LENGTH OF THE WEANING PERIOD DOES NOT AFFECT POST-WEANING GROWTH OR HEALTH OF LIGHTWEIGHT SUMMER-WEANED BEEF CALVES

J. W. Bolte, K. C. Olson, J. R. Jaeger, D. U. Thomson, B. J. White, R. L. Larson, G. A. Milliken, N. A. Sproul, and M. D. Thomas

Introduction

Bovine respiratory disease (BRD) is the most economically devastating feedlot disease. Risk factors associated with incidence of BRD include: 1) stress associated with maternal separation; 2) stress associated with introduction to an unfamiliar environment; 3) low feed intake associated with the introduction of novel feedstuffs into the diet; 4) exposure to novel pathogens upon transport to a feeding facility and commingling with unfamiliar cattle; and 5) inappropriately administered respiratory disease vaccination programs. Management practices collectively referred to as preconditioning are thought to minimize carcass damage resulting from BRD.

Preconditioning management attempts to eliminate or reduce risk factors for respiratory disease by: 1) employing a relatively long ranch-of-origin weaning period following maternal separation, 2) exposing calves to concentrate-type feedstuffs, and 3) improving resistance to respiratory pathogens through a pre-weaning vaccination program. The effectiveness of such programs for preserving animal performance is highly touted by certain segments of the beef industry.

Ranch-of-origin weaning periods of up to 60 days are suggested for preconditioning beef calves prior to sale; however, the optimal length of the weaning period has not been determined experimentally. The objective of this study was to test the validity of beef industry assumptions about the appropriate length of ranch-of-origin weaning periods for summer-weaned calves aged 100 to 160 days.

Experimental Procedures

A total of 400 polled, spring-born calves (average body weight (BW) at weaning = 359 $\pm$ 69 lbs; average birth date = 03/21/2006 $\pm$ 19.5 days) were used for this experiment. One set of calves (n = 200) originated from the Kansas State University Cow-Calf Unit. The second set (n = 200) originated from the Kansas State University Agricultural Research Center at Hays (ARCH). Bulls were castrated at least 14 days prior to the study. At each location, calves were blocked by gender and age and assigned randomly to treatments that corresponded to the length of time between separation from their dam and shipping: 60, 45, 30, 15, or 0 days (n = 40/treatment at each location). Average age of calves on the date of maternal separation was 100, 115, 130, 145, and 160 days of age for calves weaned 60, 45, 30, 15, and 0 days before shipping, respectively. The study was initiated on June 15, 2007 (day -75 relative to shipping), and the common shipping date for all treatments was August 24, 2007 (day 0). All treatments had similar average age at shipping (160 $\pm$ 19 days). Body condition score of cows at both locations was measured 60 days before and 60 days after shipping.

All calves were given an initial modified-live vaccination for IBR, BVD, PI3, BRSV, (Bovi-Shield Gold FP, Pfizer Animal Health Exton, PA) and clostridial disease (Vision 7

with SPUR®, Intervet Inc., Millsboro, DE) 2 weeks prior to separation from their dam. They also were individually identified with a color-coded ear tag corresponding to treatment.

On the day of maternal separation, all calves were re-vaccinated for IBR, BVD, PI3, BRSV, and clostridial diseases; they also were treated for internal and external parasites using Dectomax® (Pfizer Animal Health Exton, PA) and weighed. Calves were immediately transported a short distance (< 15 miles) to a central home-ranch weaning facility.

Calves were maintained in earth-floor pens (four pens/treatment) at their respective home-ranch weaning facilities for a period of days corresponding to their assigned treatment. During that period, calves were fed a common weaning ration based on chopped hay, soybean meal, and sorghum grain and formulated to achieve an average daily gain (ADG) of 2.0 at a dry matter intake of 2.5% of BW.

Calves were monitored for symptoms of respiratory disease at 7:00 am and 2:00 pm daily during the weaning phase of the experiment. Calves with clinical signs of BRD, as judged by animal caretakers, were removed from home pens and evaluated. Each calf with clinical signs of BRD was weighed, had rectal temperature measured, and was given a clinical illness score (Table 1). Calves that presented with a clinical illness score greater than 1 and a rectal temperature >104.0ºF were treated according to the schedule described in Table 2. Cattle were evaluated 72 hours post-treatment and re-treated based on observed clinical signs.

Calves from all treatments and both origins were individually weighed and shipped from their respective weaning facilities to an auction market located at Russell, Kansas on August 24, 2007 (day 0). Calves from both locations were commingled with respect to gender, treatment, and body weight and maintained on the premises of the auction market for 14 hours. During that time, calves were moved through the normal processing facilities. The purpose of this step was to simulate pathogen exposure typically encountered by market-ready calves. Calves were shipped directly to ARCH from the auction market.

Upon arrival at ARCH, cattle were individually weighed and assigned randomly to a receiving pen on the basis of treatment and gender. Cattle continued to be fed the diet introduced after maternal separation for a period of 56 days after arrival at ARCH. Feed intake was measured daily. Calves were monitored for symptoms of respiratory disease, and clinical illness was treated as in the home-ranch receiving phase. Body weights were measured at 28-day intervals during this receiving phase.

Results and Discussion

Calf body weight at maternal separation and ADG from maternal separation to shipping decreased linearly ($P<0.03$) with successively earlier weaning dates (Figure 1). Consequently, calf BW at shipping tended to decrease linearly ($P = 0.06$) with successively earlier weaning dates. This probably occurred because calves were an average of 15 days younger at each weaning date. Longer suckling periods were associated with better ADG between weaning and shipping; however, calf ADG from birth to shipping was similar ($P>0.20$) between treatments. We concluded that under the conditions of our study, ranch-of-origin weaning periods of 60 to 15 days had modest affects on calf ADG prior to shipping. Incidence of undifferentiated fever was similar ($P = 0.18$) between treatments prior to shipping. In fact, only three calves were treated for respiratory disease and none expired during the pre-shipment phase of this study.

Feed intake (dry basis) during the first 30 days following shipping increased linearly (P = 0.02) as the length of the ranch-of-origin weaning period increased. Greater experience consuming grower diets prior to shipping translated to greater feed intake of a similar diet at the feedlot. Previous experience with concentrate-based feeds might benefit recently-received calves in some circumstances; however, incidence of undifferentiated fever, gain, and feed:gain in our study were similar (P>0.12) between treatments during the first 30 days in the feedlot (Figures 2, 3, and 4).

Similarity among weaning treatments in terms of growth and health performance calls into question beef industry assumptions about the appropriate length of ranch-of-origin weaning periods. Ranch-fresh, lightweight calves that are properly vaccinated before exposure to market conditions might not require ranch-of-origin weaning periods longer than 2 weeks.

Body condition score of cows was similar (P = 0.94) at the outset of the trial and increased linearly (P = 0.03) with successively earlier weaning dates (Figure 5). Earlier weaning dates can provide beef producers with significant financial benefits in terms of reduced feed costs and improved reproductive performance associated with improved cow body condition.

Implications

Under the conditions of our study, ranch-of-origin weaning periods of between 15 and 60 days did not improve calf health or growth performance relative to shipping calves immediately after maternal separation.

Table 1. Scoring System Used to Classify the Severity of Clinical Illness

Clinical Illness Score	Description	Clinical Appearance
1	Normal	No abnormalities noted.
2	Slightly Ill	Mild depression, gaunt, +/- cough
3	Moderate Illness	Severe depression, labored breathing, ocular/nasal discharge, +/- cough
4	Severe Illness	Moribund, near death, little response to human approach.

Table 2. Treatment Schedule Used to Treat Calves Diagnosed with Bovine Respiratory Disease Complex

Treat	Drug	Dose	Route of Injection
1st Pull	enrofloxacin (Baytril®)	5 ml/CWT	Subcutaneous
2nd Pull	florfenicol (Nuflor®)	6 ml/CWT	Subcutaneous
3rd Pull	oxytetracycline (Biomycin 200®)	5 ml/CWT	Subcutaneous

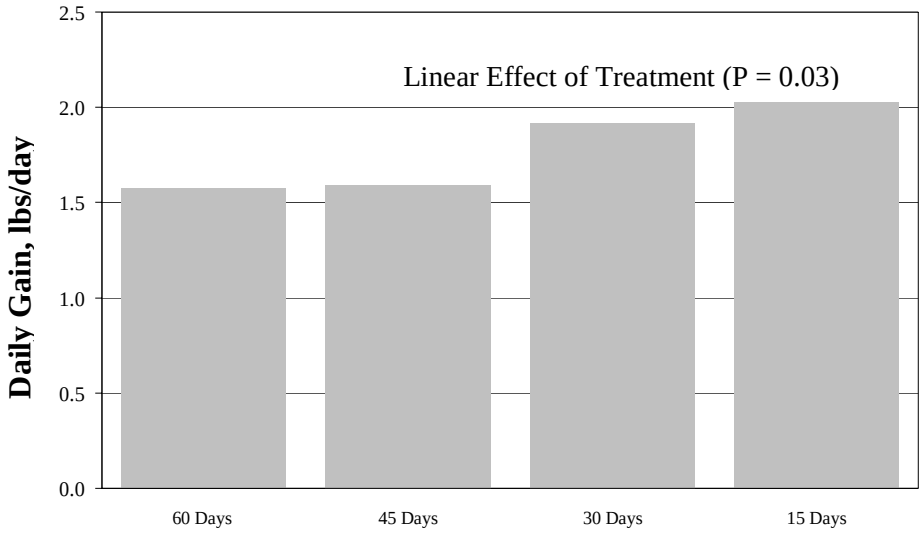

Figure 1. Effect of the Length of Ranch-of-origin Weaning Period on Daily Gain of Lightweight Calves Between Weaning and Shipment to an Auction Market.

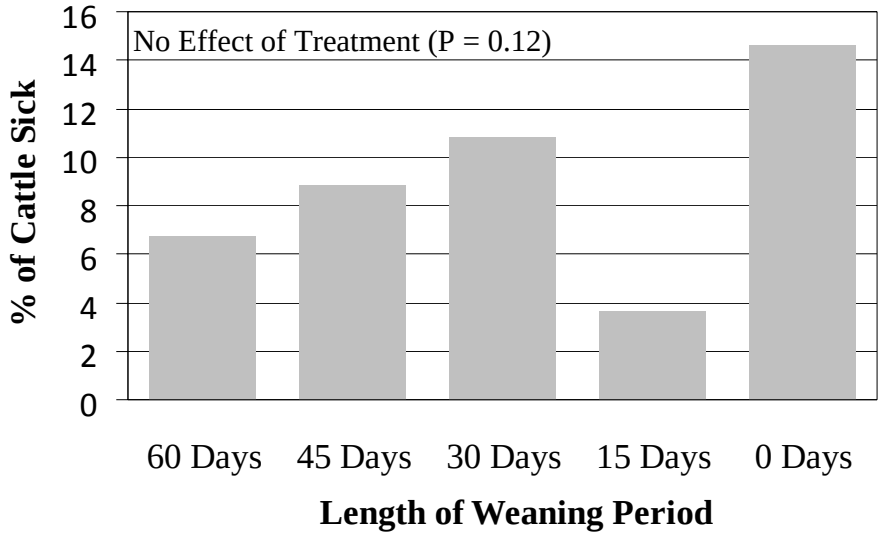

Figure 2. Effect of the Length of Ranch-of-origin Weaning Period on Incidence of Undifferentiated Fever in Lightweight Calves During the First 30 Days After Feedlot Arrival.

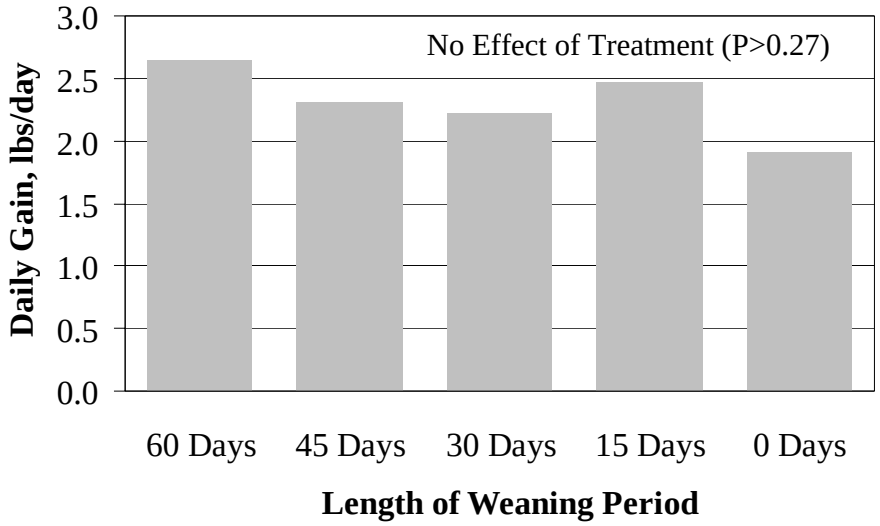

Figure 3. Effect of the Length of Ranch-of-origin Weaning Period on ADG of Lightweight Calves During the First 30 Days After Feedlot Arrival.

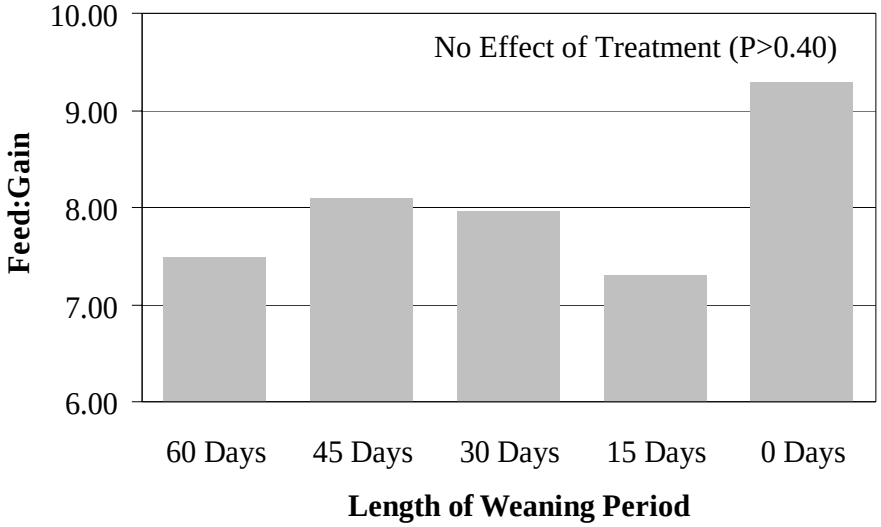

Figure 4. Effect of the Length of Ranch-of-origin Weaning Period on Growth Efficiency of Lightweight Calves During the First 30 Days After Feedlot Arrival.

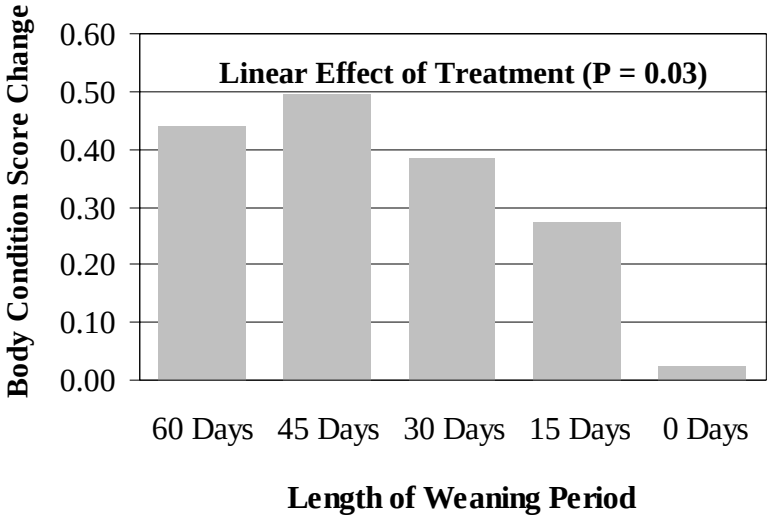

Figure 5. Effect of the Length of Fanch-of-origin Weaning Period on Cow Body Condition Score Change from 60 Days Before Calf Shipping to 60 Days After Calf Shipping.