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## SOUTH DAKOTA RETAINED OWNERSHIP DEMONSTRATION

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### CATTLE 91-23

#### Summary

Three hundred forty-five steer calves representing 53 cow-calf producers were consigned to a custom feedlot in late October. Cattle were fed in one of two pens. One pen of calves received a moderate roughage growing diet for 39 days and then were switched to a high energy finishing diet (ACC). The other pen of calves received a moderate roughage growing diet for 109 days and then were switched to a high energy finishing diet (TWO). The ACC calves weighed 574 lb initially, gained 2.94 lb per head daily and were slaughtered at 1147 lb after an average of 196 days on feed. Average cost of gain and profitability were \$52.31 per cwt and \$38.75 per head, respectively. The TWO calves weighed 504 lb initially, gained 2.77 lb per head daily and were slaughtered at 1096 lb after an average of 214 days on feed. Average cost of gain and profitability were \$52.72 per cwt and \$16.69 per head, respectively. Cattle slaughtered later in the spring were less profitable than cattle slaughtered earlier in the spring due to a weaker cattle market and wider choice-select price spread. Across either feeding program, average profits for cattle slaughtered after 170, 192, 199, 200 and 242 days on feed were \$50.03, \$64.42, \$28.69, \$27.39 and -\$16.78 per head, respectively.

(Key Words: Retained Ownership, Feedlot Performance, Feedlot Profitability.)

#### Introduction

Historically, the profitability of cow-calf operations has been low. Iowa State University's Beef Cow Business Record Program showed that the average profit per cow for the 5 years from 1982-86 was -\$60.10. From 1971 through 1984, net profits per cow averaged -\$56.93 in a University of Missouri study. Kansas State University showed a \$4.89 per cow average profit for the 14 years from 1974 through 1988.

Cow-calf producers have three options to increase gross returns to the cow herd. One strategy is to wean more calves either through improved reproductive performance or by running more cows. Another strategy would be to wean heavier calves. These strategies may require considerably more inputs such as land, labor, feed, veterinary supplies and financing. The third strategy would be to improve the marketing of the calf crop.

One marketing alternative for cow-calf producers is to retain ownership of the calf crop beyond the traditional sale at weaning. This strategy adds value to the existing calves and requires only additional financing, tax planning and risk management if the cattle are fed in a custom feedlot. When examined over a period of several years, retained ownership of feeder calves has been shown to consistently improve profitability of cow-calf operations through either an

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increase in net returns per cow or through minimizing losses in some years.

The overall objective of this program is to demonstrate and evaluate retained ownership as a marketing alternative for cow-calf producers. Specific objectives include:

1. Enable cow-calf producers unfamiliar with retained ownership to gain experience concerning cattle feeding and marketing.
2. Enable cow-calf producers interested in retained ownership to collect feedlot performance and carcass merit information from a portion of their calf crop.
3. Generate a data base of economic and performance information from retained ownership.
4. Develop educational material aimed at cow-calf producers, cattle feeders and agricultural lenders describing retained ownership and custom feeding.

#### Materials and Methods

Fifty-three cow-calf producers consigned 69 groups of five steer calves to a custom feedlot<sup>6</sup> in late October of 1990. Eighty-five calves arrived at the lot the evening prior to processing and were allowed access to water overnight. The remaining calves were processed upon arrival.

Processing procedures included weighing, measuring hip height and determining initial fat thickness with an ultrasound instrument. All calves were treated with IVOMEC<sup>7</sup> to control parasites and

implanted with Synovex-S<sup>8</sup>. They received 7-way clostridial bacterin and were vaccinated for IBR, BVD, PI<sub>3</sub>, BRSV and Hemophilus Somnus.

Following processing, the ACC and TWO calves were placed in separate pens. Both groups were fed long stem alfalfa-grass hay and a commercial complete receiving feed<sup>9</sup>. Over a several day period as cattle became accustomed to eating at the bunk, a growing ration (Table 1) gradually replaced the hay. The commercial receiving feed was increased until the calves were eating about 3% of their body weight (17 lb/head daily). At this point, additional growing ration gradually replaced the receiving feed.

Two hundred fifty-five calves were fed the growing diet until day 39. Then they were switched to a winter finishing diet (Table 1) on which they remained until they were fed the final finishing diet (Table 1) from early February through slaughter. Ninety calves were fed the growing diet until day 109. They were switched to the final finishing diet by early March and remained on it until slaughter.

Since all cattle were fed in one of two pens, individual feed bills were calculated from performance data according to equations published by Owens et al. (1984). Cattle were weighed monthly<sup>10</sup>. Ration energy density was calculated for each feeding program from the average performance for each pen. Individual intake was then 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>11</sup>. Death loss was shared by all participants. Producers were sent monthly progress reports and copies of their feed bills. Each group of five cattle were slaughtered when three steers from that group reached an anticipated low choice grade.

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<sup>6</sup>R and L Feedyard, Kimball, SD.

<sup>7</sup>Product of MSDAGVET, Rahway, NJ.

<sup>8</sup>Product of Syntex Animal Health, West Des Moines, IA.

<sup>9</sup>Pre-Con, Product of Purina Mills, Inc., St. Louis, MO.

<sup>10</sup>Deviations existed due to periods of inclement weather.

<sup>11</sup>Tri-County State Bank, Kimball, SD.

TABLE 1. COMPOSITION OF DIETS FED TO STEERS

Item	Diet		
	Grower	Winter Finisher	Final Finisher
Ingredient <sup>a</sup>			
High moisture corn		14.00	15.32
Cracked corn	24.11	47.98	51.70
Corn silage	61.72	33.59	28.72
Alfalfa hay	11.57		
Supplement <sup>b</sup>	2.41	3.84	4.07
Mineral	.19	.19	.19
Nutrient <sup>c</sup>			
Crude protein, %	12.53	12.26	12.36
NE <sub>m</sub> , Mcal/cwt	77.55	92.77	93.74
NE <sub>g</sub> , Mcal, cwt	47.67	61.30	62.10
Calcium, %	.78	.54	.53
Phosphorus, %	.33	.37	.37
Vitamin A, IU/lb	4545	3208	3158
Rumensin, g/ton	18.50	24.00	24.40

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

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

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

### Results and Discussion

A wide variety of cattle types were represented in the program. Straightbreds or crosses of the following breeds were consigned: Amerifax, Angus, Belgian Blue, Charolais, Chianina, Continental, Gelbveih, Hereford, Limousin, Polled Hereford, Red Angus, RX3<sup>12</sup>, Salers, Simmental, South Devon and Tarentaise.

Initial weight, hip height and fat thickness is displayed in Table 2. Generally, cattle placed in the accelerated finishing program were taller at the hip ( $P < .0001$ ) and heavier ( $P < .0001$ ) than cattle placed in the two phased program (45.02 in. and 574 lb vs 43.23 in. and 504 lb, respectively). There were a few steers of all sizes and weights in each pen. Steers in both programs carried similar levels of condition.

Feedlot performance information is shown in Table 3. Slaughter weight for each steer was computed by first regressing shrunk weight for each weigh day on days on feed. Then, the weight of the steers at each slaughter date was calculated from the best fit equation<sup>13</sup>. All cattle were slaughtered between 1 and 9 days following weighing. Slaughter weight was greater ( $P < .0001$ ) for steers on the accelerated program as compared with steers on the two phase program (1147 vs 1096 lb). Average daily gain was also greater ( $P < .0001$ ) for steers on the accelerated finishing program than for steers on the two phase program (2.94 vs 2.77 lb per head daily). Accelerated steers were fed an average of 196 days, while two phase steers were fed an average of 214 days ( $P < .0001$ ).

<sup>12</sup>A composite breed of Red Angus, Hereford and Red Holstein.

<sup>13</sup> $R^2$  for the best fit linear equations for all steers was between .92 and .99.

TABLE 2. INITIAL WEIGHT, HIP HEIGHT AND FAT THICKNESS OF PROGRAM STEERS

	Weight, lb	Height, in.	Fat thickness, in.
Accelerated program			
Average	574	45.02	.10
Range	380-790	41.00-50.00	.02-.20
Standard deviation	70	1.61	.03
Two phase program			
Average	504	43.23	.10
Range	375-660	40.00-48.25	.02-.20
Standard deviation	59	1.69	.04

TABLE 3. FEEDLOT PERFORMANCE OF STEERS

Pen	Item	Slaughter weight	Average daily gain	Days on feed
Accelerated program	Average	1147	2.94	196
	Range	864-1406	1.90-4.16	170-242
	Standard deviation	99	.35	17
Two phase program	Average	1096	2.77	214
	Range	916-1328	2.03-3.39	199-242
	Standard deviation	99	.29	20

Dry matter intake was 19.54 lb per head daily for the accelerated program steers and 19.24 lb per head daily for the two phase program steers. Feed to gain ratio was 6.65 and 6.95 lb dry matter per lb gain for the accelerated and two phase steers, respectively.

Table 4 shows carcass data collected for the steers. Carcasses of two phase cattle were 28 lb lighter than carcasses of accelerated calves ( $P < .0014$ ). Dressing percentage was higher ( $P < .0037$ ), kidney, heart and pelvic fat percentage lower ( $P > .0001$ ) and fat thickness tended ( $P > .07$ ) to be higher for steers on the two phase program than for steers on the accelerated diet. Cattle in both pens had similar rib eye areas, calculated yield grades and marbling scores. Cattle grading choice in the accelerated pen was 47% compared with 50% for the two phase pen.

Although there appears to be differences in cattle performance and carcass characteristics between the two pens of cattle, these differences may not be due to the different feeding programs. Cattle were not randomly assigned to each pen. Therefore, initial weight, hip height and genetic make-up of the two pens were different. Additional statistical analyses are planned to help identify factors influencing cattle performance and carcass characteristics.

Table 5 shows the feeding period costs for the accelerated and two phase cattle. Feed, yardage and interest expenses were greater for the two phase cattle due to the additional time on feed. Marketing expenses include insurance, check-off and weighing charges. Three steers died and two were sold for salvage. All

TABLE 4. CARCASS DATA FOR STEERS

Pen	Item	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 <sup>a</sup> , units
Accelerated program	Average	734	63.94	.42	12.84	2.47	2.72	4.84
	Range	531-936	57.39-70.43	.10-.90	8.90-17.90	1.50-3.50	.92-4.66	3.50-8.00
	Standard deviation	70	1.90	.15	1.56	.60	.69	.67
Two phase program	Average	706	64.42	.45	12.61	2.21	2.72	4.81
	Range	589-874	61.39-69.04	.20-.80	9.80-16.50	1.00-3.50	1.58-3.91	3.50-6.50
	Standard deviation	68	1.57	.13	1.46	.47	.61	.56

<sup>a</sup> 3.00 = Traces<sup>o</sup>, 4.00 = Select<sup>o</sup>, 5.00 = Small<sup>o</sup>, 6.00 = Modest<sup>o</sup>, 7.00 = Moderate<sup>o</sup> and 8.00 = Slightly abundant<sup>o</sup>.

TABLE 5. FEEDING PERIOD COSTS<sup>a</sup>

Item	Feeding program	
	Accel-erated	Two phase
Feed	223.06	233.84
Yardage	29.35	32.05
Veterinary	8.41	8.33
Interest <sup>b</sup>	7.88	8.37
Trucking	8.84	8.83
Marketing	1.56	1.56
Death loss	7.59	7.59
Total	286.69	300.57
Feed cost of gain, \$/cwt	40.60	40.92
Total cost of gain, \$/cwt	52.31	52.72
Break-even sale price, \$/cwt	75.97	76.53

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

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

were from the accelerated pen. However, all participants in the project shared death loss equally<sup>14</sup>.

Feed cost of gain and total cost of gain are expressed on a pay weight to pay weight basis and were similar for both pens of cattle. Initial pay weight was assumed to be 4% greater than the initial weight obtained at the feedyard. The calculated shrunk slaughter weight was assumed to equal finished pay weight. Break-even sale price was \$75.97 and \$76.53 per cwt for the accelerated and two phase calves, respectively.

Table 6 shows the initial value, sale value and profitability of the program steers. Initial price was computed by using numerous sale barn reports for the last 2 weeks in October 1990 and regressing price on pay weight (Figure 1). The equation predicting price was price (\$/cwt) = 135.4826 - .06226 x weight (lb). Four hundred nineteen observations were used in the regression. The coefficient of determination (R<sup>2</sup>) was

TABLE 6. PROFITABILITY OF RETAINED OWNERSHIP STEERS

Item	Feeding program	
	Accel-erated	Two phase
Initial pay weight, lb	597	524
Price, \$/cwt	98.33	102.84
Initial value, \$	583.47	536.88
Hot carcass weight, lb	734	706
Price, \$/cwt	123.89	121.00
Sale value, \$	908.72	854.14
Profitability, \$/head <sup>a</sup>	38.75	16.69
Annual return on investment, %	12.89	5.65

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

.6040. 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. Average carcass price was slightly higher for the accelerated calves than the two phase calves because they went to market earlier. Prices were stronger and the choice-select spread narrower earlier in the year. Base choice carcass price and the select discount were \$130 and \$5, \$129 and \$7, \$128 and \$8, \$128 and \$8 and \$119 and \$8 for cattle slaughtered after 170 (April 10), 192 (May 2), 199 (May 8), 200 (May 9) and 242 days (June 20) on feed.

Profits excluding calf interest and trucking to the lot were \$38.75 and \$16.69 per head, respectively, for the accelerated and two phase calves. Interest on the calf should be accounted for when evaluating retained ownership profitability. If opportunity interest on the calf was 7%, interest charges and profitability would have

<sup>14</sup>Death loss for the accelerated pen was actually \$10.27 per head and 0 for the two phase pen. Cost of gain was actually \$52.44 and \$51.17 per cwt for the accelerated and two phase pens, respectively.

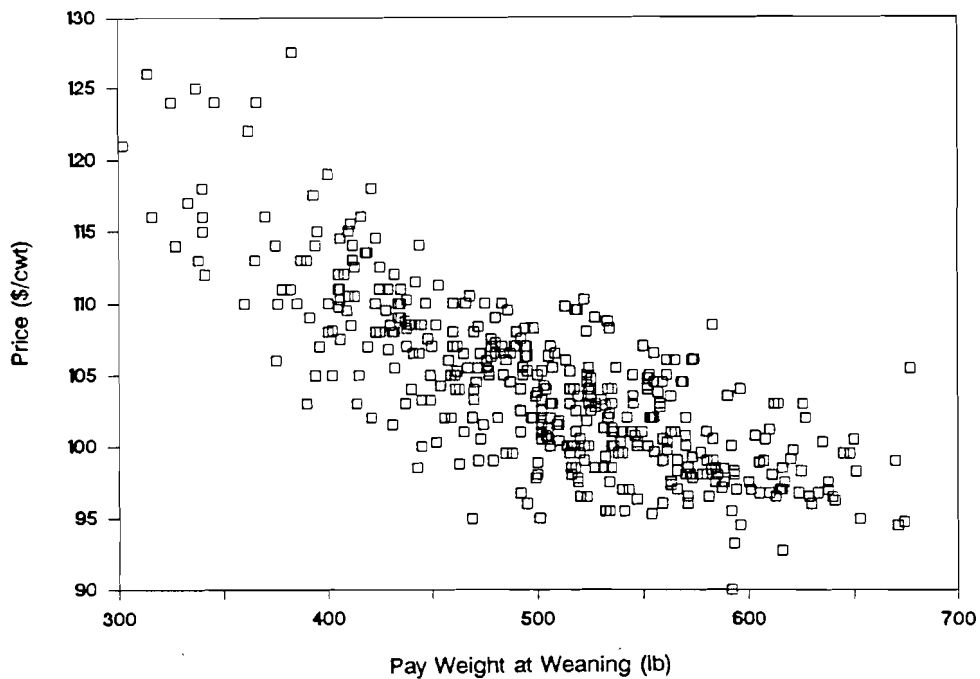


Figure 1. Relationship between price and pay weight.

been \$21.93 and \$16.82 per head for the accelerated calves and \$22.03 and -\$5.34 per head for the two phase calves, respectively. Another way to examine profitability and calf interest is to calculate an annual return on investing the calf in a retained ownership program. Annual return on investment (Initial calf value) was 12.89% and 5.65% for the accelerated and two phase programs, respectively.

The range in cattle profitability between groups of five head within each pen was tremendous. There were 51 groups of cattle in the accelerated pen. Profitability for these groups ranged from -\$56.57 to \$131.36 per head. Forty-four of the groups made a profit. Only 7 groups lost money. There were 18 groups of cattle in the two phase pen. Profitability for these groups ranged from -\$39.57 to \$57.26 per head. Eleven groups made a profit and 7 groups lost money.

Additional statistical analyses will be conducted on these data in an attempt to identify the factors that were closely related to profitability. However, it appears that average daily gain is important as it relates to days on feed. Cattle with faster rates of gain reached an acceptable market endpoint more quickly and were

slaughtered earlier in the spring when choice beef prices were stronger and there was a smaller choice-select margin. Fewer days on feed also corresponds to lower yardage, interest and feed costs. Quality grade is related to profitability in cattle slaughtered later in the spring. Later in the spring when cattle were sold, quality grade was of greater importance because the spread between choice and select beef was wider.

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