steer was computed by applying a 4% pencil shrink to this full weight. Slaughter weight was greater for the January steers as compared with the January heifers or October steers (1245 vs 1123 and 1148 lb, respectively). Average daily gain was also greater for January steers than for the January heifers or October steers (3.31 vs 3.10 and 3.03 lb per head daily, respectively). January heifers were fed fewer days than January steers or October steers (131 vs 142 and 182 days, respectively).

Actual average dry matter intake was 20.56, 23.20, and 22.43 lb per head daily for the October steers, January steers, and January heifers, respectively. Feed to gain ratios were 6.79, 7.01, and 7.24 lb dry matter per pound gain for the October steers, January steers, and January heifers, respectively.

Table 4 shows carcass data collected for the cattle. Carcasses of the January steers were heavier than carcasses of the October steers or January heifers. Dressing percentage, fat thickness, ribeye area, and calculated yield grade were greater for January steers than for October steers or January heifers. Percentage choice carcasses for the October steers, January steers, and January heifers were 53.33, 53.25, and 58.46, respectively.

Table 5 shows the feeding period costs for the cattle. Feed and yardage expenses were greater for the October steers than the January steers or heifers due to additional time on feed. Veterinary and death loss costs were much higher for the October steers than for the January steers or heifers. January cattle were backgrounded at the home ranch and probably

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<sup>8</sup>Tri-County State Bank, Kimball, SD.

Table 2. Initial data for retained ownership cattle

	Weight, lb	Hip height, in.	Fat thickness, in.
October steers			
Average	601	45.59	.16
Range	414-844	42.00-51.50	.08-.28
Standard deviation	71	1.76	.04
Range (5 head)	480-788	42.7-49.75	.10-.22
January steers			
Average	775		
Range	530-1030		
Standard deviation	92		
Range (5 head)	647-966		
January heifers			
Average	718		
Range	544-894		
Standard deviation	88		
Range (5 head)	576-834		

Table 3. Feedlot performance for retained ownership cattle

	Slaughter weight, lb	Average daily gain, lb	Days fed
October steers			
Average	1148	3.03	182
Range	929-1511	1.89-4.22	158-237
Standard deviation	93	.39	23
Range (5 head)	1008-1310	2.40-3.57	158-237
January steers			
Average	1245	3.31	142
Range	1004-1542	1.98-4.75	104-153
Standard deviation	102	.46	13
Range (5 head)	1109-1449	2.73-4.02	104-153
January heifers			
Average	1123	3.10	131
Range	931-1346	2.17-3.98	104-153
Standard deviation	80	.36	22
Range (5 head)	1032-1237	2.73-3.65	104-153

Table 4. Carcass data for retained ownership cattle

	Hot carcass wt, lb	Dressing percent	Fat thickness, in.	Rib eye area, in. <sup>2</sup>	Kidney, heart, and pelvic fat, %	Calculated yield grade, units	Marbling score, units <sup>a</sup>	Percent choice
October steers								
Average	724	63.07	.39	12.70	2.71	2.70	4.91	53.33
Range	576-964	58.93-68.85	.10-.80	10.50-16.40	1.50-4.00	1.32-4.12	3.60-7.10	
Standard deviation	64	1.72	.14	1.16	.53	.53	.53	
Range (5 head)	642-832	60.90-67.04	.23-.59	11.56-14.64	1.88-3.20	2.06-3.32	4.18-5.68	0-100
January steers								
Average	790	63.63	.41	13.15	2.48	2.83	4.82	53.25
Range	616-964	56.31-69.24	.10-.90	9.80-18.20	1.00-3.50	1.13-4.76	3.30-6.50	
Standard deviation	67	1.93	.16	1.37	.52	.69	.54	
Range (5 head)	681-913	58.76-67.16	.23-.68	11.04-15.12	1.70-3.20	1.79-3.98	4.03-5.40	0-100
January heifers								
Average	703	62.63	.39	12.71	2.62	2.60	4.81	58.46
Range	592-783	56.92-66.27	.10-1.00	11.00-15.00	2.00-3.50	1.17-4.42	3.60-6.30	
Standard deviation	56	2.05	.16	1.14	.48	.64	.60	
Range (5 head)	653-804	60.18-65.04	.22-.62	11.34-13.66	2.38-3.00	1.97-3.42	4.15-5.72	0-100

<sup>a</sup>4.00 = Slight<sup>o</sup>, 5.00 = Small<sup>o</sup>.

Table 5. Feeding period costs<sup>a</sup>

Item	October steers	January steers	January heifers
Feed	206.03	180.92	158.73
Yardage	27.35	21.33	19.65
Veterinary	15.08	4.98	4.85
Interest <sup>b</sup>	7.94	2.99	2.47
Trucking <sup>c</sup>	8.06	8.57	7.88
Marketing	1.47	1.47	1.47
Death loss	15.00	0.00	0.00
Total	280.93	220.26	195.05
Feed cost of gain <sup>d</sup> , \$/cwt	39.45	41.49	42.49
Total cost of gain <sup>d</sup> , \$/cwt	53.94	50.67	52.39
Break-even sale price, \$/cwt	75.06	73.58	73.87

<sup>a</sup> Dollars per head.

<sup>b</sup> Interest on feed, yardage, and veterinary expenses only.

<sup>c</sup> Trucking to packing plant only.

<sup>d</sup> Pay weight basis.

experienced most of the death loss and veterinary expenses at home prior to feedlot arrival.

Feed and total cost of gain are expressed on a pay weight to pay weight basis. Feed cost of gain was lowest for the October steers, yet their total cost of gain was greater than that observed for the January cattle. Initial pay weight was assumed to be 4% greater than the initial weight obtained at the feedyard. The full weight obtained the day prior to slaughter less the 4% pencil shrink was assumed to equal finished pay weight. Break-even sale prices were \$75.06, \$73.58, and \$73.87 per cwt for the October steers, January steers, and January heifers, respectively.

Table 6 shows the initial and sale values and profitability of cattle fed in the program. Initial price for the October steers was established by using numerous sale barn reports for the last 3 weeks in October and regressing price on pay weight (Figure 1). The same technique was used for predicting the January prices (Figures 2 and 3). Equations predicting price are displayed in Table 7. No attempt was

made to adjust the initial prices for breed type, frame size, initial condition, or location.

All cattle were sold on a grade and yield basis. Table 8 displays the steer carcass prices that were obtained for the cattle. A seasonal decline in the base choice price and a widening of the choice-select spread was observed. A greater number of the October steers were sold at the earlier marketing dates, resulting in a higher price being paid for these cattle as compared with the January steers or heifers. Likewise, over half of the heifers were sold prior to June 1, while over 80% of the January steers were sold after June 1, resulting in a greater price for the January heifers than the January steers.

Profits, excluding calf interest and trucking to the lot, were \$113.70, \$55.66, and \$64.59 for the October steers, January steers, and January heifers, respectively. If opportunity interest on the calf was 7%, interest charges and profitability would have been \$19.46 and \$94.24, \$18.92 and \$36.74, and \$15.75 and \$48.84 per head for the October steers, January steers, and January heifers, respectively. Annual return on investment

Table 6. Profitability of retained ownership steers and heifers

Item	October steers	January steers	January heifers
Initial pay weight, lb	625	805	746
Price, \$/cwt	89.41	86.62	85.31
Initial value, \$	558.81	697.29	636.41
Hot carcass wt, lb	724	792	712
Price, \$/cwt	131.69	122.88	125.85
Sale value, \$	953.44	973.21	896.05
Profit, \$/head <sup>a</sup>	113.70	55.66	64.59
Annual return on investment, %	40.81	20.49	28.28

<sup>a</sup> Excludes calf interest and trucking to the feedlot.

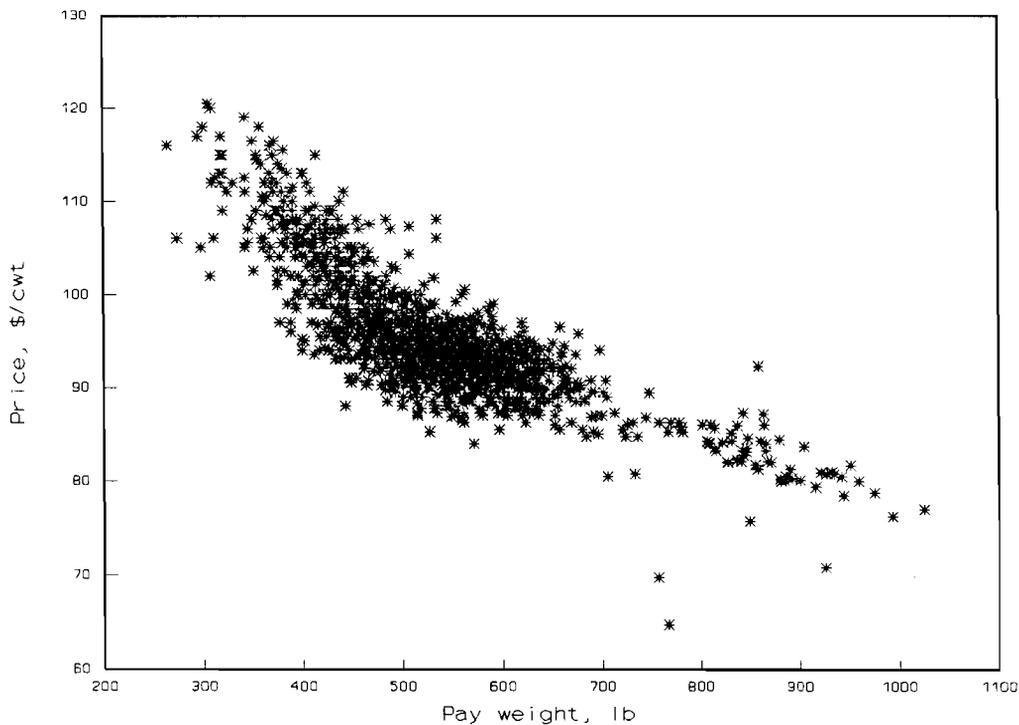


Figure 1. Relationship between price and pay weight of steers for late October 1992.

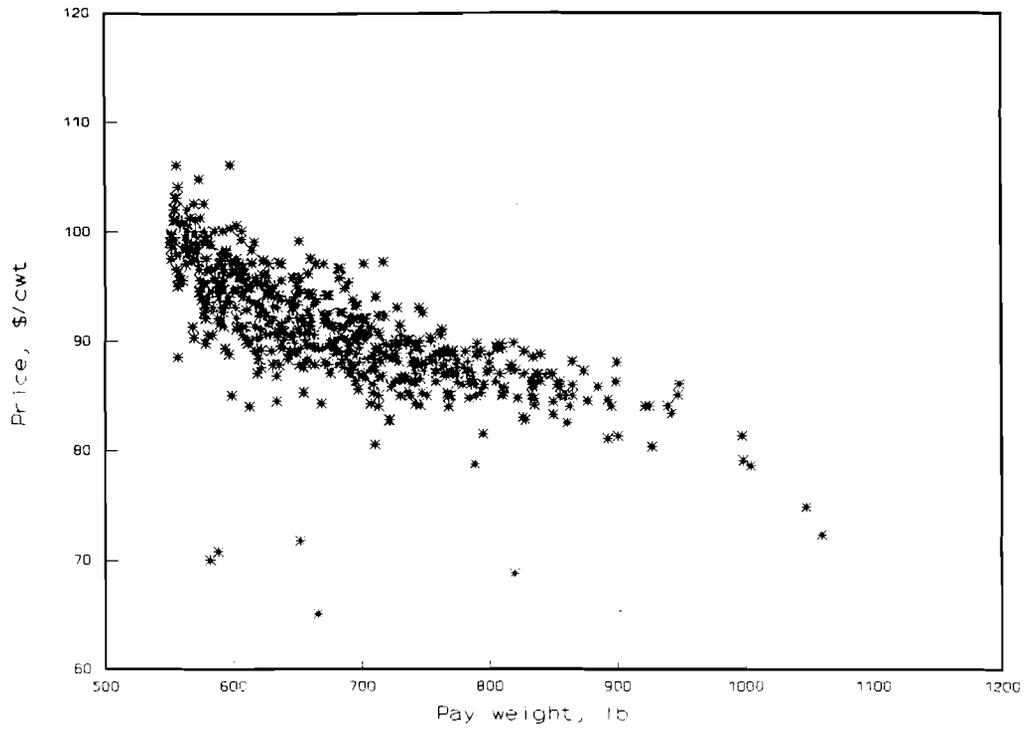


Figure 2. Relationship between price and pay weight of steers for late January 1993.

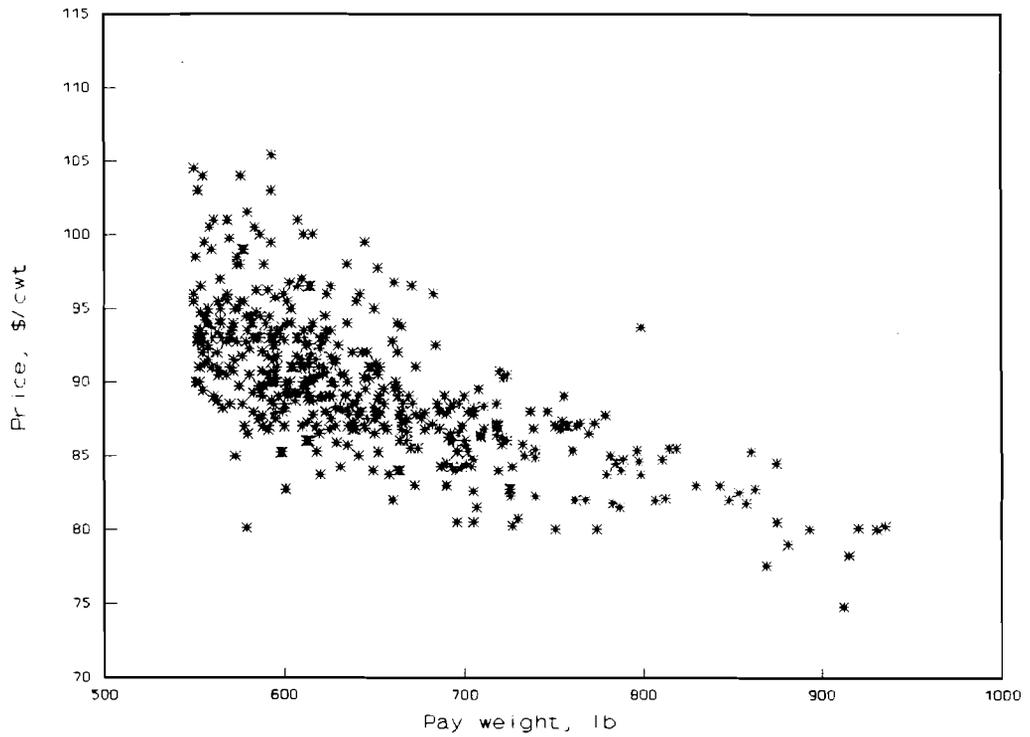


Figure 3. Relationship between price and pay weight of heifers for late January 1993.

Table 7. Equations predicting initial price

Cattle	n	Equation <sup>a</sup>	R <sup>2</sup>	Sy.x
October steers	1683	146.8276 - .13812 wt + .000074 wt <sup>2</sup>	.70	3.4618
January steers	630	151.6995 - .13311 wt + .000064 wt <sup>2</sup>	.55	3.5188
January heifers	489	146.1425 - .12773 wt + .000061 wt <sup>2</sup>	.47	3.4324

<sup>a</sup>Weight = pay weight in lb.

Table 8. Carcass prices paid for cattle

Market date	Number of cattle sold			Base choice price <sup>a</sup>	Select discount <sup>a</sup>	Heifer discount <sup>a</sup>
	October steers	January steers	January heifers			
March 23	39			134.00	2.00	
April 1	43			135.00	3.00	
May 5	58	5	20	134.00	5.00	1.50
May 25		25	15	134.00	10.00	1.00
June 10	10	55		126.00	10.00	
June 24		84	30	126.00	8.00	1.00

<sup>a</sup>\$ per cwt carcass.

(initial calf value) was 40.81, 20.49, and 28.28% for the October steers, January steers, and January heifers, respectively.

The variability in profitability between individual cattle and between groups of five head was tremendous (Table 9). The poorest profitability group of five cattle lost \$14.95 per head. The most profitable group of five cattle made over \$150 per head. Annual return on investment for the groups of five ranged from -6.46 to 57.64%.

Another way to express retained ownership profitability is to use slaughter value and feedlot costs to back calculate the value of the calves when they entered the feedlot. October steers, January steers, and January heifers were worth \$953.44, \$973.21, and \$896.05 per head at slaughter, respectively. Total feeding costs were \$280.93, \$220.26, and \$195.05 per head for the October steers, January steers, and January heifers, respectively. Therefore, the calves were worth \$672.51, \$752.95, and \$701.00 at feedlot arrival for the October steers, January steers, and January heifers, respectively. Average pay

weights on the calves were 625, 805, and 746 lb for the October steers, January steers, and January heifers, respectively. Thus, October steers were worth \$107.60 per cwt, January steers were worth \$93.53 per cwt, and January heifers were worth \$94.97 per cwt. These values represent premiums of \$14.46, \$6.91, and \$8.66 per cwt above the fed cattle market at time of placement for the October steers, January steers, and January heifers, respectively.

Data from the previous 2 years of this study clearly demonstrated that average daily gain, dressing percentage, quality grade, and total cost of gain were the most important factors contributing to profitability. Tables 10, 11, and 12 illustrate how these and other variables impacted profitability in this latest year's data. Average daily gain, dressing percentage, and quality grade were greater for higher profit cattle than lower profit cattle. Total cost of gain was greater for lower profit steers than higher profit steers. However, cost of gain appears to not be an important source of variation in profit for the heifers.

Table 9. Variation in profitability

	Profit, \$/head	Annual return, %	Fall calf premium, \$/cwt
October steers			
Average	113.70	40.81	18.41
Range	-26.81-217.27	-8.40-74.62	-4.07-32.36
Standard deviation	42.23	15.27	6.78
Range (5 head)	52.86-177.36	16.66-58.01	11.95-26.32
January steers			
Average	55.66	20.49	6.91
Range	-78.02-214.39	-32.44-93.96	-12.85-27.49
Standard deviation	50.93	19.97	6.46
Range (5 head)	-14.95-134.65	-6.46-57.64	-2.59-16.71
January heifers			
Average	64.59	28.28	8.66
Range	-65.73-159.79	-24.49-82.85	-8.66-19.25
Standard deviation	39.80	18.57	5.23
Range (5 head)	44.72-104.64	19.28-54.66	5.64-13.18

Table 10. Value of select variables for low, middle, and high profit groups of October placed calves

Variable	Profit group		
	Low 1/3	Mid 1/3	High 1/3
Profit, \$/head	64.08	114.52	158.26
Average daily gain, lb	2.75	3.10	3.23
Initial weight, lb	594	601	609
Finished weight, lb	1103	1149	1193
Dressing percent	62.13	62.86	64.23
Days fed	187	178	182
Cost of gain, \$/cwt	55.57	53.22	53.02
Percentage choice	34	58	68

Table 11. Value of select variables for low, middle, and high profit groups of January steers

Variable	Profit group		
	Low 1/3	Mid 1/3	High 1/3
Profit, \$/head	-1.34	56.19	117.24
Average daily gain, lb	3.14	3.29	3.51
Initial weight, lb	782	767	775
Finished weight, lb	1234	1231	1269
Dressing percent	63.42	63.44	64.17
Days fed	144	141	141
Cost of gain, \$/cwt	51.82	50.55	49.66
Percentage choice	13	51	96

Table 12. Value of select variables for low, middle, and high profit groups of January heifers

Variable	Profit group		
	Low 1/3	Mid 1/3	High 1/3
Profit, \$/head	19.52	64.27	112.76
Average daily gain, lb	2.90	3.22	3.17
Initial weight, lb	675	752	725
Finished weight, lb	1088	1143	1134
Dressing percent	62.57	63.24	64.32
Days fed	143	121	130
Cost of gain, \$/cwt	52.01	53.13	52.03
Percentage choice	43	32	100

Carcass quality was more important in the cattle placed in the feedlot in January as compared to cattle placed in October. This was most likely due to the wide choice-select spread at late marketing dates when most of the January cattle were sold as compared with the narrow choice-select spread at early marketing dates when most of the October cattle were sold.

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