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The Use of Early Weaning in Practical Cattle Management

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Introduction

On a short-term basis, many cattlemen find themselves with cows or heifers that are too thin at breeding time to project adequate rebreeding rates. Droughts, range fires or other natural disasters often leave cattlemen with emergency shortages of forage. Management solutions, even drastic ones that can salvage high pregnancy rates (and therefore, next year's income) are important.

On a longer-term basis, the cattle industry faces severe price competition from poultry and pork. It is unlikely that beef cattle will ever be able to compete on a price per pound of product basis with either, especially poultry. Of all the costs of producing beef, the largest single cost is that of investment cost in land for the cow herd, followed by costs for purchased feed and harvested forage. Therefore, management practices that reduce nutrient requirements of the cow herd and offer the potential for more efficient utilization of pasture resources need to be evaluated by cattle producers.

Early weaning has been shown to be a possible solution for the short-term forage and reproduction situations that arise from emergencies. This practice may also offer some help in the longer-term economic problem if management of the early-weaned calf can be handled.

Early Weaning and Reproduction

The greatest constraints for limiting nutrient intake of beef cows are the necessity of maintaining good body condition for reproduction and increased requirements for milk production. Milk production affects requirements two ways: directly for production of milk and also indirectly in terms of increased maintenance requirements during lactation.

The adverse effects of suckling on reproduction of beef cows has been well researched. Early work in the 1930's showed that Holsteins milked 6 times each day rebred more slowly than cows milked 3 times or 2 times. A classic case is illustrated in Table 1. Simulated twinning was produced by grafting an extra calf at birth on Hereford x Holstein cows at the Fort Reno Station (Wyatt et al., 1976). Cows were fed so that weight and condition changes were the same for cows with twins and singles. Cows rearing twins produced 39% more milk, weaned 60% more calf but were slower to start cycling after calving. At 80 days after calving, only 43% of cows with twins had cycled compared with 71% for cows with singles. Cows rearing twin calves were nursed more frequently (4.7 vs 3.4 times daily) and 25% longer each day than cows with single calves.

Table 1. Reproduction, performance and nursing behavior of cows rearing single or simulated twin calves.

	Single calves	Twin calves
Daily winter supplement[1] post-calving, lb	3.9	6.8
Fall weight, lb	1092	1119
Winter weight loss, %	19.0	18.6
Daily milk yield, lb	14.5	20.2
Calving date	12-29-74	12-27-74
Cows cycling by 60 days post-partum, %	36	14
Cows cycling by 80 days post-partum, %	71	43

[1]30% all-natural crude protein supplement.

The potential for using early weaning to salvage reproduction is illustrated by an OSU study (Table 2, Lusby and Wettemann, 1980). Calves from 31 spring-calving 2-year-old first-calf heifers in very thin body condition (condition scores of 3 and 4) were weaned at six to eight weeks of age. Thirty additional heifers were assigned to raise their calves to the normal weaning age of seven months. Early weaned calves were moved to drylot and fed a complete ration made of corn, cottonseed hulls, and protein. At 4 1/2 months of age,

Table 2. Weight changes and conception rates of heifers with normal or early weaned calves.

	Suckled	*Early Weaned*
Heifer weights 11/15/78	738	726
After calving, Feb, Mar, Apr, 1979	698	680
Weight gains changes		
calving to breeding	-16	34
during breeding period (5/29/79-7/31/79)	48	73
calving to weaning (10/11/79)	90	195
Weight at weaning	788	875
Conception rates		
conceived/exposed	19/32	30/31
% pregnant	59.4	96.8

half of the early-weaned calves were moved to native pasture with the drylot ration available in a creep feeder. Early weaning improved reproduction rates from 59% in heifers that raised their calves to normal weaning up to 97% for very thin heifers with early-weaned calves. Weaning weights were similar for drylot and normally weaned heifers (Table 3). However, calves moved to pasture with the drylot ration as a creep feed weighed less.

A second trial looked at the effects of early weaning on reproduction of mature cows in moderate body condition (condition score = 5; Lusby and Parra, 1981). Half the calves from 48 Hereford cows were early weaned at six to eight weeks of age and the other half remained with their dams until normal weaning age. Early-weaned calves were raised to normal weaning age on the same ration used in the previous trial. Cows with early-weaned calves rebred faster after calving (46 days vs. 81 days) and had higher conception rates (100% vs. 83%; Table 4). Early-weaned calves weighed more at normal weaning age than calves raised by their dams, and gains of early weaned calves were efficient.

Other studies have also shown that the response to early weaning may depend on body condition score of the cow. Bishop and Wettemann (1990) reported that 100% of cows with condition scores greater than 5 had begun cycling within 25 days after their calves were early weaned at 45 days of age compared to only 43% of cows with condition scores of less

Table 3. Weight gains, weaning weights and feed efficiencies of normal and early weaned calves.

	Suckled	*Drylot*	*Drylot-Pasture*
Number of calves	30	16	13
Weight at early weaning, lb		124	126
Gain from 7/31/79-10/11/79		106	62
Weight at normal weaning age	373	374	330
Feed conversion (as fed basis)		4.67	4.78
Feed consumption (lb/hd/day)			
ration 1		2.5	——
ration 2		5.9	4.3
ration 3		11.5	6.5

Table 4. Effects of early weaning on cow performance and performance of normal reared and early weaned calves.

	Normal weaned	*Early weaned*
Cow weight, lb		
Time of early weaning (Avg. date, May 19)	816	832
End of breeding, July 7	922	968
At weaning	920	1040
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%)
Calf weights, lb		
At birth	71	68
At early weaning	145	155
At weaning, (205day, steer equiv.)	347	435
Avg daily gain, early weaning to 205 days, (158 days)	1.27	1.77
Avg daily feed	——	8.84
Lb feed/lb gain, Dry matter basis	——	4.50

than 5. However, virtually all studies show that cows cycle within a relatively short period after removal of the calf. Cycling can occur within two weeks in cows in moderate condition and at least 60 days postpartum up to six weeks in thin cows and in cows less than 60 days postpartum.

Early Weaning and Forage Intake

A major expense in the production of weaned calves is the cost of forage and the land on which it is grown. Cost of forage can be even more critical during periods of drought when all feed for the cow herd must be purchased. Early weaning can be a good emergency tool during these times. An Illinois study showed that early weaned (110 days of age) fall-calving beef cow-calf pairs consumed 20% less total digestible nutrients, fed as hay, than normal weaned pairs. Additionally, the early weaned pairs were 43% more efficient in converting TDN to weight gain.

What To Do With the Calves

Although the benefits of early weaning on improving reproduction and reducing feed inputs to the cow have been recognized for many years, the factor limiting practical application of early weaning has been management of the early weaned calf. To date, the only programs for spring-born calves that permit "normal" rates of gain to typical normal weaning ages have been drylot programs. Young calves can be very efficient on high-concentrate rations and dry matter conversions of 4:1 are possible up to weights of about 500 lbs. However, feeding programs for young (2-7 month old) calves need to be "growing programs" that hold daily gains to levels similar to those achieved on the cow. These rates of gain will

generally range in the 2.0 to 2.5 lb/day range depending on frame size and growth potential of the calves. Otherwise, full-fed baby calves will get fat too early and will not finish at acceptable slaughter weights. Specialty programs such as limit-feeding of high concentrate rations are attractive to facilities than can manage the programs because of the efficiency and low cost that can be attained.

An "early weaning ration" developed during the OSU studies is shown in Table 5. This is a very palatable ration that is readily consumed by young calves. Intake should be about 3% of body weight within 7 days. Gains to normal weaning age will be in the 2.0 to 2.5 lb/day range. Of course, endless possibilities exist for such rations but this one has been very successful for early weaned calves and stressed light-weight stockers.

As a rule, cattle need to be moved to progressively increasing levels of energy as they move toward slaughter. Moving calves from a high rate of gain in drylot to native range, for example, will result in poor gains. Therefore, calves raised in drylot to normal weaning age on mixed rations need to be moved to nutritional programs with good gain potential after finishing the drylot growing phase. Calves raised to 7 months of age in drylot probably need to be moved to a feedlot or a forage with the gain potential of wheat pasture.

Oklahoma has one forage system that may provide an answer for fall-calving programs needing to early wean, namely wheat pasture. In a preliminary trial at OSU, 55 calves born in September and October, 1993 were weaned on December 14, held in drylot on prairie hay and 2 lbs of protein pellets, and moved to wheat pasture on December 29. Calves gained about 2 lbs/day on wheat through grazeout with no supplemental feed. Virtually all cows rebred with minimal supplement on native range. This system is currently under research at OSU. It offers the potential for reducing feed costs, increasing stocking rates on the native pasture and doing this with minimal labor. However, more health problems have been seen with early weaned fall-born calves than with spring-born calves.

Table 5. Ration for receiving very light calves or early weaning.

Ingredient	*% in ration, as fed*
Cottonseed hulls	14.7
Alfalfa pellets	15.1
Rolled corn	46.0
Cane molasses	4.7
Soybean meal	17.7
Calcium carbonate	1.0
Dicalcium phosphate	.5
Salt	.3
Vitamin A	2000 IU/lb
Vitamin E	20 IU/lb
Trace mineral	Cu, Zn, Se as needed to meet NRC req.
Coccidiostat	As per veterinarian's preference
Ration Specs (DM basis)	
Dry matter, %	88.2
NEm, Mcal/100 lb	82
NEg, Mcal/100 lb	50
Crude Protein, %	16.7
Potassium, %	1.2
Calcium, %	.95
Phosphorus, %	.45

Managing Health of Early Weaned Calves

Spring-calving herds present a couple of problems that should not be serious concerns for fall-calving herds. First, there presently is no summer equivalent to wheat pasture for grazing of early weaned calves. Therefore, any early weaning program for spring-born calves will need to utilize some type of drylot feeding program. Growing programs for early weaned calves studied at OSU have involved full-fed rations (Lusby, et al, 1981; Gill et al., unpublished) and limited program-fed rations (Lusby, et al., 1991).

Minimal health problems have been observed in spring-born calves with university and producer cattle demonstrations when the calves were maintained on the home ranch. However, serious problems have been encountered when early weaned calves were moved directly from the cow to commercial feeding or growing facilities. We believe there must be some kind of prior preparation phase before exposure of young, early weaned calves to the stresses of shipment, weaning and the numerous pathogens circulating around a feedlot. The preparation phase probably will involve some concentrate feeding at the ranch of origin and a well-designed immunization program. More studies are needed to involve large numbers of calves from commercial ranches rather than small numbers of Experiment Station calves.

Vaccination programs for 2-4 month-old calves are obviously tricky and are left to the discretion of the attending veterinarian. Programs used to date have ranged from only clostridial vaccines at early weaning followed by virus and other vaccines at older ages to aggressive programs with the full gamut of vaccines at early weaning and repeated re-vaccinations.

Observations and Conclusions

1. Early weaning is a fairly predictable method of salvaging high reproduction rates during droughts, management mistakes and other emergencies.
2. The early weaned calves are pretty tough and learn to eat palatable rations quickly. Health problems when calves are weaned and kept on the ranch have been minimal. Stressful procedures like castration and dehorning should be performed well ahead of early weaning.
3. If at all possible, early weaned calves should be managed on the ranch or managed with only a short haul for some period after weaning.
4. Management of early weaned calves in commercial feedlots is risky and requires close coordination of the rancher, feedlot manager, nutritionist and veterinarian. Each must understand the program and all must cooperate. Mistakes have long-term and often fatal consequences.
5. Wheat pasture offers the potential of high rates of gain for early weaned fall-born calves.
6. There are not presently any forage-based programs for early weaned spring-born calves during the summer that permit gains equal to that on the cow. Crabgrass may offer promise but has not been researched. Ongoing

research at OSU suggests that gains of about 1.5 to 1.75 lb/day can be achieved with 3 or 4 lb/day of supplemental feed and summer grass. While not a great rate of gain, it is economical and the calves probably would do very well on wheat in the fall.

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