

The Influence of Postpartum Nutrition and 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 two years of a four-year study were collected on 112 fall-calving Angus x Hereford cows, ranging in age from 3 to 6 years, 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 (10 percent greater weight loss than Moderate) level of supplementation from calving to the start of the breeding season. From the start of the 63-day breeding season until warm season grasses began to grow, all cows were fed the Moderate level of supplementation.

Moderate level cows lost less body weight and body condition to the start of the breeding season than the Low level cows. As a result, Moderate level cows had a 6.9 percent higher return to estrus (90.8 vs. 83.9 percent), exhibited postpartum estrus an average of 17.6 days sooner (46.6 vs. 64.2 days) and had a 19.4 percent higher conception rate (90.8 vs. 71.4 percent) than Low level cows. Feeding the Moderate level of supplementation to the Low level cows during the breeding season increased their body condition score, but the Low level cows were still lighter in weight and thinner in condition at the end of the breeding season than the Moderate level cows. Weaning the calves at 285 days appeared to have little effect on cow weight or cow body condition score. Adjusted weaning weight of the calves was not affected by the dam's level of supplementation prior to breeding, but definitely was affected by breed of sire, month of birth and weaning date. Calves born later in the fall had heavier adjusted 210 and 285 day weights than calves born early in the fall. Calves weaned at 285 days were 61 and 82 lb heavier for the Moderate and Low levels, respectively, than calves weaned at 210 days and grazed on native pasture for 75 days. Weaning at 285 days resulted in 160 lb additional selling weight than weaning and selling at 210 days. Charolais-sired calves were 53 and 79 lb heavier at 285 days than Beefmaster-sired and Hereford-sired calves, respectively, regardless of weaning method.

Introduction

Approximately 30 to 40 percent of the beef cows in Oklahoma calve in the fall (September-December). Fall-calving cows vary considerably in body

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condition at calving due to differences in forage availability and level of protein supplementation. Many producers wean fall-born calves late (9-10 months of age) to take advantage of summer grasses and thus wean heavier calves. However, late weaning may have an adverse effect on cow condition.

Research with spring-calving cows indicates that cows on an adequate plane of nutrition prior to calving and in moderate flesh at calving have short postpartum intervals to first estrus and high conception rates. Fall-calving cows are typically in better condition going into the calving season than spring calving cows; however, little is known about the combined effects on 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.

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 two years of a four-year study were collected on 112 fall calving Angus x Hereford cows, ranging in age from 3 to 6 years, at the Southwestern Livestock and Forage Research Station. The range on the research station, classified in excellent condition, is little bluestem (*Andropogon scoparius*) predominantly 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 forage plus 5 lb of cottonseed meal (41 percent CP) per head per day from calving to the start of the breeding season. This amount of supplemental feed is typically believed necessary for fall-calving cows to maintain a body condition score 6 from calving (approximately October 1) to the start of the breeding season (January 1). The Low level of nutrition consisted of heavily grazed forage and 0 to 2 lb of cottonseed meal from calving to the start of the breeding season. The supplemental protein was varied to approximate a 10% greater weight loss from calving to the start of the breeding season in the Low level cows as compared to the Moderate cows.

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 identified by ear tag 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 performance as well as to create a 1.0 to 1.5 unit difference in cow body condition going into the subsequent calving

season, calves were weaned from their dams at 210 or 285 days of age, ± 7 days, by weaning 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, equipped with chin-ball markers, were placed with the cows. Teaser bull activity and visual observation twice daily were used for detection of estrus. During the breeding season (January 1 to March 3), the cows were divided into four breeding groups on the basis of post-partum 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

From calving to the start of the breeding season, the Moderate level cows lost less body weight and body condition with 5 lb of cottonseed meal daily than those fed the Low level (Table 1). The Moderate level cows were in moderate flesh (5.4 condition score) at the start of the breeding season. However, the Low level cows, fed 0-2 lb of cottonseed meal daily and over grazed pasture to the start of the breeding season lost almost a full body condition score. The use of 5 lb of cottonseed meal daily from the start of the breeding season (January 1) to the end of the breeding season (March 3) was not adequate to maintain the weight of either treatment group. The Moderate level cows lost an average of 82 lbs during the 63-day period while the Low level cows lost 70 lbs. The additional supplement fed the Low level cows during the breeding season tended to improve their body condition (4.8 to 5.0 body condition score). However, the Low level cows were still lighter in weight and thinner in condition at the end of the breeding season than the Moderate level cows.

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

The effect of weaning age of calves on cow body weight and cow body condition score is presented in Table 2. Weaning the calves at 285 days had very little effect on cow body weight or cow body condition score. All treatment groups gained weight (range = 104 to 137 lbs) and body condition (.4) from 210 days post-calving to 285 days post-calving. Therefore no detrimental effects on cow weight or body condition were noted by delaying weaning by 75 days. It showed to be noted that these were fall-calving cows and the additional 75 days were during the peak nutritional period for native grass. Under

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

	Postpartum Nutrition Levels	
	Moderate	Low
No. of cows	109	112
Initial wt, post calving	1009	996
Wt, start of breeding season	970	930
Wt, end of breeding season	888	860
Wt, at weaning		
Calf weaned at 210 days	1045	1000
Calf weaned at 285 days	1113	1119
Wt change, %		
Initial to start of breeding	-3.9	-6.6
Initial to end of breeding	-12.9	-13.7
End of breeding to weaning		
Calf weaned at 210 days	+ 17.6	+ 16.3
Calf weaned at 285 days	+ 25.3	+ 30.1
Initial to weaning		
Calf weaned at 210 days	+ 3.6	+ 0.4
Calf weaned at 285 days	+ 10.3	+ 12.3
Condition score		
Initial	5.8	5.5
Start of breeding	5.4	4.8
End of breeding	5.2	5.0
Weaning		
Calf weaned at 210 days	6.3	6.0
Calf weaned at 285 days	6.0	6.0

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

Postpartum Nutriton	Days post-calving	
	210	285
Moderate		
Calves weaned at 210 days		
Cow weight, lbs	1045	1182
Cow condition score	6.3	6.7
Calves weaned at 285 days		
Cow weight, lbs	985	1113
Cow condition score	5.6	6.0
Low		
Calves weaned at 210 days		
Cow weight, lbs	1000	1113
Cow condition score	6.0	6.4
Calves weaned at 285 days		
Cow weight, lbs	1015	1119
Cow condition score	5.6	6.0

a spring calving regime, an additional 75 days would mean weaning in December, January and February, the poorest months in terms of nutritive value for the forage.

Reproductive performance

The reproductive performance of fall-calving cows was definitely affected by level of postpartum nutrition (Table 3). Cows on the Moderate level of nutrition postpartum had a 6.9 percent higher return to estrus and returned to normal estrus activity 17.6 days sooner than the Low level cows. As a result of the long postpartum interval to first estrus for the Low level cows and only a 63-day breeding season, 19.4 percent fewer cows conceived as compared to the Moderate level cows.

Calving data

The mean adjusted birth weights and adjusted 210 and 285 day weights are presented in Table 4. The level of postpartum nutrition had little effect on the weaning performance of the calves. However, breed of sire, month of birth and weaning age had marked influences on calf performance.

Beefmaster-sired calves were heaviest at birth, but Charolais-sired calves were 53 and 79 lb heavier at 285 days than Beefmaster-sired and Hereford-sired calves, respectively, regardless of weaning method. Even though the Beefmaster-sired calves were somewhat large at birth, only 3 calves required assistance at birth.

Month of birth had a significant effect on 210 day and 285 day weights. As month of birth increased from September to December, adjusted 210 day and adjusted 285 day weights also increased, apparently due to the influence of spring and summer grazing by the calves.

Delaying the weaning of fall-born calves until 9-10 months of age to take advantage of the high quality summer forage appears to result in a major improvement in selling weight. The weaning of calves at 285 days resulted in an average of 160 lbs additional selling weight than weaning and selling at 210 days. The market price for 300-500 lb feeder steers at Oklahoma City from April 15, 1982 to June 15, 1982 (approximately 210 days) average \$73/cwt. Since the average of all calves at 210 days was 412 lbs, the gross return to calves weaned and sold at 210 days was \$300.76. The market price for 500-700 lb feeder steers at Oklahoma City from June 27, 1982 to August 27, 1982 (approximately 285 days) averaged \$66/cwt. Since the average of all calves at 285 days was 571 lbs, the gross return for calves weaned and sold at 285 days was \$376.86. The resulting increase in revenue was \$76.10 per calf simply by delaying weaning by 75 days. Since weaning the calves at 285 days appeared to have very little effect on cow body weight gain or cow body condition score (Table 2) the limiting factor seems to be sufficient forage to allow grazing by both cows and calves without depleting the forage reserve for winter grazing.

In addition, leaving the calves on the cow until 285 days rather than weaning at 210 days and running the calves on grass for 75 days appears to be advantageous. Calves weaned at 285 days were 61 and 82 lb heavier for the Moderate and Low levels, respectively, than calves weaned at 210 days and grazed on native pasture for 75 days. The reduction of stress at weaning plus the additional milk of the dam resulted in an added 1 lb per day gain. This management practice alone resulted in an increase revenue of \$47 per calf.

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

	Postpartum nutrition levels	
	Moderate	Low
No. of cows	109	112
No. exhibiting estrus	99	94
Days postpartum to first estrus	46.6	64.2
No. of cows bred	99	80
Percent cows exposed actually bred	90.8	71.4

Table 4. The effect of weaning age and breed of sire on calf weights.

Dam's postpartum nutrition level	Moderate			Low			
	Breed of sire	Charolais	Hereford	Beefmaster	Charolais	Hereford	Beefmaster
No. of calves		31	19	59	29	22	59
Adjusted birth wt, lbs		85.2	75.3	87.5	82.8	77.9	89.8
Adjusted 210 day wt, lbs							
Calves weaned at 210 days		462	370	423	437	357	408
Calves weaned at 285 days		469	379	395	464	381	398
Adjusted 285 day wt, lbs							
Calves weaned at 210 days		593	510	545	553	482	528
Calves weaned at 285 days		658	582	591	654	569	586