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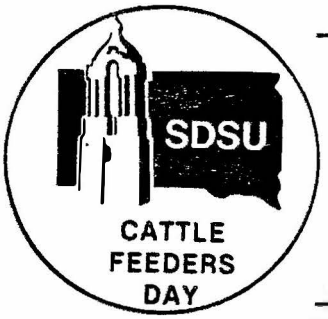

EFFECT OF PRECONDITIONING ON PERFORMANCE AND HEALTH OF FEEDER STEERS

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Summary

Two hundred steer calves from four Western South Dakota ranches were used to evaluate the effect of a preconditioning program on feedlot calf performance and health of calves fed a low or high energy receiving diet. Calves were treated by guidelines set up by the South Dakota Beef Cattle Improvement Association and Extension Service. The vaccination stress reduced average daily gain (ADG) of preconditioned calves (PC) prior to weaning at the ranch. There were no other weight gain differences while the calves were on the ranch, or through the simulated marketing process. (F/G) were evaluated for the initial 16 and 28d and for overall PC calves consumed more feed and gained weight faster than control (CO) steers. Feeding a low energy receiving diet (LE) resulted in higher ADG than feeding a high energy diet (HE) during the initial 16d. During the initial 28d, PC increased ADG (3.76 vs 3.32 lb/hd/d) and DMI (13.75 vs 12.19 lb/hd/d) over CO ($P<.01$). Steers fed HE had higher DMI than those fed LE.

Introduction

Preconditioning may be defined as preparing a calf to better endure stress associated with shipment from the ranch to the feedlot. The South Dakota preconditioning ("Green Tag") program requires calves be castrated, dehorned and healed by sale time, vaccinated for IBR, BVD, PI and 7-way clostridia, treated for parasites, and be weaned and bunk adjusted for at least 30 days to be considered preconditioned. It is suggested to vaccinate calves at least two weeks before weaning to reduce stress.

Advantages to the program would seem to be heavier calves at sale time, reduced transit shrink, reduced sickness and death loss and improved performance in the feedlot. This research is part of a two year study to determine the effects of the "Green Tag" program on calf health and performance.

Procedure

Ranch

Two hundred steer calves, averaging 442 lb., selected from four Western South Dakota ranches were used to determine the effect of preconditioning on calf performance and health, at

the ranch and throughout two feedlot feeding programs. At each ranch, calves were weighed and 50 hd were identified for use in the trial. Calf selection was based on weight and general appearance. From the 50 hd identified, 25 hd were randomly selected to be preconditioned (PC) and 25 hd were designated as controls (CO). The PC calves were treated for parasites and vaccinated against IBR, BVD, PI and 7-way clostridia. Approximately 14d later, all steers were reweighed. PC steers were weaned and fed a commercial ration[a] medicated with oxytetracycline (table 1) plus hay. The CO calves remained with their dams until all calves were shipped 29-30d later. All calves were shipped to the Sioux Falls Stockyard on the same day. Upon arrival, calves were sorted by ranch and treatment group and weighed. After an overnight rest, they were all reweighed and shipped to the SDSU research feedlot, Brookings.

Feedlot

At the feedlot, individual weights were taken. The CO steers received the same vaccination and parasite treatments used on the ranches. Calves were allotted eight to a pen based on weight, previous treatment and ranch. All processing was done within 30 hours after arrival. Each pen was then placed on either a high energy (HE) or low energy (LE) receiving diet with or without an antibiotic (table 1). Individual weights were taken on day 16, when the antibiotic was removed from the ration, and on day 28. At the end of the receiving period (initial 28d), a step-up ration program was initiated. Interim days fed and composition of these diets are shown in table 1. Individual calf weights were taken every 28 d until the end of the trial. An average backfat probe of .40 in. (with at least 5 out of the 8 steers in a pen having backfat of .40 in.) as determined using a Cook's Probe[b], and visual appraisal were used to determine marketing dates for each pen.

Health

Health of all steers was monitored daily during the initial 28d in the feedlot. A point system was used to determine health scores: 1 point for nasal discharge; 1 point for eye discharge; 1 point for a depressed appearance and 2 points for a temperature of 105 ^{o}F or greater. Four or more points in one day constituted sickness.

Results

Ranch

While the calves were on the ranch, ADG differences were seen only during the initial 14 days when all calves were still nursing their dams (table 2). PC calves had a lower ADG than CO

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[a] Zip Feed Mills, Sioux Falls, South Dakota.

[b] Cook's Probe, Cook Laboratory, Lusk, Wyoming.

(.87 vs 1.27 lb/hd/d) during this period possibly due to vaccination stress. Weight changes were not affected from the time PC calves were weaned to shipment, from initial weight to shipment or from initial weight to stockyard exit weight for either ranch or treatment. There were no differences in transit shrink attributable to ranch or treatment groups (table 3).

Feedlot

Preconditioned steers consumed more dry matter than CO steers during the initial 16 days in the feedlot (table 4). Steers fed the LE diet had higher ADG than those fed the HE diet (4.18 vs 3.56 lb/hd/d). This may be due to fill caused by differences in fiber content of the 2 diets more than differences in protein and fat deposition. Low energy steers tended to eat less feed and had better F/G than HE steers. Feeding an antibiotic had no effect on performance.

During the initial 28d, PC steers gained better and consumed more dry matter than CO steers (3.76 vs 3.32 lb/hd/d) and (13.75 vs 12.19 lb/hd/d) respectively (table 5). Steers fed the HE ration had a higher DMI than those fed the LE ration. Differences in ADG and F/G due to ration diminished at this point.

The overall performance from initial to final weight is shown in table 6. Control steers were more efficient than PC steers. This may be accounted for by compensatory gain in CO calves. Steers fed the HE diet had higher ADG and DMI and lower F/G than steers fed the LE ration. Days on feed were reduced when the HE diet was fed (209d vs 252d). Figure 1 shows the difference in rate of gain and days on feed between the two rations fed.

Steers were marketed through the Sioux Falls Stockyard with the understanding that individual animals would be identified on the graders sheet after slaughter. There were no differences in yield or quality grades attributable to slaughter date, treatment or diet (table 7).

Health

Health scores are shown in table 8. Steers fed the HE ration had higher total points accumulated and higher number of head days of sickness than the LE steers. There was a treatment x diet interaction where the PCHE calves had the highest point total and PCLE calves had the lowest total. Feeding an antibiotic had no effect on health scores in this study.

Conclusions

These results suggest that preconditioning of feeder calves may be beneficial during the early phases of the feeding period. However, by the end of the trial, the control cattle achieved similar rates of gain and feed efficiencies. The effectiveness of the "Green Tag" program will likely vary every calf crop due

to variation in range conditions, vaccination and weaning times, length of time in the marketing channel and cost of labor and feed. These results are from the first year of a two year study. Data from the entire experiment should help ranchers place an economic value on preconditioning.

Table 1. Composition of Diets[a]

Ration	Alfalfa brome	Corn	Molasses	Corn silage	Protein Mineral supplement[b]	Crude protein	NEm Mcal/lb	NEg Mcal/lb
Preconditioning (before shipment)	--	--	--	--	--	14.43	.61	.34
Receiving (1-28 days)								
High energy	40.00	53.00	--	--	7.00	13.10	.78	.44
Low energy	10.00	--	--	76.89	13.11	13.10	.70	.41
Intermediate (29-111 days)								
High energy	25.00	69.47	3.00	--	2.53	11.42	.85	.57
Low energy	--	--	--	88.90	11.10	12.63	.72	.44
Finishing Ration (remainder of trial)								
High energy								
(112-131 days)	10.00	85.30	3.00	--	1.70	10.48	.94	.61
(132-174 days)	9.96	85.37	2.98	--	1.70	10.85	.97	.66
(175 to end of trial)	10.00	83.80	4.50	--	1.70	10.52	.96	.65
Low energy[c]								
(112-167 days)	--	47.75	--	47.75	4.50	10.45	.85	.55
(167-230 days)	--	65.27	3.50	26.73	4.50	10.64	.90	.60

[a] Percent dry matter basis.

[b] Supplements contain an appropriate amount of soybean meal, trace mineralized salt, dicalcium phosphate, potassium, chloride and limestone.

[c] On day 231, all remaining cattle were placed on the High Energy finishing ration to the end of the trial.

Table 2. Effect of Preconditioning and Ranch on Preshipment Weight Change

Period ADG, lb/hd/day	Treatment: Preconditioned	Control
Initial 14 days	.87[a]	1.27[b]
PC weaning to shipment	2.17	1.39
Initial weight to shipment	1.74	1.35
Initial weight to stockyard exit weight	.94	.63

Period ADG, lb/hd/day	Ranch: 1	2	3	4
Initial 14 days	.99[a,b]	1.53[a]	.66[b]	1.04[a,b]
PC weaning to shipment	2.41	1.55	1.37	1.82
Initial weight to shipment	1.88	1.55	1.16	1.58
Initial weight to stockyard exit weight	.94	.95	.36	.86

[a,b] Means in the same row with different superscripts differ ($P<.01$).

Table 3. Effect of Preconditioning and Ranch on Transit Shrink

Shrink, %[a]	Treatment: Preconditioned	Control
Ranch to stockyard	7.14	5.93
After overnight rest	6.69	6.24
Ranch to feedlot	9.13	8.76

Shrink, %[a]	Ranch: 1	2	3	4
Ranch to stockyard	7.24	6.57	7.75	4.58
After overnight rest	8.02	5.60	7.02	5.24
Ranch to feedlot	10.79	7.74	9.45	7.80

[a] 1 - (destination weight ÷ origin weight) * 100.

Table 4. Initial 16 Day Feedlot Performance

Item	Treatment		Diet	
	Preconditioned	Control	High Energy	Low Energy
ADG, lb	4.05	3.70	3.56[c]	4.18[d]
DMI, lb	13.40[a]	11.59[b]	12.63	12.36
F/G	3.31	3.14	3.52[a]	2.96[b]

Item	Treatment * Diet			
	Preconditioned		Control	
	High Energy	Low Energy	High Energy	Low Energy
ADG, lb	3.72	4.40	3.41	3.96
DMI, lb	13.31	13.49	11.92	11.26
F/G	3.58	3.07	3.50	2.84

a,b Means in the same row with different superscripts differ (P<.01).

c,d Means in the same row with different superscripts differ (P<.05).

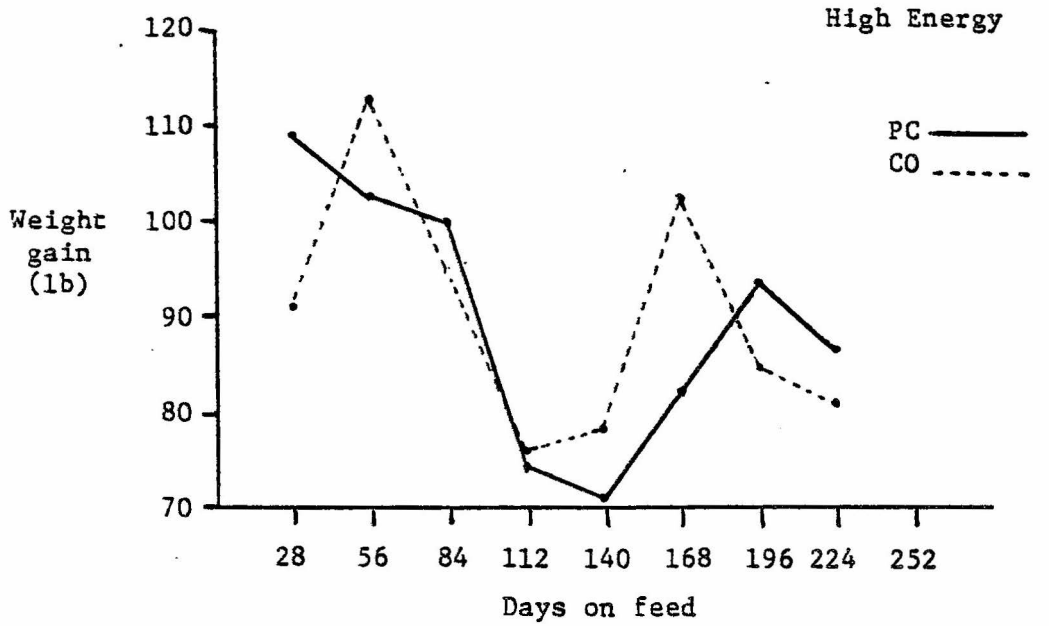
Table 5. Cumulative 28 Day Feedlot Performance

Item	Treatment		Diet	
	Preconditioned	Control	High Energy	Low Energy
ADG, lb	3.76[a]	3.32[b]	3.59	3.56
DMI, lb	13.75[a]	12.19[b]	13.60[a]	12.32[b]
F/G	3.66	3.67	3.79	3.46

Item	Treatment * Diet			
	Preconditioned		Control	
	High Energy	Low Energy	High Energy	Low Energy
ADG, lb	3.87	3.74	3.28	3.37
DMI, lb	14.28	13.20	12.91	11.46
F/G	3.69	3.53	3.94	3.41

[a,b] Means in the same row with different superscripts differ ($P<.01$).

Figure 1. Effect of Interim Weight Gain Within Diet



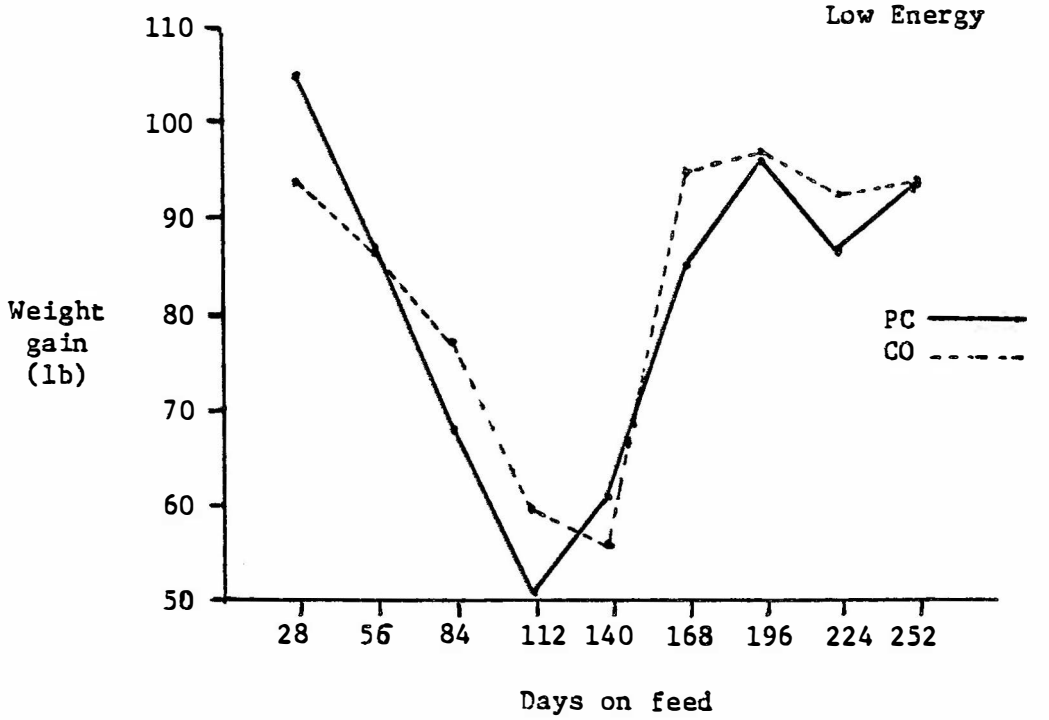


Table 6. Cumulative Feedlot Performance

Item	Treatment		Diet	
	Preconditioned	Control	High Energy	Low Energy
ADG, lb	3.10	3.15	3.28[a]	2.97[b]
DMI, lb	18.85	18.61	19.12[c]	18.35[d]
F/G	6.08[a]	5.91[b]	5.83[a]	6.18[b]
Days on Feed	231.75	230.08	209.33[a]	252.50[b]

	Treatment * Diet			
	Preconditioned		Control	
Item	High Energy	Low Energy	High Energy	Low Energy
ADG, lb	3.23	2.95	3.30	3.00
DMI, lb	19.14	18.57	19.10	18.15
F/G	5.93	6.29	5.79	6.05
Days on Feed	211.00	252.50	207.67	252.50

a,b Means in the same row with different superscripts differ (P<.01).

c,d Means in the same row with different superscripts differ (P<.05).

Table 7. Carcass Weights and Grades

	No. hd	Avg Carcass wt	Quality Grade			Yield Grade			
			Prime	Choice	Good	1	2	3	4
Total	187	726	3	156	28	2	78	98	9
Treatment									
PC	91	732	2	74	15	1	40	45	5
CO	96	728	1	82	13	1	38	53	4
Diet									
HE	92	709	0	73	19	1	34	50	7
LE	95	730	3	83	9	1	44	48	2
Trt*Diet									
PC-HE	44	713	0	34	10	1	17	22	4
PC-LE	47	732	2	40	5	0	23	23	1
CO-HE	48	707	0	39	9	0	17	28	3
CO-LE	48	727	1	43	4	1	21	25	1

Table 8. Initial 28 Day Feedlot Health Scores

Item	Treatment		Diet	
	Preconditioned	Control	High Energy	Low Energy
Total points	346	318	394[a]	270[b]
No. hd day of sickness	9	2	9	2

Item	Treatment * Diet[c]			
	Preconditioned		Control	
	High Energy	Low Energy	High Energy	Low Energy
Total points	224	122	170	148
No. hd day of sickness	9	0	0	2

[a,b] Means in the same row with different superscripts differ (P<.01).

[c] Treatment x Diet interaction (P<.05).