THE EFFECTS OF EARLY WEANING ON INTAKE OF NATIVE HAY IN FALL CALVING COWS

H.T. Purvis II[1] and K.S. Lusby[2]

Story in Brief

Eighteen fall-calving cows were allotted by weight and body condition score (BCS) in a split plot experimental design. Treatments were: normal wean at 205 days of age (NW), early wean at 70 days of age (EW). Five separate intakes were performed: precalving August 10, 1994 (PRCALV), post calving/pre-early weaning (PREW), 130 days of lactation (LAC130), 190 days of lactation (LAC190), and 240 days of lactation (LAC240). Subsequent to intake determination, all cows were adapted to native hay for one week in a drylot. During the one week collection period, cows were individually fed native hay at approximately 7:30 to 11:00 AM and 1:00 to 5:00 PM in 3 x 9 ft stalls. Cattle remained in the drylot and had free access to water when not in the stall barn during the intake periods. Supplementation of NW cows with 1 lb of a 41% protein cube began October 1, 1994 and was increased by 1 lb monthly until a feeding rate of 3 lb daily was attained by the first of December. Supplementation of NW cows was stopped March 1, 1995. Early weaned cows received no supplement through the winter. There was no difference in DM intake (16.9 lb vs 17.1 lb) between EW and NW during the precalving period intake. During the PREW intake NW cows consumed 22% (18.7 lb vs 24.9 lb) more native hay than EW cows, probably due to supplemental protein the NW cows received compared with the unsupplemented EW cows. During the LAC130, LAC190, and LAC240 EW cows consumed significantly less feed than NW cows (16.3, 17.8, 16.9 lb vs 24.2, 24.7, 22.7 lb). Mean dry matter intakes for EW cows were 16.9 lb compared with 21.2 lb for NW during the trial. Overall there appears to be approximately a 20% saving in dry matter intake when cows a EW compared to normal weaned and managed cows.

(Key Words: Native Hay, Dry Matter Intake, Fall-Calving Cows.)

Introduction

Land requirement for the cow/calf coupled with supplemental feed are two factors that make up the largest proportion of annual cow cost. The use of non-traditional management schemes such as early weaning to reduce land costs and feed requirements must be evaluated. The adoption of such a system requires more intensive management of the calf (Purvis et al., 1995) and

[1] Graduate Assistant [2] Professor

questions the validity of increasing stocking rates to offset the loss of production in terms of pound of calf weaned (Purvis et al., 1995). The objective of this trial was to evaluate cow performance, and quantitate the use of early weaning (EW) on DM intake compared with normal weaning (NW) the cow.

Materials and Methods

Animal Management. Eighteen fall-calving cows were randomly assigned by weight and BCS to one of two treatments: normal wean (205 days) and normal managed or early wean (70 days) and nutritionally restricted. All cows were managed as a single herd during the study with the exception of the supplementation period. Supplementation of the normal weaned cows began October 1, 1994 where cows received 1 lb of a 41% protein cube consisting of cotton seed meal. Feeding rate was increased to 2 lb November 1 and to 3 lb December 1, 1994. Supplementation continued at 3 lb per head through April 1, 1995 when supplementation was stopped. Early weaned cows did not receive supplement during the winter months. Therefore, during the supplementation period cows were managed as two separate herds. Hay was given to all cows during a few days in March when snow covered the standing forage. All cows had access to mineral and water throughout the trial. Cows were exposed to mature bulls from November 27, 1994 through January 29, 1995. Bulls were rotated between treatments weekly. Pregnancy rate was determined via rectal palpation approximately 70 days following bull removal.

Intake Determination. Five separate intake trials were conducted throughout a production year for fall calving cows. The precalving intake (PRCALV) was initiated prior to calving August 10, 1994. The second, or post calving/pre-early weaning (PREW), intake was performed on November 11, 1995. Early weaning occurred November 22, 1994. Early weaned calves were placed on wheat pasture until May 10, 1995 at which time they were moved to summer native range until July 10, 1995 (Purvis et al., 1996). Following the PREW intake three lactation intake studies were performed: 1) 130 day of lactation (LAC130 January 11, 1995), 2) 190 days of lactation (LAC190, April 7, 1995), and 3) 240 day lactation (LAC240, June 23, 1995).

All cows were adapted to the same native hay which they would consume during the intake period for seven days in a drylot. Prior to PRECAL intake cows were randomly assigned by treatment to individual stalls (3 x 9 ft) in a covered stall barn. Cows remained in the same stall through all five intake measurements in which they were originally assigned. Cows had access to native hay at approximately 7 to 11 AM and again 1 to 5 PM during collection periods. When the animals were not in the stall barn they were placed in the drylot where they had access to water. Calves of the NW cows remained in the

drylot while their dams were in the stall barn. During the PREW and LAC130 intakes NW cows were supplemented daily (1 lb and 3 lb, respectively) during the morning intake collection.

Sample Collection. Intake of hay was determined by average daily DM intake calculated as an average DM consumption over a 7-day collection period. Hay and ort samples were collected during each of the intake periods and analyzed for CP, ADF, NDF and *in vitro* determination. All intakes are reported on a DM basis.

Animal Measurements. All cows were weighed prior to and after the intake periods following a 14-hr shrink without feed or water. Body condition scores were taken at the first weigh period.

Statistical Analysis. Data were analyzed as a split plot design with repeated measurements. Treatment was tested with cow(trt) as the error term. Period and the two way interaction of treatment x period were tested with residual error. There was no treatment x intake period interaction for DM intake. Therefore treatments can be compared across period. However there was a significant period x treatment interaction for body weight and BCS changes and only treatments by period are reported. Calf weights were analyzed as a completely randomized design (SAS, 1985). Dry matter intakes were regressed over intake period for prediction of responses in treatments (SAS, 1985). Mean separation was done utilizing protected paired-*t*-test (SAS, 1985).

Results and Discussion

Animal Performance. Cows weighed approximately 1,404 lb at initiation of the trial (Table 1). Additionally, there was no difference (P=.74) in initial body condition score (BCS) between treatments (7.19, EW vs 7.25 NW). Body weight was less (P<.01) for EW cows compared with NW at the time of the PREW and LAC130 intakes. Body weight tended to be less (P=.10) for EW compared with NW during the LAC190 intake period, with no difference (P=.23) in body weight at the LAC240 intake.

Body condition was similar (P=.74) between treatments at the initiation of the PRECAL intake. However, EW cows were thinner (P<.05) during the PREW and LAC130 intakes compared with NW cows. During the LAC190 intake period BCS were similar (P=.27). During the LAC240 EW cows tended (P=.06) to be higher in BCS compared with NW cows (6.2 vs 5.8).

Body weight changes for EW cows were greater compared with the NW cows. This reflects the difference in the nutritional regimen that was imposed on the EW cows compared with NW. Similar body weight and BCS changes were noted in spring calving cows in a previous trial by Purvis et al. (1995). Restricting supplement to the EW cows would impact their ability to maintain

enough energy for maintenance. Therefore body weight and fat were utilized for energy.

Dry Matter Intake. Dry matter intake was not significantly different between treatments at the PRECAL intake (16.9 vs 17.1, P=.89; Table 2). During the PREW intake EW cows consumed less (P<.01) hay compared with NW (18.7 vs 24.9, P<.01). Additionally, DM intake in EW (18.7 vs 16.9 lb) and NW (24.9 vs 17.1 lb) cows were significantly (P<.01) higher in the PREW intake compared to the PRECAL intake. The increase in DM intake for both treatments during the PREW intake compared to PRECAL intake is due to the initiation of lactation after parturition. The difference in intake between treatments during the PREW period is due to the supplemental protein which was fed during this period. Dry matter intake during LAC130, LAC190 and LAC240 was greater (P<.01) for NW compared with EW. The reduction in dry matter intake during the lactation period observed in the EW cows is due to the cessation of the nutrient demand for milk synthesis. Normal weaned cows had higher DM intake during the entire lactation period compared with EW (Figure 1). Mean DM intake for EW cows was 16.9 lb vs 21.2 lb for NW cows (P<.01). Overall this relates to about a 20% decrease in DM intake in EW cows.

Initial intakes were about 1.2% of body weight in both NW and EW cows. These values are considerably lower than earlier reports by Marston and Lusby (1994). They reported gestation intakes to be about 1.6% BW in cows grazing native hay. The current estimate of DM intake during the PRECAL period may be biased due to the high condition scores and body weights at the initiation of the trial (Table 1). It should be noted that following the PRECAL intake period, the DM intake for EW cows were about 1.5% of BW though the remainder of the trial. This is similar to values found by Martson and Lusby (1994) in spring calving cows. Intake during lactation periods for the NW cows were about 1.85% BW. These values agree with Marston and Lusby (1994) and Thrift (1993) who found that cows consuming native hay or grazing dormant native range consumed around 1.8 to 2.2% body weight during the lactation period.

There was no difference (P>.20) in pregnancy rate between treatments (Table 1). Calf birth weight was similar (P=.87) between EW and NW cows (88.4 vs 87.2 lb; Table 3). Additionally, at the time of early weaning calf weights were similar (P=.67). At the time of weaning (June 23, 1995) EW calves were heavier (P<.05) than NW (590.5 vs 499.8 lb).

Early weaning appears to result in significant savings of about 20% in terms of DM intake through a reproduction year. However, direct application of DM savings in the current trial does not equate into a 20% increase in stocking rate. Other factors such as current stocking rate, current herd

management, herbage mass, herbage quality should be considered prior to altering current stocking density.

Literature Cited

Marston, T.T. and K.S. Lusby. 1994. Okla. Agr. Exp. Sta. Res.Rep. P-939:106

Purvis II, H.T. and K.S. Lusby. 1995. Okla. Agr. Exp. Sta. Res. Rep. P-943:159

Purvis II, H.T. et al. 1995. Okla.Agr. Exp. Sta. Res. Rep. P-943:68.

Purvis, H.T. et al. 1996. Okla.Agr. Exp. Sta. Res. Rep. (in press).

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

Thrift, T.A. 1993. Masters Thesis. Oklahoma State University, Stillwater.

Table 1. The effects of weaning treatment on BCS and BW changes in fall calving cows.

Intake period	Early wean (n=9)	Normal wean (n=9)	P-value
Precalving (8/10/1994)			
BWT, lb	1394	1414	.46
BSC, units	7.3	7.3	.74
Pre-early weaning (11/11/94)			
BWT, lb	1139	1210	.001
BSC, units	5.5	6.1	.03
Lactation 130 days (1/11/95)			
BWT, lb	1042	1133	.004
BSC, units	4.5	5.2	.04
Lactation 190 days (4/7/95)			
BWT, lb	1051	1091	.10
BSC, units	4.7	5.0	.27
Lactation 240 days (6/23/95)			
BWT, lb	1271	1242	.23
BSC, units	6.2	5.8	.06
Pregnancy Rate, %	100	88	.74

Table 2. The effects of weaning treatment on DM intake of native hay by fall calving cows.

Period	Early wean	Normal wean	P-value
Precalving (8/10/1994)			
DM intake, lb	16.9	17.1	.89
Intake, % BW	1.2	1.2	.84
Pre-early weaning (11/11/94)			
DM intake, lb	18.7	24.9	.0001
Intake, % BW	1.6	1.9	.07
Lactation 130 days (1/11/95)			
DM intake, lb	16.3	24.2	.0001
Intake, % BW	1.5	1.9	.06
Lactation 190 days (4/7/95)			
DM intake, lb	17.8	24.7	.002
Intake, % BW	1.6	2.0	.05
Lactation 240 days (6/23/95)			
DM intake, lb	16.9	22.7	.002
Intake, % BW	1.3	1.6	.09

Table 3. Effects of weaning treatment on body weight changes in fall born calves.

Item	Early weaned	Normal wean	P-value
Birth weight, lb	88.4	87.2	.87
Weight at EW, lb	213.4	215.2	.67
Weaning weight, (6/23/95)	590.5	499.8	.04

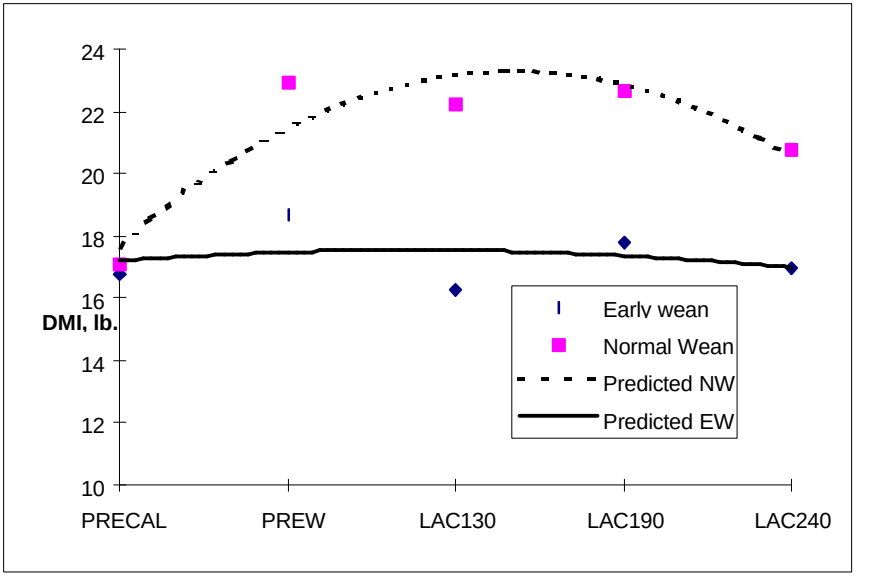

Figure 1. Effects of weaning treatment on DMI in fall calving cows consuming native hay