

NUTRITION—COW-CALF AND STOCKER

Effects of Early Weaning on Calf Performance and on Reproduction in Mature Cows

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Story in Brief

Calves from 24 mature Hereford cows were early weaned at 6-8 weeks of age while an additional 24 cows raised their calves to weaning. Early weaned cows rebred faster after calving (46 days vs. 81 days) and had a higher conception rate (100 percent vs. 83 percent). Early weaned calves weighed more at normal weaning age than calves raised by their dams (435 vs. 347 lb). Early weaned calves may be efficiently raised to a normal weaning weight with minimal labor and facilities.

Introduction

Early weaning has been shown to be an effective tool for achieving high conception rates and short intervals from calving to breeding. Management of the early weaned calves (6-8 weeks old) has been the principal factor limiting the use of early weaning in situations where poor rebreeding performance is expected.

In a previous study (Lusby and Wettemann, 1980) rebreeding rates of very thin first-calf heifers were increased from 58 percent to 97 percent in early weaned heifers compared to heifers that raised calves to normal weaning age. Weaning weights of calves raised in drylot were equal to weights of calves raised by their dams. The early weaning system used was simple and required minimal labor and facilities.

The objectives of the research reported here were to improve the rations fed to early weaned calves and to study the feasibility of using early weaning to move late calving mature cows into sequence with the earliest calving cows in the herd.

Experimental Procedure

Fifty-eight mature Hereford cows, most calving late in the calving season, were assigned by date of calving to either have their calves early weaned or to raise their calves to a normal weaning age of 7 months. Calves were early weaned at 2-week intervals beginning at the time the oldest calf was 8 weeks old so that all early weaned calves were weaned at between 6 and 8 weeks of age.

At the time of early weaning all calves (early and normally weaned) were weighed and vaccinated for Blackleg, malignant edema, IBR and PI-3. Males were banded at birth. Calves to be normally raised were returned to their dams and maintained on bermuda pasture throughout the summer. Dams of early weaned calves were returned to bermuda pasture but were kept separate from nursing females for 4 weeks to prevent any calves from nursing early weaned cows.

All cows were exposed to Hereford bulls for a 62-day period from May 13 to July 14. Bulls were equipped with chin-ball markers for heat detection.

Early weaned calves were placed in a covered barn with a 20 by 20 foot outside pen. Water and feed were easily available at all times. The starter ration (Table 1) was high in energy and protein and contained 10 percent cottonseed hulls as the sole roughage source. Two calves 4-5 months old were kept with each new group of early weaned calves since the 1980 study showed that the older calves seemed to reduce the stress of early weaning and lead the new calves to feed and water.

After 10 to 14 days on the starter ration, the early weaned calves were moved to a half-acre drylot pen and fed to weaning from a self feeder. Ration II was fed in the self feeder for about 6 weeks after which time Ration III was fed until weaning.

All calves were weaned at 7 months plus-or-minus 7 days of age in October and November. All cow and calf weights were taken after overnight withdrawal from feed and water. One calf on pasture was removed due to an abscessed leg, and one early weaned calf died of atypical interstitial pneumonia in October. Data from both calves and their dams were discarded.

Results

Early weaning rations used in the previous early weaning study were more complex than the rations used in this trial and included oats and alfalfa pellets. The simpler rations using cottonseed hulls as the sole roughage source appear to be more readily consumed and less prone to the sorting problems encountered with the more complex rations.

The use of two older calves during the critical first two weeks of early weaning again appears beneficial since the young calves are often seen to follow the older calves to feed and water.

It must be remembered that early weaned calves should be started with a ration high in energy and protein and gradually changed to a grower-type ration as their total intake increases. Calves in this study consumed only about 1.5 lb/day of the starter ration during the first 10-14 days of early weaning. The calves were changed from Ration II to Ration III when intake of Ration II had increased sufficiently to cause some scouring. This occurred after about 6 weeks on Ration II.

Other than the cases noted in the procedure section, the only health problem encountered during the study was the incidence of coccidiosis in two early weaned

Table 1. Early weaning rations used in 1980

Ingredient	Ration		
	Starter	Ration II	Ration III
	%	%	%
Rolled corn	64.0	56.5	50.0
Soybean meal	20.0	17.0	12.0
Cottonseed hulls	10.0	20.0	33.0
Cane molasses	5.0	5.0	3.0
Dicalcium phosphate	—	—	.5
Limestone	0.5	0.5	0.5
Potassium chloride		0.5	0.5
Salt	0.5	0.5	0.5
Vit A (30,000 IU/gm)	1 lb/ton	1 lb/ton	½ lb/ton
Deccox (for prevention of coccidiosis)	1 lb/ton	0.8 lb/ton	

calves in late October. Both quickly responded to treatment. A coccidiostat was fed for the first few weeks of early weaning and probably should have been fed again during the last portion of the trial to the early weaned calves.

Average daily gains of early weaned calves were greater ($P < .01$) than gains of normal reared calves (1.77 vs. 1.27 lb/day, Table 2). Feed conversions in drylot were very efficient, 4.5 lb dry matter/lb gain. These efficient gains were also seen in the previous study and were expected since calves of this age are primarily depositing lean instead of fat. More rapid gains could have been achieved by feeding a higher level of concentrate in Ration III, but the possibility of founder and the probability of getting the calves too fat may reduce the desirability of more rapid gains. Average weaning weights of early weaned calves were 435 lb, 88 lb more ($P < .01$) than the calves raised by their dams. The relative difference in weaning weights of early and normal weaned calves will obviously depend on forage conditions, weaning rations, growth potential of the calves and milking ability of the cows.

The effects of early weaning on cow performance are shown in Table 3. The conception rate of early weaned cows was 100 percent compared to 83 percent for cows that raised calves. The interval from calving to first observed estrus was 46 days for

Table 2. Performance of normal reared and early weaned calves

No. of calves	23	23
Calf weights, lb		
At birth	71	68
At early weaning	145	155
At weaning, (205 day, steer equiv.)	347 ^a	435 ^b
Avg daily gain, early weaning to 205 days, lb (158 days)	1.27 ^a	1.77 ^b
Avg daily feed, lb		
Lb feed/lb gain,		
As fed basis		5.00
Dry matter basis		4.50

^{ab}Means on a line with different superscript letters differ ($P < .01$).

Table 3. Effects of early weaning on cow performance

	Treatments	
	Normal weaned	Early weaned
No. of cows	23	23
Cow weight, lb		
Time of early weaning (Avg. date, May 19)	816	832
End of breeding, July 7	922 ^a	968 ^b
At weaning	920 ^a	1040 ^b
Condition scores		
Time of early weaning	5.04	5.07
End of breeding	5.69	6.29
At weaning	5.99	6.82
Interval from calving to first observed estrus, days	81	46
No. cows pregnant/exposed	19/23 (83%)	23/23 (100%)

^{ab}Means on line with different superscript letters differ ($P < .01$).

early weaned cows compared to 81 days for cows with calves. Early weaned cows frequently cycled within 3 days after calf removal.

All cows gained weight and increased in condition during the summer. As expected, the non-lactating, early weaned cows gained more weight ($P < .01$) and were fatter at the end of the summer than the cows that raised calves. The better condition of the early weaned cows would reduce the supplement requirements of the early weaned cows during the following winter.

Results of this study as well as results of the previous study (Lusby and Wettemann, 1980) show that calves can be successfully weaned at 6-8 weeks of age and efficiently raised to a normal weaning weight in drylot. Early weaning will permit high conception rates and rapid rebreeding in cows. While early weaning is certainly not recommended as standard practice, it should be useful in times of drought when purchased feed may more efficiently be fed directly to the calf than to the lactating cow. Early weaning may, as well, offer cattlemen a chance to achieve high conception rates in cows too thin to rebreed otherwise.

An economic analysis of early weaning is shown in Table 4. A spring calving

Table 4. Costs and returns analysis for early weaning vs. normal weaning of calves born in February of 1981: the impact on returns for 1981 and 1982

	Meet cow's requirements				Do not meet cow's requirements			
	Adequate forage		Inadequate forage		Inadequate forage		Inadequate forage early wean	
	CSM	Hay	CSM	Hay	CSM	HAY	CSM	Hay
1980-81, lb/hd/day								
Oct. 15-Jan. 1	2	—	2	5	2		1	
Jan. 1-Feb. 15	3	4.5	3	10	3	4.5	2	4.5
Feb. 15-May 1	4	4.5	3	15	4	4.5	1	4.5
Total lb fed	588	400.	514	1955	588	400	317	400
Cost for cow	\$95.38		\$147.59		\$95.38		\$58.80	
Cost for early weaned calf							\$112.00	
1980-81 Returns								
Avg weaning wt, lb	400		400		375		434	
Calving rate	88		88		88		88	
Weaned wt/cow, lb	352		352		330		382	
Returns, 80¢/lb	\$282.		\$282.		\$264.		\$306.	
Net (calf-feed costs)	\$186.62		\$134.41		\$168.62		\$135.20	
1981-82 costs ¹	\$ 95.38		\$ 95.38		\$ 95.38		\$ 80.0	
1981-81 returns								
Avg weaning wt, lb	400		400		400		400	
Calving rate, %	88		88		60		98	
Weaned wt/cow, lb	352		352		240		392	
Returns, 80¢/lb	\$282.		\$282.		\$192.		\$314.	
Net (calf-feed costs)	\$186.62		\$186.62		\$96.62		\$234.00	
2-year summary								
1981-81 returns	\$373.24		\$321.03		\$265.24		\$369.20	

¹For 1981-82, assume costs are the same as in 1980-81 and that forage is adequate. Wintering costs will be slightly lower for early weaned cows due to their added condition going into the winter. Ingredients costs: Corn, \$4.00/bu.; SBM, \$300/ton; Hulls, \$80/ton; Molasses, \$130/ton; Dical, \$13/cwt; Limestone, \$1.50/cwt; Kcl, \$5/cwt; Salt, \$2/cwt.

program is used in which calving begins about February 15. The type of forage is range or bermuda. An 88 percent calf crop with 400-lb weaning weights is considered average for cows raising their calves. Rations I, II, and III are priced at \$186, \$175, and \$159/ton, respectively. The ingredient prices used to arrive at the ration costs are shown at the bottom of Table 4. A \$20/ton markup is included.

The feasibility of early weaning is evaluated under four situations:

- a. There is adequate standing roughage, and the cow's nutrient requirements can be met with cottonseed meal and some supplemental hay during periods when ice and snow covers forage.
- b. There is a shortage of standing roughage, but grass hay will be fed along with cottonseed meal to meet the cow's nutrient requirements.
- c. There is inadequate standing roughage, but the hay supply is inadequate to meet the cow's requirements. Cows will be in poor condition at breeding in the spring of 1981.
- d. Same as c, but we will early wean at 6-8 weeks of age in the spring of 1981.

For cows we intend to early wean, we will maintain sufficient condition to insure that the cows can calve and nurse for 6 weeks.

Note that for 1981, early weaning about breaks even with purchasing grass hay in situations where forage is scarce. Assuming a 98 percent calf crop the following year from early weaned cows along with their lower wintering cost, early weaning shows a \$48 advantage for the 2-year period over purchasing hay in 1980-81. Early weaning netted a \$104 advantage over living through poor conception rates with underfed cows.

The most likely place for early weaning is in a situation where poor condition rates are expected. Depending on concentrate and hay prices, early weaning might be profitable when large amounts of hay must be purchased for the cow.

Literature Cited

K. S. Lusby and R. P. Wettemann. 1980. Okla. Ag. Exp. Station. MP-107:55.

Influence of Month of Calving on Daily Milk Yield: Progress Report on Development of a Model of a Cow-calf System

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Story in Brief

Daily milk yields of 2-, 3- and 4-year-old Holstein, Holstein-Hereford cross and Hereford cows were used to develop equations to describe the lactation curve. Then, the equations were used to predict the average daily milk yield for different weeks of the lactation. Breed, year and month of calving affected average daily milk yield for each week of lactation.