Preconditioning Rations: Barley vs Barley Screenings With and Without Probiotic Fed to Range and Drylot Raised Steer Calves

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Cattlemen have an opportunity to add value to crop products they produce by feeding calves. Excellent quality feeder cattle produced in North Dakota are in demand by feeders in other states. However, feedyards prefer calves that have been weaned and started on feed. A high proportion of feed grains produced in the state are sold out of state. Cropping system by-products such as screenings are occasionally available in abundance and have little cash value.

Cow/calf producers are becoming more aware of added profit potential by feeding their calves for an additional 100 days to gain 200 to 250 pounds or more. Feeding strategies and management of the calves, especially the first 30 days after weaning, are generally developed by experience and consultations. New approaches are continually being proposed, especially in response to: 1) reducing cost of production; 2) increasing salable farm products, 3) consumer concerns about use of subtherapeutic antibiotics and 4) economic development of agriculture in North Dakota.

This article addresses the use of probiotics and screenings in receiving rations for stressed (range raised) and non-stressed (drylot) weaned calves. The two-year study was conducted at the Carrington Research Extension Center.

EXPERIMENTAL PROCEDURE

Each of the two years, drylot steers were fed for 28 days following weaning in mid September. Range steer calves were fed in the same pens during the next 28-day period.

Drylot steers were Hereford and Hereford-Red Angus-Tarentaise cross calves raised at the Carrington Research Extension Center. Three weeks prior to weaning, drylot calves were vaccinated for IBR, 7 way and BVD. Previous to weaning, drylot calves were consuming 6 to 8 pounds of creep feed consisting of half alfalfa-grass hay and half whole grain (barley-corn-grain sorghum in approximately equal parts). On weaning day, drylot pairs were separated, weighed, and steer calves sorted to respective treatment groups.

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Range-raised steer calves (Angus-Simmental cross steers) from the Central Grasslands Research Center at Streeter were allotted to the same treatments. These steers had also been vaccinated three weeks prior to weaning but had not received creep feed. Calves were shipped by semi 100 miles to the Carrington Research Center within two days of weaning. Start weights for range calves were taken coming off the truck.

Drylot and range raised steers were separately allotted randomly by breed group to one of four treatments: 1) screenings-barley at equal levels with probiotic supplement; 2) screenings-barley at equal levels without a probiotic; 3) barley with a probiotic and 4) barley without a probiotic. Corn silage was fed to appetite and chopped alfalfa hay was added at approximately 2 pounds per head per day. Each ration was thoroughly mixed in a mixer wagon and delivered to fenceline bunks once per day. Calves were weighed every seven days during the 28-day test period.

The probiotic supplement used in this study was Power-Pak, manufactured by Ralco Mix Inc. It is an all natural supplement which contains a broad range of vitamins, electrolytes, lactic acid and added cobalt to enhance Vitamin B12 synthesis. The following dried fermentation products are listed on the product label: Lactobacillus acidophilus, Lactobacillus plantarum, Bacillus subtillis, Streptococcus diacetylactis, Aspergillis oryzae

Table 1. Drylot raised steer calves average daily feed consumption (pounds as fed) during 28-day postweaning period.

	Screenings			
	Barley Probiotic	Barley Control	Barley Probiotic	Barley Control
Supplement	.31	.31	.31	.31
Rolled Barley	3.52	3.64	6.73	6.84
Ground Wheat Screenings	3.52	3.64	—	—
Corn Silage	10.21	10.34	10.06	9.72
Chopped Alfalfa Hay	3.33	3.65	3.44	3.37
Chopped Straw	.81	.86	.78	.85
DM Intake/hd/day	13.57	14.08	13.15	13.01

Table 2. Range raised steer calves average daily feed consumption (pounds as fed) during 28-day postweaning period.

	Screenings			
	Barley Probiotic	Barley Control	Barley Probiotic	Barley Control
Supplement	.31	.31	.31	.31
Rolled Barley	3.93	3.98	7.44	7.54
Ground Wheat Screenings	3.93	3.98	—	—
Corn Silage	9.74	9.73	9.42	9.09
Chopped Alfalfa Hay	4.90	4.43	4.78	4.78
Chopped Straw	.77	.83	.73	.74
DM Intake/hd/day	15.58	16.73	15.03	15.08

and Saccharomyces cerevisiae. Table 1 lists average daily feed consumption and daily dry matter intake per head by treatment for drylot calves. Table 2 gives the same data for range-raised calves.

RESULTS AND DISCUSSION

There were genetic differences in the drylot and range calves so comparison of the stressed vs non-stressed steers is not precise. Some observations on feed consumption, adaptation and gains may be made, however. Drylot steers were weaned at lighter weights approximately one month earlier than range-raised calves. Weaning day for drylot calves was the same day as the start of the feeding period. Drylot calves were acclimated to the bunks, waterers and pen environment and started on feed faster and more consistently than range-raised calves. Average steer weights by week and total gains from weaning and placement in the feedlot are presented in Table 3.

Table 3. Average weights for drylot vs range raised steer calves during a 28-day post weaning feeding trial.

	Drylot	Range
Number of Head	104	124
Actual Weaning Weight (lbs)	481	600*
Feeding Trial Starting Weight (lbs)	481**	545***
Week 1 Weight (lbs)	508	584
Week 2 Weight (lbs)	535	606
Week 3 Weight (lbs)	556	628
Week 4 Weight (lbs)	578	644
Avg Gain from Weaning (lbs)	97	44
Avg Gain from Start (lbs)	97	99

* Weaning weight taken at the ranch
** Starting weight taken weaning day
*** Starting weight taken on arrival at test site 2 days after weaning

Range-raised calves shrank 10 percent from ranch weaning weight to off-truck weights at the feedlot. Most of this fill weight was;gained back the first week. In 1989, a respiratory disease outbreak occurred with several range steers showing snotty noses, droopiness and lack of appetite. Temperatures were taken on six steers in each pen with five animals recording temperatures over 103 degrees F. One steer died. A broad spectrum antibiotic was administered to all steers for three consecutive days. In 1990, range-raised calves did not experience any significant disease problems. Dry matter consumption increased each week of the study.

Table 4 depicts the feed consumption pattern for drylot vs range-raised calves by week. In 1989, consumption for range calves increased the first two weeks but decreased in three of four pens during the third week when the respiratory break occurred. In 1990, range calves increased consumption each of the four weeks on test. Drylot calves increased feed intake each of the four weeks of the trial during both years.

Dry matter consumption figures indicate range raised calves require more time to acclimate to the new environment but after four weeks, intake relative to body weight is equal. No differences are apparent due due to ration treatment.

Table 4. Dry matter consumption for drylot and range raised steer calves on four diets (2 year averages).

	Screenings				AVG DM
	Barley Probiotic	Barley Control	Barley Probiotic	Barley Control	Consumption As % Body Wt.
	Avg. Per Head				
Range Calves					
Week 1	10.61	10.61	10.56	10.56	1.94
Week 2	14.23	14.13	13.56	13.56	2.44
Week 3	14.66	14.91	14.18	14.88	2.61
Week 4	15.56	15.71	15.51	15.51	2.71
Drylot Calves					
Week 1	11.95	12.14	11.99	12.19	2.55
Week 2	13.39	14.21	12.69	13.01	2.59
Week 3	14.28	15.78	14.02	13.93	2.70
Week 4	15.43	15.72	14.94	14.58	2.72

The response from adding a probiotic to the receiving rations was analyzed separately for range and drylot raised calves but pooled across barley and screenings-barley based diets within each management group. It appears that probiotics in the ration tend to increase daily gains in range raised calves which are more stressed at weaning.

Table 5. Post weaning daily gains for drylot and range raised steer calves fed diets with and without probiotics.

	Probiotic	Control
Range Calves		
Number of Head	62	62
Week 1 ADG	5.59	5.49
Week 2 ADG	3.16	3.14
Week 3 ADG	3.29	2.87
Week 4 ADG	2.27	2.25
28 day ADG	3.58	3.44
Drylot Calves		
Number of Head	52	52
Week 1 ADG	3.50	3.98
Week 2 ADG	3.78	3.79
Week 3 ADG	2.99	3.13
Week 4 ADG	3.42	3.16
28 day ADG	3.42	3.52

To determine the economic value of each treatment, feed consumption, feed costs, and gains were summarized for each pen. Table 7 presents economic information. It appears that feeding calves can return $60.86 and $74.00 per head above feed cost to labor and management. Acclimating calves to the feeding environment prior to weaning is desirable from a stress reduction perspective. Less stress means healthier calves with better appetites earlier in the feeding period. Total feed costs averaged less than $.22 per pound of gain for all calves in this trial. Screenings are useful in the ration but need to be procured at less than the price of barley to increase profits. Quality and content vary widely so purchase screenings carefully., Barley in this trial, is priced at $2.00 per bushel, screenings at $40 per ton, corn silage at $20 per ton and hay at $60 per ton. The probiotic supplement was priced at $.569 per pound vs $.365 for the control. Probiotics appear to be useful for stressed calves with a higher return in 1989 than in 1990.

The comparison of receiving rations with barley vs screenings was analyzed within range or drylot-raised calves but pooled across probiotic vs control treatments. No differences were detected in average daily gain for the 28-day feeding period. Results suggest ground screenings can be used in receiving rations at up to half the grain component if the diet is palatable, thoroughly mixed and meets the needs of the animal.

Table 6. Post weaning daily gains for drylot and range raised steer calves fed diets with barley vs barley/screenings.

	Barley	Barley/ Screenings
Range Calves		
Week 1 ADG	5.58	5.49
Week 2 ADG	2.77	3.53
Week 3 ADG	3.20	2.96
Week 4 ADG	2.38	2.13
28 dav ADG	3.48	3.53
Drylot Calves		
Week 1 ADG	3.37	4.11
Week 2 ADG	4.06	3.51
Week 3 ADG	3.53	2.59
Week 4 ADG	3.04	3.54
28 day ADG	3.50	3.41
Over all ADG	3.49	3.47

Table 7. Economics of rations for drylot and range calves fed barley vs barley/screenings with and without a probiotic supplement.

	Barley Screenings Probiotic	Barley Screenings Control	Barley Probiotic	Barley Control
Range Calves				
DM Cons/Hd/Day (lbs)	15.93	15.58	15.03	15.08
Feed Cost/Hd/Day ($)	.699	.617	.750	.685
Avg Daily Gain (lbs)	3.69	3.40	3.49	3.47
Feed CosVLb gain ($)	.189	.182	.217	.198
Gain per head(lbs)	103	96	91	101
Value of Gain/Hd@$.90 ($)	92.70	86.40	81.90	90.90
Value over feed cost ($)	73.74	69.58	60.86	72.03
Drylot Calves				
DM Cons/Hd/Day (lbs)	13.57	14.08	13.14	13.01
Feed Cost/Hd/Day ($)	.607	.563	.672	.608
Avg Daily Gain (lbs)	3.31	3.46	3.39	3.58
Feed CosVLb gain ($)	.184	.163	.199	.170
Gain per head (lbs)	93	97	95	100
Value of Gain/Hd@$.90 ($)	66.70	71.54	85.50	90.00
Value over feed cost ($)	66.70	71.54	66.68	70.96