

System for Feeding Early Weaned Beef Calves

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Early weaning of dairy calves is a common practice, but early weaning of beef calves in the cattle producing areas of the United States is very uncommon, particularly in southwestern North Dakota where cows and their calves normally graze large tracts of improved native grass pastures from May until November. Although generally uncommon, there are circumstances where early weaning of beef calves has shown to be beneficial. Such circumstances include fall calving, drylot cow/calf production and drought.

When considering early weaning, a producer must decide how calves are to be handled and what they will be fed. Under drought conditions early weaning generally becomes an emergency measure rather than customary practice. Drought conditions have prevailed in several southwestern and western North Dakota counties during the past four out of five grazing seasons. Drought of the magnitude experienced has caused producers to make liquidation decisions. Many have had to liquidate both cows and calves because of pasture regrowth hasn't occurred and feed supplies were short or non-existent. Others with some remaining feed supplies decided to keep their calves and sell only cows.

Before early weaning calves for drylot feeding producers have asked, "Is there any profitability in feeding the early weaned calf, how and what should they be fed and what special handling is necessary?"

A survey of the literature shows that most early weaned calf research has been done with dairy calves (Hallman, 1971) and that a limited amount of work has been done with beef calves pointing out the effects that early weaning has on the interval from calving to first estrus. Bellows et al., (1974) reported that weaning calves early at 3 to 10 days of age resulted in a shortening of the interval from calving to first estrus and that early weaned calf gains were normal and digestive problems minimal. Methods for handling early weaned calves were evaluated by comparing

the performance of calves held in drylot with those housed on pastures with creep feed (Lusky et al., 1981). At seven months of age, early weaned calves weighed the same as calves weaned normally. Moving early weaned calves to pastures with creep feed reduced labor but gains were reduced by 20 kilograms (44 lbs.). McKee et al., (1977) compared performance of early weaned calves with nursing calves that did and did not have access to creep feed. Total gain was highest for the early weaned calves and lowest for the nursing calves that were not creep fed. It was determined from the limited amount of work conducted with beef calves and the differences in feeds by these investigators when compared to those that are common to southwestern North Dakota, that a comparison of feeding systems for early weaned beef calves would be beneficial to drought stricken cattlemen. The purpose of this investigation is to compare calf rations that are suitable for an early weaned calf program that have been either commercially prepared or formulated from home grown ingredients.

Based on information gleaned from the literature and recommendations from Dr. Chung Park of the North Dakota State University dairy science department, it was determined that to be successful, adherence to the following would be necessary:

1. Calves should be at least 35 days of age if supplemental milk wasn't going to be used.
2. Calves should be supplied a highly palatable ration that is high in protein, available energy, vitamins and minerals.
3. Starter rations should be available to the calves during a 2-3 week adjustment period before the calves are actually weaned.
4. Calf-hood vaccinations for blackleg, malignant edema, hemoglobulinuria, pasturellosis, enterotoxemia, and Vitamins A and D should be administered at the beginning of the adjustment period.
5. Calves should be checked regularly for respiratory problems and flies must be controlled.

Procedure:

To answer the questions most often asked by producers planning to early wean calves under ranch conditions, 82 calves comprised of Hereford, Angus X Hereford and Longhorn X Hereford breeding from young or poorer producing cows were randomized by age, sex, breed, size and age of dams into four feeding treatments as follows:

1. Completely commercial pelleted starter and calf growing program.

2. Commercial pelleted starter and calf growing program during the critical first one-third of the growing phase followed by a home grown oat based preparation.
3. Home grown rations formulated around an oat base.
4. Home grown rations formulated around a barley base.

The calves ranged in age from 38-89 days during the first year and from 64-105 day of age the second year.

At the start of the study, all calves were weighed and vaccinated with Electroid-7 and allowed to remain with their mothers in drylot for three weeks while they developed immunity and became accustomed to starter rations. The commercial and home grown starter rations were fed in low trough feeders inside a creep area that restricted the cows during adjustment. At weaning, the calves were started on complete mixed self-fed rations that were either commercially prepared or blended from home grown feeds. High quality crested wheatgrass/brome grass hay was provided free choice throughout the feeding study.

Commercial rations used were pelleted and formulated for specific age and weight of calves and changes were made according to the manufacturers recommendations. Aureomycin/ Sulfomethazine (As-700) medication was included during the first twenty-eight days of feeding after weaning. In the treatment in which a commercial ration and a home grown blend were both used the commercial medicated formulation was fed for 28 days, then the medication was removed and feeding was continued for an additional 28 days. At the end of 56 days the commercial preparation was discontinued and an oat based home grown blend was provided during the remainder of the feeding study.

Home grown rations blended on the farm were formulated to be highly digestible. Nutrient digestibility was maintained between 71% and 73%. Protein levels during the early part of the feeding study ranged from 15.5% and 16% and were lowered to 14% as calves matured.

Calves were weighed at selected intervals during the course of the investigation beginning at the trials onset, when the calves were weaned from their mothers and at 28 day intervals thereafter. Final weights were taken following an overnight feed and water shrink.

Calves were fed for a total of 142 days which corresponded to an average weaning age of 205 days.

Calf performance under each system of feeding, feeding economics, and net returns over feed using a calf value of \$78.50 per hundredweight have been summarized in table 2.

Results and Discussion: Eighty-two beef calves of Hereford, Angus X Hereford and Longhorn X Hereford breeding were randomly allotted to one of four ration types in a feeding a systems comparison for early weaned calves.

The study was conducted two consecutive years and weaning age ranged from 38 days to 89 days the first year and from 64 days to 105 days the second year. Calves were weaned after a twenty-one day adjustment period during which time they had access to starter rations. Starter ration consumption per calf averaged approximately twenty-five pounds and seasoned the calves to dry feed making the transition from nursing to a completely dry ration very smooth.

Diets evaluated in this feeding system comparison were as follows:

1. Completely commercial pelleted starter and calf growing program.
2. Commercial pelleted starter and calf growing program during the critical first one-third of the growing phase followed by a home grown oat based ration. Home grown rations were complete mixed preparations that were self-fed in straight sided feeders.

Growth rates among calves fed any one of the four ration types were satisfactory. Problems encountered with high rations were small and easily rectified. Molasses was initially used to increase palatability and control dust but unfortunately it attracted an unbearable number of flies and discontinued early in the study. When average daily gains of calves fed the commercial ration are compared to the commercial/home grown oat base and the straight home grown oat base rations there is some variation but the differences are not significant. Comparing the daily gains of calves fed the commercial/home grown rations scheme with those calves fed either the oat or barley based rations also shows slight differences but none of them were great enough to be statistically significant. Calf gains among calves fed the all commercial ration were significantly faster than those generated by calves receiving the barley based preparation.

When these four ration types are evaluated in terms of economic efficiency and resultant profitability the results take on an entirely different complexion. The all commercial ration which yielded the fastest daily gains generated the lowest net return over feed cost of \$205.37. Calves receiving the all commercial preparation during the critical first one-third of the feeding period followed by a home grown oat based ration had the most efficient feed to gain ration of 4.60 pounds and had the highest net return per head over feed cost of \$256.48.

The completely mixed home grown oat and barley rations returned similar net dollars and were substantially higher than the all commercial ration returning \$240.09 and \$242.06 over feed costs. Feed costs per hundredweight gain had the greatest effect on net return in the comparison of these rations.

Flies and pinkeye are problems that can easily be encountered and must be controlled. Fly tags should be used on the calves to control those fly species that are susceptible to ectrin and permethrin type compounds. Residual barn sprays for buildings and facilities should also be considered.

Calves that are weaned early are more susceptible to disease and therefore need to be under close surveillance. Respiratory problems are one of the major disease problems that might be encountered. When the first sign of respiratory problem or other disease arises it should be treated immediately according to the recommendations of a veterinarian.

These data clearly indicate that livestock producers wanting to early wean beef calves have several feeding options, at their disposal depending on individual circumstances, available feed supplies and processing and handling equipment. These data also indicate quite strongly that choice of feeding method can definitely have a strong influence on profitability.

Table 1. Percentage of ingredients and various ration changes in the home grown oat and barley based rations.		
Changes	Oat Base	Barley Base

	Starter (1)	2	3	4	Starter (1)	2	3	4
Ingredients:								
Alfalfa, %	34	39	39	39	36	41	41	41
Corn, %	20	20	20	20	20	20	20	20
Oats, %	27	27	33	34	---	---	---	---
Barley, %	---	---	---	---	27	27	31.5	32.5
Soybean Meal, %	12	12	6	5	10	10	5.5	4.5
Molasses, %	5.1	---	---	---	5.1	---	---	---
Minerals & Vit. ¹ Protein %, as fed	16	16.4	14.5	14.2	15.5	15.8	14.4	14.1
TDN, %	73.4	71.4	71.0	71.0	74.8	72.9	72.9	72.9
¹ Minerals and Vitamins: 1.0% dicalcium phosphate; 3% limestone; .6% T.M. salt; 2,000,000 IU vitamin A; 800,000 IU vitamin D.								

Table 2. Summary of gains, feed, ration economics and net return among early weaned calves when comparing four different ration types.				
Rations:	Commercial	Commercial/ home grown oat base	Home grown oat base	Homegrown barley base
No. Head	21	21	20	20
Days Fed	142	142	142	142
Gains:				

Initial Wt.#	155	158	152	156
Final Wt. #	490	459	434	421
Gain, lbs.	335	301	282	265
Actual/ADG, lbs.	2.34	2.12	1.97	1.85
ADG obtained by regression analysis ¹	2.43 _a	2.22 _{a, b}	2.10 _{a, b}	1.94 _b
Feed:				
Feed/head, lbs.	1754.00	1384.00	1623.00	1409.00
Feed/hd/day, #	12.3	9.70	11.35	9.84
Feed/lb., gain, lbs.	5.27	4.60	5.77	5.39
Feeding Economics:				
Feed cost/hd/day, \$	1.24	0.73	0.70	0.62
Feed cost/cwt gain, \$	52.71	34.62	35.86	33.75
Feed cost/hd., \$	176.83	103.83	100.60	88.42
Returns:				
Gross return/hd @ \$78.50/cwt, \$	382.20	360.31	340.69	330.48
Feed cost/hd \$	176.83	103.83	100.60	88.42
Return/hd over feed, \$	205.37	256.48	240.09	242.06
¹ Average daily gains subjected to regression analysis: statements of significance are based on Tukey's multiple range comparison with p=.05. ADG's with similar subscripts so not differ significantly.				

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