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## Effects of weaning on body condition recovery and calf performance in previously nutritionally restricted cow-calf pairs

### Abstract

Drought, defined as less than 75% of normal rainfall, occurs once every 5 to 7 years in Northwest Kansas. Record widespread drought conditions throughout the Midwest and Western United States in 2012 resulted in an early reduction in forage quality and availability. In these situations, cow-calf producers are faced with deciding how to adapt to the conditions. Some producers may be unprepared for the speed at which cows can lose body condition in the face of declining pasture conditions and how much it takes to regain body condition. Early weaning is one option that can improve a cow's nutritional status, conserve forage, and delay the need for supplementation. The price slide between lightweight early weaned calves and heavier calves is an important factor in the economic outcome of that decision. Feed use and cow and calf performance data are needed to evaluate production and economic differences between early and normal weaning scenarios. The objective of this study was to quantify intake differences between dry and lactating cows that had previously been nutritionally restricted and measure feed consumed by calves still nursing dams.

### Keywords

Kansas Agricultural Experiment Station contribution; no. 13-162-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1083; Swine; Weaning; Performance data; Nutrition

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# Effects of Weaning on Body Condition Recovery and Calf Performance in Previously Nutritionally Restricted Cow-Calf Pairs

*M.A. Ward<sup>1</sup> and S.K. Johnson*

## Introduction

Drought, defined as less than 75% of normal rainfall, occurs once every 5 to 7 years in Northwest Kansas. Record widespread drought conditions throughout the Midwest and Western United States in 2012 resulted in an early reduction in forage quality and availability. In these situations, cow-calf producers are faced with deciding how to adapt to the conditions. Some producers may be unprepared for the speed at which cows can lose body condition in the face of declining pasture conditions and how much it takes to regain body condition.

Early weaning is one option that can improve a cow's nutritional status, conserve forage, and delay the need for supplementation. The price slide between lightweight early weaned calves and heavier calves is an important factor in the economic outcome of that decision. Feed use and cow and calf performance data are needed to evaluate production and economic differences between early and normal weaning scenarios. The objective of this study was to quantify intake differences between dry and lactating cows that had previously been nutritionally restricted and measure feed consumed by calves still nursing dams.

## Experimental Procedures

A combination of 36 primiparous and multiparous cows, primarily Angus and South Devon crosses, were blocked by age and randomly allotted to 1 of 2 treatments, early weaned and normal weaned. All cows were fitted with electronic identification tags and placed in a drylot pen that was equipped with a GrowSafe 6000 digital intake monitoring system (GrowSafe, Ltd., Alberta, Canada). The cows were offered a free-choice ration designed to meet the nutritional requirements of a cow at 120-plus days of lactation. The ration was composed of ground Conservation Reserve Program (CRP) hay (70.2%), wet distillers grains (28.3%), and a mineral package (1.5%), all dry matter basis, and was delivered 3 times per day. Consecutive weights were taken on the first, middle, and last 2 days of the feeding period. Body condition scores (1 = thin; 9 = very fat) were assigned by 2 individuals on day 0 and 77 of the trial. Statistical models used to evaluate the effects of treatment on weight and condition change included starting weight and starting body condition score as covariates.

The early weaned calves were weaned at an average of 150 days of age on the first day of the feeding period. During the trial, the normal weaned calves were given access to the same diet as the cows through a creep gate system. Calves had experience eating from a bunk prior to the start of the trial. The normal weaned calves were weaned at the conclusion of the trial at 228 days of age. Calf weights were taken at day 0 and 77 of the trial.

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## Results and Discussion

At the start of the feeding period, primiparous cows had lower ( $P < 0.01$ ) body condition scores ( $3.3 \pm 0.2$ ) than multiparous cows ( $4.0 \pm 0.1$ ); however, no significant differences were present in cow body weight or condition between treatments at the initiation of the study (Table 1). Cows in both treatments gained weight during the feeding period, but gain was greater ( $P < 0.01$ ) for early weaned than normal weaned cows, at 137 lb and 93 lb, respectively. Starting body condition was a significant ( $P < 0.03$ ) factor in explaining cow weight gain.

At the end of the feeding period, end weight was higher ( $P < 0.01$ ) for early weaned than normal weaned cows. Final cow body condition score and body condition change tended ( $P < 0.08$ ) to be greater in early weaned than normal weaned cows. Compared with mature cows, 2-year-old cows had lower final condition scores,  $4.9 \pm 0.1$  vs.  $4.3 \pm 0.1$ , respectively. The improvement in body condition was greater ( $P < 0.01$ ) in mature cows ( $1.2 \pm 0.1$ ) than in 2-year-old cows ( $0.5 \pm 0.1$ ). Since shortly after calving, the 2-year-old cows had been managed with the mature cows, which likely played a role in their inability to maintain the same condition as mature cows.

Average dry matter intake was 20.4 and 25.6 lb for early weaned and normal weaned cows, respectively, which is somewhat higher than National Research Council–predicted values. The bulky diet presented some challenges in the GrowSafe feeders. The variability in recorded intake likely prevented statistical differences in intake being noted between treatments.

Weaning occurred for normal weaned calves on day 77, at which point calves had gained an average of 2.1 lb per day. Total weight gain during the feeding period was less ( $P < 0.01$ ) for calves born to 2-year-old dams ( $141 \pm 8$  lb) than for calves born to mature cows ( $166 \pm 5$  lb).

Feed delivered directly to the calf creep bunk averaged 3.6 lb per head per day (dry matter basis). This is an underestimate of feed use, because some of the larger calves would eat from the GrowSafe bunks when cows were finished.

Differences in cow dry matter intake, pen intake for calf creep, and calf weights were used to develop a partial budget comparing the two weaning options. Calf prices were based on a 5-year average of Kansas weighted prices in August and October. Observations were limited for August in some years. Wet distillers grain price was taken from a 5-year average of United States Department of Agriculture weekly Nebraska distillers grain reports. A sound historical price series for CRP hay was lacking, so Kansas weekly hay reports for good grass hay were used as an alternative. Net income was higher for the normal weaned calves when calculated using long-term average prices and including the cost of additional feed for lactating cows and creep feeding calves (Table 2). Using this year's actual feed cost and average calf prices of \$188.66/cwt and \$162.96/cwt, respectively; the early weaned calves returned a \$16 advantage compared with normal weaned calves.

## Implications

When calves are weaned earlier than normal, forage is conserved from both the cow and calf. When cows become thin due to nutritional restriction, considerable time and a high-quality diet are needed to regain condition. First-calf heifers, however, still lag in recovery time compared with mature cows. Young cows that remain thin postweaning may experience reduced longevity and profitability.

**Table 1. Weight and condition change for early and normal weaned cows and calves during a 77-day feeding period**

Trait	Early weaned <sup>1</sup>	Normal weaned <sup>1</sup>	
Number	18	18	
Day 0			
Cow age (year)	4.3 ± 0.6	4.6 ± 0.6	
Julian calving date	57 ± 3	60 ± 3	
Calf weight, lb	351 ± 13	367 ± 13	
Cow weight, lb	1023 ± 39	1072 ± 38	
Cow body condition score	3.6 ± 0.2	3.9 ± 0.2	
Day 77			
Cow weight, lbs	1182 ± 10	1137 ± 10	**
Cow body condition score	4.7 ± 0.1	4.5 ± 0.1	†
Cow weight change, lb	137 ± 10	93 ± 10	**
Cow condition change	0.9 ± 0.1	0.7 ± 0.1	†
Cow dry matter intake/day, lb	20.4 ± 3.0	25.5 ± 3.0	
Final calf weight, lb		518 ± 6	
Calf weight change, lb		159 ± 6	

<sup>1</sup>Mean ± standard error.

\*\*  $P < 0.01$ ; †  $P = 0.08$ .

**Table 2. Cost analysis of early weaned versus normal weaned calves**

	Early weaned	Normal weaned
Weaning weight, lb	351	518
Income per calf	\$552.61 <sup>1</sup>	\$643.10 <sup>1</sup>
Feed cost, cow <sup>2</sup>		\$26.74
Creep feed, calf		\$32.67
Net income per calf	\$552.61	\$583.70

<sup>1</sup>5-year Kansas weight average price: 350-lb calves in August, \$157.44/cwt; 550-lb calves in October, \$124.15/cwt.

<sup>2</sup>7.8 lb more was fed normal weaned than early weaned  $\times$  77 days  $\times$  \$0.045/lb feed; creep feed normal weaned 9.53 lb/day.