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E.A. Koch

J.A. Christopher

T.T. Marston

Ryan M. Breiner

See next page for additional authors

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Abstract
Commercial cow/calf pairs (Angus based, n=103) were used to determine the effect of calf weaning age on cow body weight and body condition score (scale=1 to 9) and calf performance in terms of subcutaneous fat and marbling deposition. Only cows with male progeny (steers, n=52; bulls, n=51) were used in this study. Treatments were: 1) early-weaned bulls, 2) early-weaned steers, 3) traditionally weaned bulls, and 4) traditionally weaned steers. Cow/calf pairs grazed pastures at four different locations. Calving began February 1, 2003, and ended in early April. In the early-weaned treatment group, calves were weaned June 25, with an average age of 115 days. In the late-weaned treatment group, calves were weaned October 6, with an average age of 218 days. The data indicate that the cows in the early-weaned treatment group gained 121 lb more weight (P<0.0001), had 0.13 inches more external backfat (P<0.0001), and had an average body condition score 1.2 greater (P<.0001) than their late-weaned counterparts. All steer calves were implanted before they entered the feedlot. Early weaning and subsequent feedlot placement produced heavier calves at approximately nine months of age. Ultrasound technology indicated that early-weaned calves had greater backfat and marbling scores 26 days after feedlot placement than did traditionally weaned calves. However, the early-weaned bulls had less backfat at a similar average weight to their steer contemporaries.

Keywords
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Authors
E.A. Koch, J.A. Christopher, T.T. Marston, Ryan M. Breiner, and John A. Unruh

EFFECTS OF EARLY WEANING ON PERFORMANCE OF COW/CALF PAIRS

E. A. Koch, R. M. Breiner, J. A. Christopher, T. T. Marston, and J. A. Unruh

Summary

Commercial cow/calf pairs (Angus based, n=103) were used to determine the effect of calf weaning age on cow body weight and body condition score (scale=1 to 9) and calf performance in terms of subcutaneous fat and marbling deposition. Only cows with male progeny (steers, n=52; bulls, n=51) were used in this study. Treatments were: 1) early-weaned bulls, 2) early-weaned steers, 3) traditionally weaned bulls, and 4) traditionally weaned steers. Cow/calf pairs grazed pastures at four different locations. Calving began February 1, 2003, and ended in early April. In the early-weaned treatment group, calves were weaned June 25, with an average age of 115 days. In the late-weaned treatment group, calves were weaned October 6, with an average age of 218 days. The data indicate that the cows in the early-weaned treatment group gained 121 lb more weight (P<0.0001), had 0.13 inches more external backfat (P<0.0001), and had an average body condition score 1.2 greater (P<.0001) than their late-weaned counterparts. All steer calves were implanted before they entered the feedlot. Early weaning and subsequent feedlot placement produced heavier calves at approximately nine months of age. Ultrasound technology indicated that early-weaned calves had greater backfat and marbling scores 26 days after feedlot placement than did traditionally weaned calves. However, the early–weaned bulls had less backfat at a similar average weight to their steer contemporaries.

Introduction

Traditionally, calves are weaned when they are approximately 205 days of age. Nutrient requirements of the cow are much greater when she is lactating. Several research studies have indicated that early weaning will help alleviate the effects of limited nutrient intake associated with limited precipitation on young cows. In addition, some producers have voiced concerns about effects of early weaning on calf performance and health.

The objectives of this study were to determine if weaning age affects cow body weight and condition score and to investigate the effects of early weaning on male calf performance.

Experimental Procedures

Commercial cows (Angus based, n=103) nursing crossbred male calves (average birth date=March 2) were blocked by calf birth date and calf sire and randomly allotted to treatments. The four treatments consisted of weaning calves early (June 25) or at the traditional time (October 6) and as steer or bull calves. Therefore, treatments were: 1) early-weaned bulls, 2) early-weaned steers, 3) traditionally weaned bulls, and 4) traditionally weaned steers. Cow/calf pairs from all treatments were commingled within four native-grass pastures near Manhattan, Kansas (average stocking rate = 8 acres/cow-calf pair). All pastures were supplemented with a free-choice

salt/mineral mixture. Health maintenance programs and breeding seasons (May 21 to July 21) were similar between pastures and treatments. All calves were injected with Fortress 7 (Pfizer Animal Health) on May 27. Calves assigned to the steer group were castrated and received an implant of Component E-C (Vet-Life). Cows were examined for pregnancy in the fall.

Lactation periods for the early-weaned and traditional treatments averaged 115 days and 218 days, respectively. On both weaning dates, cows were weighed and body condition was scored. Body condition (scale = 1, emaciated; 9, obese) was the average of four independent estimates made by trained individuals. Additionally, on the late weaning date, external backfat of cows was measured by using ultrasound.

Calves weaned on June 25 were assigned to pens according to treatment and were fed a commercially available, complete starter ration. Daily feed intake was recorded for the pens, and calves were treated for illness as necessary. Feed intake averaged 11.3 lb (as fed) per day. On July 14, calf weight was recorded, and all weaned calves were shipped to the Agriculture Research Center in Hays, Kansas. Calves were assigned to feedlot pens by sex status, birth date, and sire. The feedlot grower ration for early-weaned calves is presented in Table 1. On September 1, the calves were adjusted to a high-protein finishing ration.

The calves designated for traditional weaning remained with the cows on native grass near Manhattan, Kansas, with no creep feed throughout the summer. Traditionally weaned calves were weaned and weighed on October 6. They were fed an average of 4.0 lb/day of a commercial grower ration and 10.3 lb/day of prairie hay until October 29, at which time calves were weighed and shipped to the Agriculture Research Center in Hays, Kansas. Early-weaned calves were also weighed on October 29 at the Agriculture Research Center. Feedlot rations are listed in Table 1. On November 25, all calves were weighed and ultrasound measurements were taken.

Results and Discussion

Table 2 illustrates the effect of the treatments on cow body weight, body condition score, and backfat measurements. Because cow weight and condition score were not affected by calf sex, data were pooled, and comparisons for cow parameters were made between weaning treatments. Cows on different treatments had similar body weights and conditions when the early-weaned calves were removed from their dams (June 25). Cows with calves weaned early in the summer weighed more and achieved greater body condition scores ($P<0.0001$) during the summer grazing period (June 25 to October 6) than the cows still nursing their calves. The additional 121 lb of body weight gain corresponded to 1.2 units of body condition. Furthermore, cows from the early weaned treatment averaged 0.13 inches greater backfat ($P<0.0001$) than the dams with later-weaned calves. Because cows were not measured for backfat on June 25, we cannot verify that backfat changes were different between treatments. However, correlation analysis indicates that ultrasound backfat measurements and body condition scores are positively related ($r=0.77$; $P<0.0001$). Almost all cows were diagnosed pregnant the subsequent fall, regardless of weaning treatment (early=96%; late=100%).

Average daily gains of early-weaned bulls and steers were 1.86 and 2.40 lb/day, respectively, from weaning until the calves were shipped to Hays (20 days). The traditionally weaned bulls and steers gained 1.17 and 1.20 lb/day, respectively, from weaning until the

calves were transported to Hays (23 days). The immediate post-weaning average daily gains were not compared between weaning treatments because different rations were fed.

On October 29, the early-weaned calves weighed more ($P<0.05$) than the traditionally weaned calves (Table 3). Regardless of weaning strategy, bulls and steers had similar ($P>0.05$) body weights within the weaning groups.

On November 24, after all calves had received a common feedlot diet for 25 days, calves were weighed at the Hays facility as well as measured by ultrasound for backfat and marbling. The early-weaned cattle weighed more than the traditionally weaned cattle on November 24 ($P<0.05$). Ultrasound indicated that the early-weaned steers had more ($P<0.05$) backfat than the early-weaned bulls. As would be expected, both of the early-weaned groups had more ($P<0.05$) backfat than either of the traditionally weaned groups. Based on ultrasound measurements, early-weaned steers had more ($P<0.05$) marbling than the traditionally weaned calves. The early-weaned bulls had marbling intermediate to the early-weaned steers and traditionally weaned cattle (Table 3).

During the summer, when the traditionally weaned calves were still on grass, some of the early-weaned calves (four steers, two bulls) experienced bloat and pneumonia in the feedlot. Three early-weaned calves were eventually removed from the trial because of chronic bloat, and three more early-weaned calves died. Although the cause of these deaths was not determined, they seemed to be caused by respiratory disease. The death loss for the early-weaned calves was nearly 6%. Meanwhile, no traditionally weaned calves were removed from the trial or lost for health reasons.

This study indicates that weaning age can be an effective means of increasing spring-calving cow body weight and condition, as well as backfat. Manipulating the length of lactation by adjusting the weaning date can be a useful management decision under a variety of production systems, especially those incorporating young cows, limited feed resources, and harsh weather conditions.

Table 1. Composition of Diets Fed to Weaned Calves at Agricultural Research Center – Hays, Kansas

Ingredient	Growing (7/14 to 8/31)	Finishing (9/1 to 10/29)	Finishing (10/30 to 11/24)
	---------- %, as fed basis ----------		
Sorghum silage	43.9	32.3	32.4
Milo	43.2	58.8	59.1
Soybean meal	8.9	6.1	6.0
Rumensin/Tylan premix	1.0	0.7	0.5
Ammonium sulfate	0.4	0.3	0.2
Limestone	2.1	1.5	1.1
Urea	-	-	0.3
Salt	0.5	0.4	0.4

Table 2. Effect of Weaning Age on Changes in Cow Body Weight, Body Condition Score, and External Backfat of Spring-Calving Cow/Calf Pairs

	Treatment			
Item	Early[b]	Traditional[c]	SE	P-value
No. of cows	52	51		
Average calving date	March 2	March 2		
Body weight, lb				
June 25	1181	1176	18.8	
October 6	1322	1201	8.3	0.0001
Gain, 6/25 to 10/6, lb	143	22	8.3	0.0001
Body Condition Scores[a]				
June 25	5.0	4.9	0.08	
October 6	6.2	4.9	0.07	0.0001
Change in BCS, 6/25 to 10/6	1.2	0.0	0.07	0.0001
Backfat on October 6, inch	0.30	0.17	0.009	0.0001
Pregnant, %	96	100		0.49

[a]Body condition scale: 1=emaciated; 9=obese.
[b]Early treatment group=calves weaned June 25.
[c]Traditional treatment group=calves weaned October 6.

Table 3. Weights and Ultrasound of Early-Weaned and Traditionally Weaned Steers and Bulls

	Early Weaned		Traditionally Weaned	
Item	Steers	Bulls	Steers	Bulls
Average calving date	March 2	March 4	March 1	March 5
Initial weight, lb	369	350	368	369
Post-weaning daily gain, lb				
June 25 to July 14	2.40[a]	1.86[b]	-	-
October 6 to October 29	-	-	1.17[a]	1.20[a]
Weight on October 29, lb	719[a]	716[a]	654[b]	674[b]
November 24				
Weight, lb	786[a]	781[a]	706[b]	714[b]
Backfat, inch	0.23[a]	0.19[b]	0.12[c]	0.11[c]
Marbling score	4.49[a]	4.36[ab]	4.04[b]	4.03[b]

[abc]Means within a row that have different superscript letters differ (P<0.05).
[d]Measurement of ultrasonic speckle generated by the cell walls of unfilled pre-adipocytes.