

THE INFLUENCE OF POSTPARTUM NUTRITION OF WEANING AGE OF CALVES  
ON COW BODY CONDITION, ESTRUS, CONCEPTION RATE AND CALF  
PERFORMANCE OF FALL-CALVING BEEF COWS

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Story in Brief

Data combining the first three years of a four-year study was collected on 140 fall-calving beef cows, ranging in age from 2-7 years of age, to determine the influence of postpartum nutrition on cow and calf performance. The cows were either fed a Moderate (maintain a body condition score 6) or Low (no supplemental protein) level of nutrition from calving (October 1) to the start of the breeding season (January 1). All cows were fed the Moderate level from the start of the 63 day breeding season until warm season grasses began to grow (April 30).

Moderate cows lost less body weight and were able to remain in acceptable body condition to the start of the breeding season. As a result, Moderate cows had a 3.6 percent higher return to estrus (96.9 vs 93.3 percent), exhibited postpartum estrus 16.8 days earlier (48.4 vs 65.2 days) and had a 15.8 percent higher conception rate (95.5 vs 76.7 percent) than Low cows. The added supplement provided Moderate cows from calving to the start of the breeding season amounted to \$59.80 per cow.

Calves nursing Moderate cows to 210 days were 19 lb heavier than calves nursing Low cows (436 vs 417 lb). Calves nursing Moderate cows to 285 days were 14 lb heavier than calves nursing Low cows (620 vs 606 lb). When conception rate is considered, the added cost of supplementing Moderate cows is compensated for by the difference in pounds of calf per cow exposed to the bull.

Weaning and selling calves at 9-10 months of age rather than 7 months resulted in 186 lb additional selling weight or \$58.06 per calf. Calves that remained on their dams for 285 days were 59 and 69 lb heavier and \$38-45 more valuable than calves weaned at 210 days and ran as stockers on native pasture for 75 days. Cows weaning calves at 285 days were lighter in weight and thinner in condition at 285 days postpartum than cows weaning their calves at 210 days; however, body weight and flesh were still acceptable.

Introduction

Approximately 30 to 40 percent of the beef cows in Oklahoma calve in the fall (September-December). Fall-calving cows are typically in better condition going into the calving season than spring calving cows. Little is known about the combined effects of condition at calving and postpartum level of nutrition on the reproductive performance of fall-calving cows, especially when the availability and quality of forage is decreased. While it may be possible to increase the pay weight of the calves by extending the weaning period to 9-10 months, the effect on cow condition and reproductive performance is unknown.

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The purpose of this study is to determine the influence of postpartum nutrition and weaning age of calves on cow body condition, postpartum interval to first estrus, conception rate and calf performance of fall-calving beef cows.

### Experimental Procedure

Data combining the first three years of a four year study were collected on 104 fall-calving Angus x Hereford cows, ranging in age from 2 to 7 years, at the Southwestern Livestock and Forage Research Station. The range on the research station, classified in excellent condition, is predominantly little bluestem (*Andropogon Scoparius*) and has a carrying capacity of approximately 7 acres per cow-calf unit on a year-long basis. The range forage is normally dormant from early November (first frost) to late April.

Two postpartum nutritional levels were evaluated. The Moderate level consisted of abundant native forage plus 5 lb cottonseed meal (41 percent CP) per head per day from calving (October 1) to the start of the breeding season (January 1). This amount of supplemental feed should maintain fall-calving cows in a body condition score 6. The Low level consisted of heavily grazed native forage and no supplemental protein from calving to the start of the breeding season.

At the start of the breeding season (January 1), all cows were fed 5 lb of cottonseed meal daily to April 30. Throughout the study, all cows were fed three times per week (daily allowance x 7 - 3). After April 30, all cows grazed common pasture through weaning.

Individual cow weights and body condition scores were taken after a 12-hour shrink biweekly from September 1 to March 3 (end of the breeding season) and monthly from March 3 to September 1. The condition scores were based on a scale of 1 (very thin) to 9 (very fat).

All calves were weighed and eartagged within 24 hours after birth. The calves remained with their dams on native pasture until weaning and did not receive creep feed. Calf weights were obtained after a 6-hour shrink biweekly until the end of the breeding season and monthly thereafter. To determine the effect of weaning age on calf and cow performance, calves were weaned from their dams at 210 or 285 days of age (+ 7 days). Weaning occurred biweekly from April 1 to August 17. Assignments to weaning age within postpartum nutrition level were made on the basis of calving date to equalize the effects within treatment groups. The age-corrected weaning weights were adjusted for age of dam by Beef Improvement Federation Guidelines and all heifer calves were corrected to a steer equivalent by multiplying by 1.05. Calves weaned at 210 days were fed a high roughage weaning ration (*ad-libitum*) for two weeks to reduce weight loss associated with the stress of weaning. After the two-week period, the weaned calves were placed on native pasture similar to that grazed by the nursing calves and received no additional feed. Steer calves were implanted with Ralgro in February and reimplanted in June.

From calving to the start of the breeding season, teaser bulls with chin ball markers and visual observation were used to detect estrus. During the breeding season (January 1 to March 3), the cows were divided into four breeding groups on the basis of postpartum nutrition level and weaning age of the calf. All cows were purchased bred to Charolais and Hereford bulls. During the subsequent breeding seasons, all cows were exposed to Beefmaster bulls which were rotated biweekly among pastures. Cows were observed for breeding activity twice daily and herd bulls were

equipped with chin-ball markers to assist in determination of breeding dates.

## Results and Discussion

### Cow weight and condition

At calving, cows in both postpartum nutritional levels were acceptable in body weight and body condition (Table 1). Moderate cows lost 4.4 percent of their postcalving weight and 0.4 body condition score to the start of the breeding season (January 1). The feeding of no supplemental protein to the Low cows from calving to the start of the breeding season resulted in only a 4.3 percent greater body weight loss but the Low cows lost almost one full body condition unit. This reduction of body condition meant the Low cows entered the breeding season below acceptable body condition.

The use of 5 lb of cottonseed meal daily during the breeding season was not adequate to maintain the weight of either nutritional group. The additional supplement fed the Low cows maintained their body condition. However, the Low cows were still lighter in weight and thinner in body condition at the end of the breeding season than Moderate cows.

Table 1. Cow weights, percent weight change and body condition scores

	Postpartum nutrition levels	
	Moderate	Low
No cows	161	150
Initial wt, post calving	1032	1028
Wt, start of breeding season	984	936
Wt, end of breeding season	902	868
Wt, at weaning		
Calf weaned at 210 days	967	906
Calf weaned at 285 days	1077	1087
Wt change, %		
Initial to start of breeding	-4.4	-8.7
Initial to end of breeding	-12.6	-15.4
End of breeding to weaning		
Calf weaned at 210 days	+5.1	+6.1
Calf weaned at 285 days	+22.1	+23.3
Initial to weaning		
Calf weaned at 210 days	-8.2	-10.7
Calf weaned at 285 days	+6.8	+4.2
Condition score		
Initial	5.9	5.8
Start of breeding	5.5	4.9
End of breeding		
Calf weaned at 210 days	5.5	5.2
Calf weaned at 285 days	6.0	6.0

With the advent of warm season grass growth in April and May, all cows were able to regain considerable weight and condition to weaning.

The effect of weaning age of calves on cow weight and body condition is illustrated in Table 2. Cows weaning calves at 210 days were heavier and in better condition at 285 days postpartum than cows weaning calves at 285 days. Even though cows weaning calves at 385 days were thinner in condition at weaning, they were very acceptable (6.0). It should be noted that these were fall-calving cows and the additional 75 days encompassed the peak nutritional period of the native forage. Under a spring-calving regime, an additional 75 days would result in weaning during December, January and February, the poorest months in terms of nutritive value of the forage.

**Table 2. Effect of weaning age of calves on cow weight and cow body condition**

Postpartum nutrition	Days post-calving	
	210	285
<b>Moderate</b>		
Calves weaned at 210 days		
Cow weight, lb	967	1146
Cow condition score	5.5	6.7
Calves weaned at 285 days		
Cow weight, lb	924	1077
Cow condition score	5.5	6.0
<b>Low</b>		
Calves weaned at 210 days		
Cow weight, lb	906	1102
Cow condition score	5.2	6.5
Calves weaned at 285 days		
Cow weight, lb	943	1087
Cow condition score	5.3	6.0

### Reproductive performance

Reproductive performance was affected by the level of postpartum nutrition (Table 3). Moderate cows had a 3.5 percent higher return to estrus and exhibited estrus 16.8 days sooner than Low cows. As a result of the longer postpartum interval to first estrus and a 63-day breeding season, 15.8 percent fewer Low cows conceived as compared to Moderate cows.

### Calving data

At 210 days of age, calves nursing Moderate cows were 19 and 12 lb heavier than calves nursing Low cows (Table 4). The Moderate cows were fed protein supplement from calving to January 1, while the Low cows received none. This increased supplementation cost \$59.80 (560 lb x \$0.13/lb) for the Moderate cows. The additional weight at 210 days of the Moderate calves appears insufficient to make up the difference in

**Table 3.** The effect of postpartum nutrition on the reproductive performance of fall-calving beef cows

	Postpartum nutrition levels	
	Moderate	Low
No of cows	161	150
No exhibiting estrus	156	140
Days postpartum to first estrus	48.4	65.2
No of cows bred	149	115
Percent cows exposed actually bred	92.5	76.7

**Table 4.** The effect of dam's postpartum nutrition level and weaning age on calf weights

Dam's postpartum nutrition level	Moderate		Low	
	No.	Wgt	No.	Wgt
Adjusted 210 day wgt, lb				
Calves weaned at 210 days	85	436	76	417
Calves weaned at 285 days	76	431	74	419
Adjusted 285 day wgt, lb				
Calves weaned at 210 days <sup>a</sup>	85	561	76	537
Calves weaned at 285 days	76	620	74	606

<sup>a</sup> Calves weaned at 210 days, creep fed for 14 days and run as stockers on native pasture for 61 days.

protein cost. However, if conception rate is considered (Table 3), the Moderate calves were 81 lb heavier (401 vs 320 lb) per cow exposed to the bull. The market price for 300-500 lb feeder steers at Oklahoma City from April 15, 1983 to June 15, 1983 (approximately 210 days) averaged \$79/cwt. This 81 lb difference amounts to \$64 advantage to Moderate calves. The added cost of supplementing Moderate cows is compensated for by the difference in pounds of calf per cow exposed to the bull.

Delaying weaning of fall-born calves until 9-10 months of age to take advantage of the high quality summer forage results in a major improvement in selling weight. Weaning calves at 285 days resulted in an average of 186 lb additional selling weight than weaning and selling at 210 days. Since the average weight of calves weaned at 210 days was 427 lb, the gross return for calves weaned and sold at 210 days was \$337.33. The average weight of calves weaned at 285 days was 613 lb. The market price for 500-700 lb feeder steers at Oklahoma City from June 27, 1983 to August 27, 1983 (approximately 285 days) averaged \$64.50/cwt. Therefore, the gross return for calves weaned at 285 days

was \$395.39. Delaying weaning by 75 days increased calf revenue \$58.06 without adding any expense or detrimental effects on the cows.

Calves weaned at 285 days were 59 and 69 lb heavier for Moderate and Low levels, respectively, than calves weaned at 210 days and grazed as stockers on native pasture for 75 days. The reduction in stress at weaning plus the additional milk of the dam resulted in an added daily gain of .79 and .92 for Moderate and Low levels, respectively. This management practice alone resulted in an increase revenue of \$38-\$45 per calf.

The birth weights of the Charolais-sired and Beefmaster-sired calves were very similar while Hereford-sired calves were approximately 9 lb lighter (Table 5). Charolais-sired calves were heaviest under all management systems, followed by Beefmaster- and Hereford-sired calves.

Since weaning at 9-10 months of age had no detrimental influence on fall-calving cows and calf revenue was increased by late weaning, it appears that 285 day weaning is a feasible practice. However, our study indicates that breed of sire and postpartum plane of cow nutrition can have significant impacts on the production system. If 7 month weaning is practical, the producer needs to find a feeding and grazing system that increases the weaning weight of 210 day old calves.

Table 5. The effect of breed of sire on calf weights

Breed of sire	Charolais		Hereford		Beefmaster	
	No	Wgt	No	Wgt	No	Wgt
Adjusted birth weight, lb	60	87.2	41	77.5	210	86.5
Adjusted 210 day weight, lb	60	478	41	381	210	421
Adjusted 285 day weight, lb <sup>a</sup>						
Calves weaned at 210 days	30	593	20	503	111	546
Calves weaned at 285 days	30	676	21	584	99	606

<sup>a</sup>Calves weaned at 210 days, creep fed for 14 days and run as stockers on native pasture for 61 days.