

INITIATION OF LUTEAL ACTIVITY IN EARLY WEANED SPRING CALVING COWS VARYING IN BODY CONDITION AT THE TIME OF CALVING

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Story in Brief

In a 2-year study one hundred thirty-two spring calving cows were utilized to evaluate the effects of body condition at calving on return to estrus following early weaning. Cows were assigned to two treatments at the time of calving (February); to calve at a body condition score 5.0 (NORMAL), or cows that calve at a condition score less than 5.0 (THIN). Cows were supplemented individually in a covered stall barn and grazed in one common pasture. Calves were weaned from all calves about 65 days postpartum. Blood samples were taken via the tail vein. The initiation of luteal activity was defined as the first of two consecutive weekly samples with progesterone greater than 1 ng/ml. Average body condition at the time of calving was greater for NORMAL cows compared to THIN (5.4 vs 4.1). Additionally, NORMAL cows exhibited luteal activity sooner than THIN cows (71 vs 83 days). Body condition at calving was negatively correlated ($r = -.69$) with days to luteal activity following early weaning and negatively correlated ($r = -.32$) with days from calving to initiation of luteal activity. Normal managed cows exhibited luteal activity sooner following early weaning than THIN cows (13.4 vs 28.4 days). Therefore, increased body condition score at the time of calving appears to decrease the time for return to luteal activity following early weaning. Regression analysis allowed prediction of days to luteal activity following early weaning the calf [days to estrus = 76.4 days + -11.2X] (where X is body condition at calving, $r^2 = .49$). There appears to be an effect of body condition score on the onset of luteal activity even if the calf factor is removed.

(Key Words: Early Weaning, Return to Estrus, Body Condition Score.)

Introduction

Cow/calf producers are faced with many challenges in the current market. With relatively high feed cost in relation to calf prices, management decisions may be made that affect the body energy reserves of the cow herd. During times of feed restriction, cows may become thin during the winter months and the rebreeding rate of these animals may be reduced. The option to early wean the calf and salvage rebreeding rates is a consideration for producers. In

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general, cows will cycle more quickly if the suckling stimulus is removed. However, little information is available on the interaction of body condition score (BCS) and return to estrus in cows that are early weaned. The objective of this trial was to evaluate the initiation of normal luteal activity following early weaning (65 days post partum) in cows that differed in body condition at the time of calving.

Materials and Methods

One hundred thirty-two (Angus x Hereford, 66 per year) spring calving cows were allotted by weight, age, and condition score to one of two treatments as described previously by Purvis et al. (1996). At the time of calving, cows were assigned to treatment as follows: cows that calved with a BCS equal to or greater than 5.0 (NORMAL), and cows that calve with a BCS less than 5 (THIN). All cows were managed as one herd while grazing native range at the Range Cow Research Center 15 miles west of Stillwater, OK. Cows were individually fed in covered stall barns 3 days/week (all feeding rates were prorated to a 3-day/week supplementation level). Supplementation of the cows consisted of either 3 lb/day (NORMAL) or .25 lb/day (THIN) of a 41% cottonseed pellet (CS) from November 9, 1993, and November 10, 1994 through April 4, 1994 and April 10, 1995. All cows had access to water, salt and trace mineral mix while on pasture.

Cows were weighed every 28 days following a 16-hour withdrawal from both feed and water. Body condition scores (scale 1= emaciated, 9 = extremely fat) were assigned by two independent evaluators in November, January, February, April, July, and October.

Early weaning of the calves of NORMAL and THIN cows that were born early in the calving season (prior to March 3, 1994 or March 10, 1995) occurred May 3, 1994 and May 5, 1995. Calves of cows that calved later in the calving season (after March 3, 1994 or March 10, 1995) were weaned June 1, 1994 and June 5, 1995.

Weekly blood plasma samples were obtained via tail vein and analyzed for progesterone from all cows beginning April 19, 1994 and March 15, 1995, through July for both years. Onset of luteal activity was defined as the first of two consecutive serum samples with progesterone greater than 1 ng/ml. Cows were exposed to mature bulls from May 3, 1994 and May 5, 1995 to July 25, 1994 and July 28, 1995 while grazing native range.

Changes in body weight and BCS were analyzed utilizing the general linear procedure of SAS (1985), and means were separated utilizing Students-t test. Regression analysis (SAS, 1985) was used to determine the relationship of BCS at the time of calving and initiation of luteal activity following early weaning and days from calving to initiation of luteal activity. Simple

correlation (SAS, 1985) was utilized to examine relationships between body condition at calving, days to luteal activity, and date of calving.

Results and Discussion

Cow/Calf Performance. At the time of calving, NORMAL cows were heavier and had greater BCS compared with THIN cows (Table 1; 1108, 5.4 vs 1029 lb, 4.2, $P < .05$). Additionally, birth weights of the calves were less ($P < .05$) in the THIN cows than NORMAL cows (80.2 vs 86.7 lb). Body weights of the early weaned calves at the time of early weaning were less for the THIN cows compared with NORMAL cows (186 vs 212 lb).

Postpartum Interval / Initiation of Luteal Activity. Body condition scores of the cows ranged from 3.5 to 6.7 at the time of calving. NORMAL cows had a shorter ($P < .05$) postpartum interval to luteal activity compared with THIN cows (82.6 vs 71.3 days). Regression analysis revealed the relationship between BCS at calving and the postpartum interval in days (Figure 1, $y = 97.5 + -.81(x)$ $r^2 = .32$). Body condition score at calving was negatively correlated ($-.32$; $P = .05$) with the postpartum interval.

Cows on the NORMAL treatment initiated luteal activity sooner ($P < .05$) following calf removal than THIN cows (13.4 vs 28.5 days). Additionally there was a negative correlation ($-.69$, $P = .01$) with BCS at calving and the interval from early weaning to initiation of luteal activity. Regression analysis revealed the relationship of body condition at calving and the initiation of luteal activity following early weaning (Figure 2, $y = 77.4 + -11.2(x)$ $r^2 = .49$). Cows that were greater in BCS at calving returned to luteal activity quicker than cows in thinner body condition. This is in agreement with the negative correlation with BCS and return to luteal activity following early weaning. Therefore, cows that calve with a body condition score > 5 will initiate luteal activity sooner than thin cows following early weaning.

Other factors, such as date of calving, may have an effect on postpartum interval. Cows that calved early in the calving season had a longer postpartum interval than cows that calved later in the season (Purvis et al., 1996). Calving date was negatively correlated ($-.53$) with the postpartum period. It appears that animals that calve early in the calving season may have a longer period to luteal activity than cows that calve later in the season. THIN cows had longer return to luteal activity compared with NORMAL cows following early weaning. This reveals that even with the cessation of the suckling stimulus there is an effect of body condition on the initiation of luteal activity. Using the regression equation in Figure 2 we can predict the return to estrus in spring-calving cows based on body condition at calving if the cows are weaned 65 days postpartum (Table 2).

Cows that are thin will not return to estrus as quickly as cows with high body condition scores following calf removal. Additionally, it appears that the date a calf is born impacts the postpartum interval independent of condition score.

Literature Cited

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SAS. 1985. SAS User's Guide: Statistics (Version 5). SAS Inst. Inc., Cary, SC.

Table 1. Performance of spring calving cows early weaned at different BCS at 65 days postpartum.

	THIN	NORMAL
Calving weight, lb	1029.1 ^a	1108.3 ^b
Calving body condition (1= thin to 9 = obese)	4.2 ^a	5.4 ^b
Calf birth weight, lb	80.2 ^a	86.7 ^b
Calf weight at early weaning, lb	186.4 ^a	212.3 ^b
Postpartum interval, days from calving to luteal activity	82.6 ^a	71.3 ^b
Return to estrus following calf removal, days from early weaning to luteal activity.	28.5 ^a	13.4 ^b

^{a,b} Means within a row with an uncommon superscript differ $P < .05$.

Table 2. Predicted duration to onset of luteal activity following early weaning at 65 days postpartum based on body condition at calving in spring-calving cows.

Body condition at calving	4.0	4.5	5.0	5.5	6.0	6.5
Predicted return to estrus, days	31.6	26.0	20.4	14.8	9.2	3.6

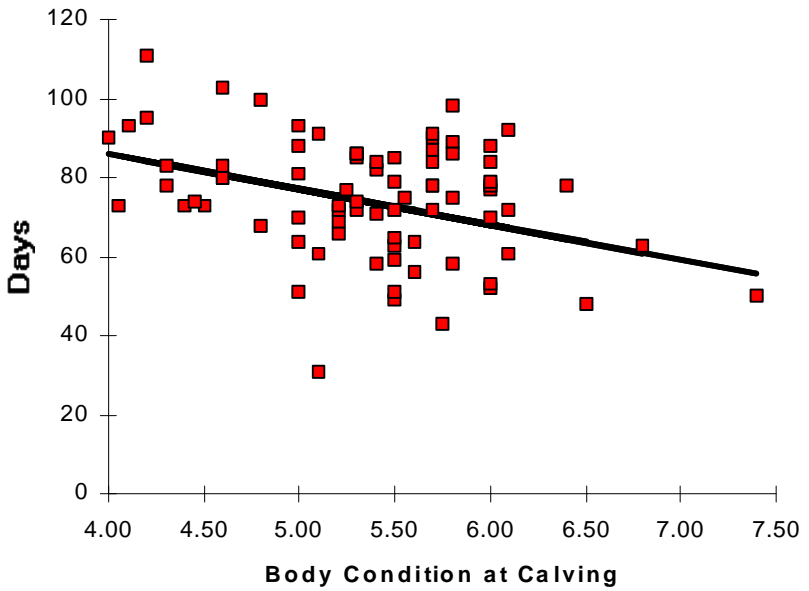


Figure 1. Predicted postpartum interval based on body condition score at calving.

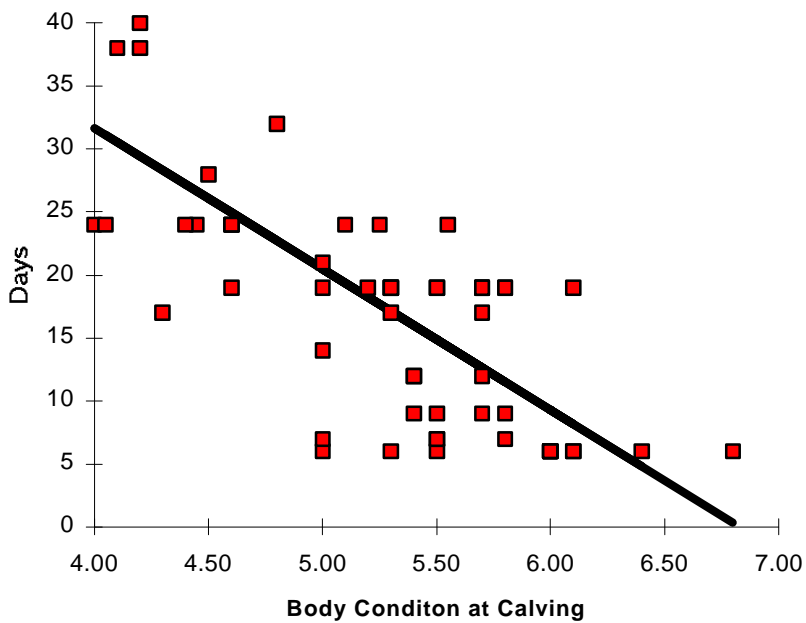


Figure 2. Predicted days to luteal activity based on body condition at calving.