EFFECTS OF EARLY-WEANING AND BODY CONDITION SCORE (BCS) AT CALVING ON PERFORMANCE OF SPRING CALVING COWS

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Story in Brief

Ninety-three cows 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 70 d postpartum (NOREW), or nutritionally restricted to attain a body condition score of 3.5 at calving coupled with EW 70 d postpartum (LOWEW). Normally managed cows were individually fed 3 lb/d of a 41% protein pellet from November 9, 1993 to April 19, 1994. NOREW were fed like NOR until calving when supplement was reduced to match LOWEW cows. LOWEW treatment cows were fed 2.0 lb/d from March 3, 1994 to April 19, 1994. Early weaned calves were weaned at a mean age of 65 d and grazed on native range pasture and were fed a 25% protein pellet (2.5 lb/d) in groups of three. Body weight (BW) and condition were less for LOWEW than for NOR and NOREW at calving. Fewer LOWEW cows had luteal activity prior to early weaning than NOR and NOREW. Cow BW and BCS changes during breeding were less ($P<.05$) for NOR (66 lb, -.28) compared to NOREW (186.3 lb, +.06) and LOWEW (244.9 lb, +.83). Fall BW and BCS (October 10, 1994) were greater for NOREW (1209 lb, 6.1) and LOWEW (1171 lb, 6.1) compared to NOR (1189 lb, 5.5). Calf weights at normal weaning were greater for NOR calves (506 lb) compared to NOREW and LOWEW (444, and 432 lb respectively) calves. Pregnancy rates were not significantly different between treatments. Reproductive performance can be improved with early weaning when cows lack sufficient body reserves for rebreeding.

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

Introduction

Cow-calf producers face increasing challenges to maintain profitability. New techniques and production system which allow producers to reduce their production costs must be evaluated. Practices which lower feed requirements and/or land requirements would greatly enhance production opportunities for the cattleman. The use of early-weaning may prove to be a useful management

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tool to reduce both land and feed requirements. The objective of this study is to evaluate the use of early-weaning as a management tool and to determine the effects of long-term early-weaning on cow productivity. These are the first data collected from a 5-year study to develop specific recommendations on cow and calf management while utilizing early-weaning as a production system.

Materials and Methods

Ninety-three Angus X Hereford cows were allotted by breed, weight, age, and condition score to one of three treatments. Treatments were: 1 (NOR), cows under normal management to attain a mean BCS of 5.0 at calving; 2 (NOREW), cows to calve at a BCS 5.0 coupled with early weaning at 70 d post-partum; and 3 (LOWEW), cows maintained to calve at a mean BCS 3.5 coupled with early-weaning 70 d post-partum. This report covers the first year’s results from a five year study. The cows will remain on the same treatments throughout the duration of the trial to observe long term affects of reduced feed intake and early weaning on cow productivity.

Cows were assigned to treatment on November 9, 1993. 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 three d/wk (all feeding rates were prorated to a three d/wk supplementation level). Supplemetation of NOR cows consisted of three lb/d of a 41% cottonseed pellet (CS) from November 9, 1993 through April 4,1994. Cows on the LOWEW treatment were supplemented with .25 lb/d (CS) until March 3, 1994. 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 (CS) was used to pacify the LOWEW treatment while in the barn. The LOWEW cows received 2 lb/d (CS) beginning March 4, 1994 through April 19, 1994. Cows on the NOREW treatment received the same supplementation as NOR cows up to calving at which time they were switched to the same supplementation rate as LOWEW (prior to March 4, 1994 .25 lb/d and after March 4, 1994 2.0 lb/d, CS). All cows had access to water, salt and trace mineral mix while on pasture.

All cows were weighed every 28 d following a 16 h shrink period where both feed and water were withheld. Body condition scores (scale 1=emaciated, 9=extremely fat) were assigned by two independent evaluators on November 9, 1993, January 13, April 19, July 25, and October 11, 1994. All calves were weighed within 24 h of birth and NOR calves were weighed at intermittent periods with their dams. Early weaned calves were weighed within 48 h of the NOR calves. Ending weights, following a 16 h shrink, on October 10, 1994 were considered weaning weights for both set of calves.

Early weaning of NOREW and LOWEW that were born early in the calving season took place on May 3 and calves born later were weaned on June 1, 1994. After weaning calves were allowed free access to native hay and 2 lb of a 40% all natural protein pellet. Following a two week adjustment period calves were allowed access to native range and had free access to water and salt. At approximately 7:30 am on Monday - Friday, calves were sorted into feeding reps and supplemented with 2.5 lb /d of a 25 % protein supplement (prorated for 5 d a week feeding). All calves were supplemented throughout the grazing season until weaning (November 10, 1994).

Weekly blood samples were obtained via tail vein from all cows beginning April 19 through July 29, 1994, and analyzed for progesterone. Onset of luteal activity was defined as the first of two consecutive serum samples with progesterone greater then 1 ng/ml. Cows on NOR treatment were exposed to one mature bull from May 3 to July 25, 1994 while grazing summer bermuda pasture. Cows on NOREW and LOWEW were maintained separately on summer native range while being exposed to one bull from May 3 through July 25,1994. Pregnancy was determined on all cows via rectal palpation on October 28, 1994.

Data were analyzed using general linear models of SAS. The final model include the effects of calving date, body condition, weight, and date weaned. Means were separated using Tukey procedure of SAS. Calf weight gains were analyzed separately using general linear model of SAS (1985). Weight gains were analyzed using feeding replication as the error term. Mean comparisons were done utilizing the Tukey procedure of SAS.

Results and Discussion

Cows weighed 1078 lb with an average BCS of 5.27 at the beginning of the trial (Table 1). Cows on the LOWEW treatment lost more weight and condition score prior to calving compared with NOR and NOREW cows (-84, -.56, vs 26, .35, and 26 lb , .35). At calving LOWEW cows weighed less ($P<.05$, 1008 lb) and were thinner ($P<.05$; 4.8) than NOR and NOREW (1092, 5.46 and 1103 lb, 5.46 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 (935, vs 933). Cows on the LOWEW treatment weighed less (842; $P<.05$) and were thinner (4.23) at the initiation of the breeding season compared to NOR and NOREW. Cows on the NOR treatment lost 65.9 lb and .28 BCS units during the breeding season, compared with a increased in both live weight and BCS for the NOREW and LOWEW treatments (186; .06 and 245 lb; .83). During summer grazing, live weight gain was greater for the NOR cows compared with NOREW and LOWEW (120 vs 80, 84 lb). At normal weaning (October 10,

1994) NOREW and LOWEW cows were heavier and had greater BCS compared with the NOR cows.

Decreased supplementation of the LOWEW cows facilitates increased use of body reserves and therefore to thin cows going into the breeding season. Upon the cessation of the 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 cows ($P<.05$) on the NOR and NOREW treatment were cycling prior to early weaning compared with LOWEW (63, 78 vs 27; Figure 1). More NOR and NOREW had luteal activity compared with LOWEW on weeks one and two following early-weaning. Twenty-one days following early weaning, there was no difference in luteal activity between treatments. However, earlier blood sampling may have shortened the interval for days post partum to return to luteal activity in the NOR and NOREW cows due to the greater percentage of animals cycling at the initiation of blood sampling. Of the early-weaned cows following calf removal, days to estrous did not differ ($P>.10$) between NOREW and LOWEW treatments (22 vs 28 d). Due to the increased number of NOR and NOREW cows returning to estrus before LOWEW calving date may be impacted in the following year. Pregnancy rates were not influenced by treatments (NOR 94, NOREW 97 and LOWEW 97%).

Birth weights of calves from LOWEW cows were less ($P<.10$) than NOR and NOREW cows (77 vs 84 and 86). This reflects the decreased nutritional status in the last stages of pregnancy in the LOWEW cows. There appeared to be no difference in calving difficulty between treatments. Calf gains from birth to early weaning were greater for NOR calves than for NOREW, which were greater than LOWEW (115 vs 104 vs 97 lb). Supplementation of the NOR cows probably increased total ME intake over NOREW and LOWEW cows. Cows on the N OREW 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 was 65 d at early weaning May 3 and June 1, 1994. Calves that were early weaned had access to native hay and 2 lb of 40% crude protein pellet. Following adaptation (14 d) calves were allowed access to native range and fed 2.5 lb of a 25% protein pellet in reps as described above. Feed refusals were noted, however most calves consumed supplements within 30 min of offering. Refusals were noted in lighter weight reps were intake of 2.5 lb of 25% CP pellets may represent a large proportion of their total intake.

Overall NOR calves gained more weight from early-weaning to normal weaning compared with NOREW and LOWEW calves (Table 2; 306 vs 257 and 257 lb; (P<.10). Ending weights were greater (P<.10) for NOR calves (506 lb) compared with NOREW (444 lb) and LOWEW (431 lb).

In conclusion calving cows at a reduced body condition score and early weaned can attain similar reproductive efficiency as the normal managed herd and cost much less. However, to make this system feasible calf gains must equal normal weaned calves. Precalving dam nutrition reduced birth-weights of the calves, which results in the need for higher gains in theses calves to equal normal weaned calves. The need for quick gains following early-weaning may not be attainable with native hay and supplement. In general, shifting feed cost from the cow to the calf may not be economically attactive. However, if stocking rate could be increased due to lower cow requirements profit per acre may increase.

Literature Cited

SAS. 1985. SAS Inst. Inc., Cary NC.

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

	Treatments		
	NOR	NOREW	LOWEW
Beginning WT (11/15/93), lb	1067.1	1075.8	1092.7
BCS (11/15/93)	5.1	5.3	5.4
Calving WT (2/1/94),lb	1092.4[a]	1102.[a]	1008.4[b]
BCS (2/1/94)	5.5[a]	5.6[a]	4.8[b]
Breeding WT (5/3/94),lb	933.1[a]	935.32[a]	841.9[b]
BCS (5/3/94)	4.9[a]	5.0[a]	4.2[b]
End Breeding WT (6/30/94), lb	999.0[a]	1121.58[b]	1086.8[b]
BCS (6/30/94)	4.61[a]	5.1[b]	5.0[b]
End weight (10/10/94), lb	1188.6[a]	1209.6[b]	1170.7[a]
BCS (10/10/94)	5.5[a]	6.1[b]	6.1[b]
WT changes (lb)			
Precalving (11/15/93-2/1/94)	26.3[a]	26.8[a]	-84.3[b]
Calving (2/1-5/3/94)	-158.9	-167.4	-166.5
Breeding (5/3-7/26/94)	65.9[a]	186.3[b]	244.[9c]
Summer (7/26-10/10/94)	119.9[a]	88.0[b]	83.7 [b]
BCS changes			
Precalving (11/15/93-2/1/94)	.35[a]	.35[a]	-.56[b]
Calving (2/1-5/3/94)	-.60	-.60	-.60
Breeding (5/3-7/26/94)	-.28[a]	.06[b]	.83[c]
Summer (7/26-10/10/94)	1.01	.89	.99
Pregnancy Rates %	94	97	97

[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	86.2[a]	83.6[a]	77.2[b]
WT at early-weaning, lb	200.7[a]	187.2[b]	174.6[c]
Prewean gain, lb	114.5[a]	103.5[b]	97.3[c]
Postwean gain , lb (early weaning-10/10/94)	305.6[a]	257.1[b]	256.7[b]
Total live weight gain (birth-10/10/94)	420.2[a]	360.6[b]	354.1[b]
Ending weight 10/10/94	506.3[a]	444.3[b]	431.5[b]

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

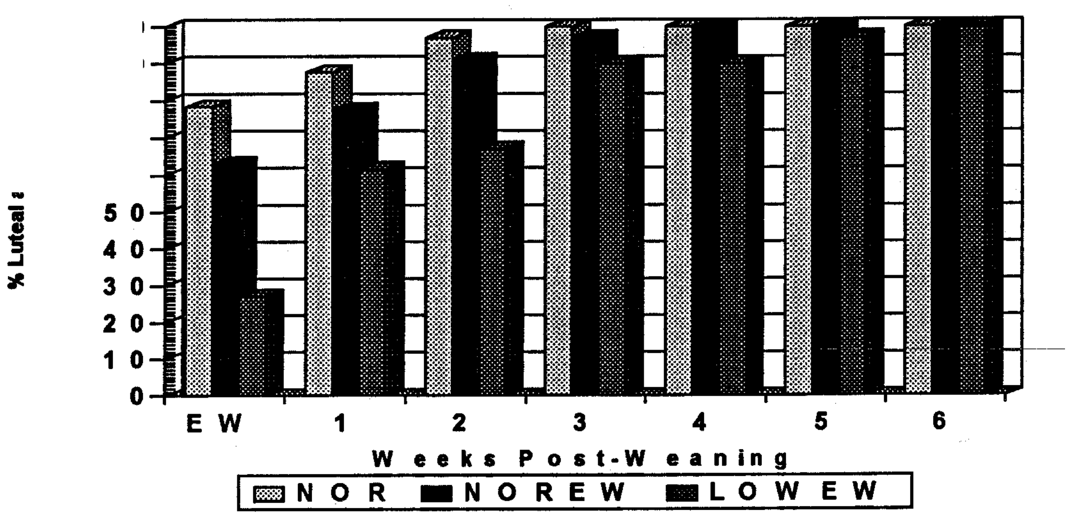

Figure 1.The effect of precalving treatment on percentage of cows cycling relative to early-weaning.