EFFECTS OF EARLY WEANING AND BODY CONDITION SCORE AT CALVING ON PERFORMANCE OF SPRING CALVING COWS

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Story in Brief

In a 2-year study one hundred eighty-six cows (93 head/year) were assigned to three treatments; normal management fed to attain a 5.0 body condition score (BCS) at calving (NOR); normal management coupled with early weaning 65 days postpartum (NOREW), or nutritionally restricted to attain a body condition score of 3.5 at calving coupled with EW 65 day postpartum (LOWEW). Normally managed cows were individually fed 3 lb/d of a 41% protein supplement in both years beginning in mid November through mid April. NOREW were fed like NOR until calving when supplement was reduced to match LOWEW cows. LOWEW treatment cows were fed .25 lb/d of a 41 % protein supplement during the same period. Early weaned calves were weaned at a mean age of 65 days, and grazed on native range pasture and were fed a 25% protein pellet (2.5 lb/d) in replicated groups. Body weight (BW) and condition were less for LOWEW than for NOR and NOREW at calving. Fewer LOWEW followed by NOREW had luteal activity prior to early weaning compared with NOR. Cow BW and BCS changes during breeding were less for NOR than for NOREW and LOWEW. Fall BW and BCS were greater for NOREW and LOWEW compared with NOR. Calf weights at normal weaning were greater for NOR calves than NOREW and LOWEW calves. Pregnancy rates were not significantly different between treatments. Cows with a low BCS at the time of calving and early weaned have similar reproductive efficiency as a normal managed herd.

(Key Words: Beef Cattle, Reproduction, Early Weaning.)

Introduction

Cow-calf producers face increasing challenges to maintain profitability. New techniques and production systems that allow producers to decrease their production costs must be evaluated. Practices which reduce feed requirements and/or land requirements would greatly enhance production opportunities for cattlemen. The use of early-weaning may prove to be a useful management tool to reduce both land and feed requirements. The objectives of this study were to evaluate the use of early weaning as a management tool and to determine the

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effects of early weaning for several years on cow productivity. These are the results of the first two years of a 3-year study to develop specific recommendations on cow and calf management while utilizing early weaning as a production system.

Materials and Methods

One hundred eighty-six (93/year) spring calving Angus x Hereford cows were allotted weight, age, and condition score to one of three treatments. Treatments were: cows under normal management to attain a mean BCS of 5.0 at calving (NOR), cows to calve at a BCS 5.0 coupled with early weaning at 65 days post-partum (NOREW), and cows maintained to calve at a mean BCS of 3.5 coupled with early-weaning 65 days post-partum (LOWEW). Cows remained on the same treatments throughout the duration of the trial to observe long term effects of reduced feed intake and early weaning on cow productivity.

Cows were originally assigned to treatment on November 9, 1993 and 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 d/wk (all feeding rates were prorated to a 3 day/week supplementation level). Supplemetation of NOR cows consisted of 3 lb/day of a 41% crude protein cottonseed meal pellet (CSM) from November 9, 1993, and November 10, 1994 through April 19, 1994 or April 10, 1995. Cows on the LOWEW treatment were supplemented with .25 lb/day CSM until March 3, 1994. The LOWEW cows were placed in the stall barns at the same time as NOR and NOREW to equalize effects of handling. The supplementation rate of .25 lb/d CSM was used to pacify the LOWEW treatment while in the barn. The LOWEW feeding rate was increased to 2 lb/day CSM beginning March 4, 1994 through April 19, 1994 during year one only for humane treatment. Cows on the NOREW treatment received the same supplementation as NOR cows until calving at which time they were switched to the same supplementation rate as LOWEW. 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 (BCS, scale 1=emaciated, 9=extremely fat) were assigned by two independent evaluators in November, January, April, July, and October. All calves were weighed within 24 hour of birth and NOR calves were weighed at intermittent intervals when their dams were weighed. Early weaned calves were weighed within 48 hour of the NOR calves. Weights following a 16-hour shrink, in October were considered weaning weights for early weaned and NOR calves.

Early weaning of NOREW and LOWEW calves that were born early in the calving season (prior to March 3 year one, and March 10 year two) occurred May 3, 1994 (year one) and May 5, 1995 (year two). Calves born later in that calving season (after March 3 year one, and March 10 year two) were weaned June 1, 1994 and June 5, 1995. During year one, early weaned calves were allowed free access to native hay and were fed 2 lb of a 40% all natural protein pellet during the first two weeks post-early weaning. Following this 2-week adjustment period calves were allowed access to native range and had free access to water and salt. At approximately 7:30 am Monday through Friday, calves were sorted into 14 feeding replications and supplemented with 2.5 lb /d of a 25% protein supplement (prorated for 5 d a week feeding). During year two, calves were managed differently during the drylot period as explained by Purvis et al. (1996) and then grazed native range similar to year one. All early weaned calves were supplemented throughout the grazing season until weaning (October 6, 1994, and October 10, 1995) (Purvis and Lusby, 1996).

Weekly blood samples were obtained via tail vein from all cows beginning April 19, 1994 and March 15, 1995 through July 15 of both years and analyzed for progesterone. Onset of luteal activity was defined as the first of two consecutive plasma samples with progesterone greater then 1 ng/ml. Cows on NOR treatment were exposed to one mature bull from May 3, 1994 and May 5, 1995 to July 25, 1994 and July 28, 1995 while grazing summer Bermuda pasture. Cows on NOREW and LOWEW were maintained separately on summer native range and exposed to two mature bulls for the same period as the NOR cows. Pregnancy was determined on all cows via rectal palpation October 28, 1994.

Statistical Analysis. Data were analyzed using general linear models of SAS (1985). The final model include the effects of calving date, wean management treatment, date weaned, year and all possible interactions. Means were separated using Tukey's procedure of SAS. Calf weight gains were analyzed using general linear model of SAS (1985) and feeding replication was the error term. Means were compared utilizing the Tukey procedure of SAS (1985).

Results and Discussion

Cows weighed 1078 lb with an average BCS of 5.27 at the beginning of the trial during year one. However, by the initiation of the second year NOREW and LOWEW cows were heavier and had greater condition score than NOR (Table 1). Cows in the NOREW and LOWEW treatments utilized nutrients for their own body stores when the demand for nutrients for milk production was stopped due to early weaning. Therefore it would appear that early weaning cows 65 days postpartum has some carryover effect on body weight and BCS.

Cows on the LOWEW treatment lost more weight and BCS prior to calving compared with NOR and NOREW cows (-78, -.88, vs 14, .08, and 14 lb, .02). At calving LOWEW cows weighed less ($P<.05$, 1048 lb) and were thinner ($P<.05$; 5.0) than NOR and NOREW (1105, 5.38 and 1154 lb, 5.68, respectively). Even with the decrease in supplementation at the initiation of lactation, weights of NOREW cows were similar to NOR cows at the beginning of the breeding season (962 vs 972 lb, $P>.05$). Cows on the LOWEW treatment weighed less and had a lower BCS at the initiation of the breeding season compared to NOR and NOREW (881, 4.4 vs 962, 4.9 and 972 lb, 5.0, $P<.05$). Cows on the NOREW and LOWEW treatment gained more weight and condition score compared with NOR during the breeding season (176; .06 and 222, .84 vs 73 lb -.28). At normal weaning (October 6, 1994, and October 10, 1995) NOREW and LOWEW cows were heavier and had greater BCS compared with the NOR cows.

Decreased supplementation of the LOWEW cows increases the use of body reserves for maintenance and results in thin cows at the time of calving and lactation. Cessation of suckling at early-weaning, both weight gain and BCS increased in the nonlactating cows. The weight and BCS fluctuation of the NOR cows were similar to those in typical management situations. The observation that early weaned cows were heavier and had greater BCS at normal weaning time, reflects the lack of metabolic demands placed on the lactating cow which may allow for more body reserves at the start of winter and a delay in the initiation of winter supplementation.

More ($P<.05$) cows on the NOR and NOREW treatment were cycling prior to early weaning compared with LOWEW (52, 66 vs 28%; Figure 1). More NOR and NOREW had luteal activity compared with LOWEW on weeks one through four following early-weaning. Twenty-eight days following early weaning, there was no difference in luteal activity between treatments. There was no difference in days to luteal activity between NOR and LOWEW cows (71 and 76 days). However, NOREW cows had less days from calving until luteal activity compared with LOWEW (69 vs 76 days, $P<.05$). The number of days from weaning until luteal activity was not different ($P>.10$) between NOREW and LOWEW treatments (26 vs 27 days). Due to the increased number of NOR and NOREW cows returning to estrus before LOWEW, calving date may be impacted in the following year. However, Julian calving date following the first year was not significantly different between treatments (NOR 73, NOREW 69, and LOWEW 70 days). There was a significant effect of time of weaning on return to estrus. Cows that calved early in the breeding season and were weaned during May had longer ($P<.05$) post partum intervals than the cows that calved later in the calving season (78 vs 64 days, $P<.05$). Pregnancy rates were not influenced by treatments (NOR 95, NOREW 98 and LOWEW 96%).

Birth weights of calves from LOWEW cows were less (P<.10) than NOR and NOREW cows (83 vs 88 and 87 lb). This reflects the decreased nutritional status in the last stages of pregnancy in the LOWEW cows. Calf gains from birth to early weaning were greater for NOR calves than for NOREW, which were greater than LOWEW (Table 2; 126 vs 114 vs 104 lb, P<.05). Supplementation of the NOR cows probably increased total ME intake over NOREW and LOWEW cows which resulted in greater milk production. Cows on the NOREW treatment did not receive supplementation postcalving but because of their greater body reserves they likely produced more milk than LOWEW. Average age of all calves that were early weaned was 65 days. Overall NOR calves gained more weight from the time of early-weaning to normal weaning compared with NOREW and LOWEW calves. Final weights were greater (P<.05) for NOR calves (480 lb) compared with NOREW and LOWEW (420, 414 lb).

In conclusion, cows that calved at a reduced body condition score and are early weaned can result in similar reproductive efficiency as the normal managed herd. Precalving dam nutrition reduced birth-weights of the calves, which results in the need for greater gains in theses calves to equal normal weaned calves. In general, shifting feed cost from the cow to the calf may not be economically attractive. Unless stocking rates could be increased due to lower cow requirements profit per acre may increase.

Literature Cited

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Table 1. Live weight and BCS changes in spring calving cows that were normal or early weaned.

	Treatments		
	NOR	NOREW	LOWEW
Year 1 and Year 2			
Beginning WT (11/9/93), lb	1067	1075	1092
BCS (11/9/93)	5.1	5.3	5.4
Beginning WT (11/10/94), lb	1114[a]	1193[b]	1158[b]
BCS (11/10/94)	4.8[a]	6.0[b]	6.1[b]
Pooled data			
Calving WT (February), lb	1105[a]	1154[a]	1048[b]
BCS (February)	5.4[a]	5.7[a]	5.0[b]
Breeding WT (May), lb	962[a]	972[a]	881[b]
BCS (May)	4.9[a]	5.0[a]	4.4[b]
End breeding WT (July), lb	1035[a]	1148[b]	1103[b]
BCS (July)	4.6[a]	5.1[b]	5.0[b]
End weight (October), lb	1106[a]	1234[b]	1197[a]
BCS (October)	5.2[a]	5.8[b]	5.8[b]
Weight changes (lb)			
Precalving	14[a]	14[a]	-77[b]
Calving	-143	-182	-166
Breeding	73[a]	176[b]	222[c]
Summer	71[a]	86[b]	94[b]
BCS changes			
Precalving	.08[a]	-.02[a]	-.64[b]
Calving	-.58	-.68	-.88
Breeding	-.28[a]	.06[a]	.83[b]
Summer	.56	.71	.76
Pregnancy Rates %	95	98	96

[a,b,c] Means in the same row not sharing a common superscript differ (P<.05).

Table 2. Live weight gain of early or normal weaned calves.

	Treatments		
	NOR	NOREW	LOWEW
Birth WT	88[a]	86[a]	83[b]
WT at early-weaning, lb	215[c]	201[d]	188[e]
Prewean gain, lb	126[c]	114[d]	104[e]
Ending weight 10/10/94	480[a]	420[b]	414[b]

[a,b] Means in the same row not sharing a common superscript differ (P<.10).

[c,d,e] Means in the same row not sharing a common superscript differ (P<.05).

Figure 1. The effect of precalving treatment on percentage of cows cycling relative to early-weaning.