2003

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Effect of Calving Time and Weaning Time on Cow and Calf Performance - A Preliminary Report

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BEEF 2003 – 08

Summary

Cows grazing native range pasture year round in western South Dakota were allotted to 3 management systems: 1) A calving season starting in mid March with calves weaned in late October; 2) A calving season starting in mid March with calves weaned in mid September; and 3) A calving season starting in early May with calves weaned in late October. The effect of management system on pregnancy rate was year dependent. After 4 years of the study, there was no consistent advantage for any particular group. Average weaning weight was consistently higher for the March calving/October weaned group that was older at weaning than the other two groups. In the first year of the study, severe winter weather caused a higher calf death loss that resulted in a lower weaning percentage for the March calving groups compared to the May calving group. The weaning percentage favored the March calving groups in year 4. With the exception of the first year, the pounds of calf weaned per cow exposed were greater for the March calving/October weaned group compared to the other two systems. An estimate of overall calf income was $30 higher per cow exposed for the March calving/October weaned group compared to the May calving group. In deciding the optimum time to calve, the potential to reduce cost of winter feed, equipment, facilities and labor for a specific situation would need to be considered.

Introduction

Dunn (2000) reported that high profit cow/calf producers have lower than average investments and expenses per cow. Measures of reproductive performance were higher than average for high profit producers. Hoyt and Oedekoven (1994) reported that feed costs are approximately two-thirds of the cost of production for South Dakota beef cow herds and that high profit operators have approximately 10 % lower nonpasture feed costs than average.

A common management strategy for high reproduction at reasonable cost is to manage cow winter weight loss and then time the beginning of the breeding season to allow cows to gain weight rapidly on pasture for at least 30 days prior to the breeding season. In western South Dakota this results in a breeding season starting in early June and a calving season starting in March. In this system it is difficult to meet the cow's NRC nutrient requirements during the winter with the forages available without high levels of supplementation. But winter weight loss can be compensated by rapid weight gain before breeding.

Another strategy is to match the cow's production cycle and nutrient requirements to the forage production cycle. In this system the cow's highest requirements after calving are matched with peak pasture forage quality. In western South Dakota this fits a breeding season starting in late July and a calving season starting in May. Later calving also has the potential advantages of reduced calf disease and death loss from severe weather, reduced costs for calving facilities and reduced labor during the calving season. Potential disadvantages of a May calving season include reduced reproductive performance from breeding in the hottest months of the year when forage quality is relatively low and lighter weaning weights if calves are weaned on the same date.

Another approach to reducing winter feed costs is to wean the calves early, which would allow the cows to be in higher body condition early in the winter.

There is strong interest among some cow-calf producers in the potential to change from a late winter calving to a spring calving season. There is limited information to predict how production and cost of production will change with this management adjustment. The overall objectives

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of this study are to determine the effect of time of calving season and weaning on: 1) the performance of beef cows managed to optimize the use of native range and 2) the performance of calves from birth through slaughter. The results pertaining to objective 1 are discussed in this paper.

Materials and Methods

This on-going study involves 126 crossbred cows grazing native range pastures at the SDSU Range and Livestock Research Station near Cottonwood, SD from November to May and pastures near Sturgis, SD during the summer. In the spring of 1996 cows were allotted by age and breed composition to 3 management systems (Table 1).

Cows graze native pasture year round and receive 1 lb supplemental crude protein from December 1 to May 1. Grass hay is fed only when snow cover prevents grazing. For the first 3 years of the study cows in estrus during 7 days following a prostaglandin injection were artificially inseminated. Cows were then exposed to bulls for 53 days and rectally palpated to determine pregnancy in November. Beginning in year 4, cows are exposed to bulls for approximately 60 days. Only cows that are not pregnant in November or have physical defects are culled.

To ascertain absorption of colostral antibodies, blood samples are collected after 24 hours of birth. Samples are frozen and later analyzed for serum total protein using refractometry. Blood serum total protein is well correlated to absorption of colostral antibodies, which in turn is related to calf survival and health. If calves have serum total protein concentrations of 5.5 mg/dl or greater, they were considered to have adequate absorption of colostral antibodies.

Following weaning heifers are fed in drylot to gain 1.5 lb per day until May 1 when they are turned out to native pasture. Heifers are bred to start calving 30 days earlier than the cows. They are artificially inseminated to a synchronized estrus and then exposed to a bull for 45 days and rectally palpated for pregnancy diagnosis in the fall.

All male calves are branded, castrated and implanted with Ralgro at an average age of approximately 45 days of age and re-implanted 90 days later with Synovex C. Following weaning, steer calves are transported to the SE Experiment Station, Beresford, SD where they are fed a high grain diet for maximum gain to harvest.

Calf income per cow exposed was estimated from calf prices at western South Dakota sale barns for each year. Regression equations for each year were developed to estimate price per hundred weight based on weaning weight and sex.

Results and Discussion

In 1997 the percentage of calves alive at 1 week ($P = 0.07$) and weaning percentage ($P = 0.10$) were greater for the May calving group than the March calving groups (Table 2). The severe weather during the winter of 1996-1997 resulted in a high number of calf deaths shortly after birth for the March calving groups.

In 2000 the low weaning percentage for the May calving group ($P = 0.05$) was due to the number of cows examined pregnant in the fall that did not calve (Table 3). Absorption of colostral antibodies as indicated by serum total protein was not affected by calving time.

In 1999 and 2000 the means for calf birth weight were lower ($P < 0.10$) for the May calving group compared to the March calving groups (Table 4). In all years the calves born in March and weaned in late October were the heaviest at weaning ($P < 0.05$) due to their older age at weaning. In 1997 the May calving/October weaned group was 23 lb. heavier ($P < 0.05$) than the March calving/September weaned group that were about the same age at weaning. This was due to a higher average daily gain from birth to weaning for the May calving group ($P < 0.05$). In following years, calf weaning weight was similar for the March calving/September weaned and May calving groups.

In 1997 there was a higher percentage of cows in the May calving group in estrus ($P < 0.01$) during the first 7 days of the breeding season following an injection of prostaglandin (Table 5). In following years, the percentage of cows cycling in each group was more similar.

As could be expected, year had a large impact on pregnancy rate (Table 5). In 1997 and 1998 pregnancy rate was not significantly affected by treatment. In the third year, the May calving

group had the highest pregnancy rate. A year later, the May calving group had the lowest pregnancy rate. For the March calving groups, weaning calves in September did not result in an advantage in pregnancy rate or weaning percentage but did result in lower weaning weights compared to the October weaned group.

Table 6 shows calculations of pounds weaned and income per cow exposed based on the preliminary data presented in this paper. Even though average calf weaning weight was lower for the May calving/October weaned group compared to the March calving/October weaned group in 1997, the pounds of calf weaned per cow exposed were nearly identical. Due to a higher estimated price per hundredweight, the income per cow exposed to breeding for the May calving/October weaned group is slightly higher than the March calving/October weaned group for 1997. This was due primarily to differences in calf death loss. In following years, the pounds of calf weaned per cow exposed averaged 68 lb more for the March calving/October weaned group compared to the May calving group.

The estimated gross income per cow exposed is greatly influenced by year, pregnancy rate, calf survival and calf weaning weight (Table 6). The lighter weaning weights of the May calving/October weaned group compared to the March calving/October weaned group was partially offset by higher estimated calf price per hundredweight. This resulted in a difference in calf income $30 per cow exposed. In deciding the optimum time to calve, the potential to reduce cost of winter feed, equipment, facilities and labor for a specific situation would need to be considered. Another way to look at this is that if expenses per cow could be reduced by more than $30 by calving in May, then May calving would be more profitable.

This portion of the project will continue through the fall of 2002. A more complete economic analysis will be done at that time.

Tables

Table 1. Three management systems

Calving Season Starts Weaning Time	March 15 late October	March 15 mid September	May 1 late October
No. of cows	42	42	42
Approximate calving season[a]	3/15 to 5/14	3/15 to 5/14	5/1 to 6/30
Approximate breeding season[a]	6/5 to 8/4	6/5 to 8/4	7/22 to 9/20
Approximate weaning date	10/31	9/14	10/31

[a] The breeding and calving seasons start 30 days earlier for yearling replacement heifers.

Table 2. Calf survival and serum total protein for calves born in 1997

Calving season starts	March 15	May 1	Prob.
% calves alive at 1 week[a]	88.1	97.6	0.07
Weaning percentage[a]	85.5	95.2	0.10
Serum total protein, mg/dl	7.79	8.14	0.14
% calves with adequate total serum total protein	98.6	100.0	0.47

[a] Number of calves alive divided by the number of pregnant cows the previous December.

Table 3. Calf survival and serum total protein for calves born 1998 to 2000

Calving season starts Weaning time	March 15 late October	March 15 mid September	May 1 late October	Prob.
% calves alive at 1 week[a]				
1998	97.6	85.4	90.5	0.14
1999	90.5	92.5	95.1	0.72
2000	92.9	95.2	85.7	0.18
Weaning percentage[a]				
1998	95.2	85.4	85.7	0.27
1999	88.1	92.5	95.1	0.50
2000[b]	95.1	95.2	83.3	0.15
Serum total protein, mg/dl				
1998	7.21	6.85	7.15	0.21
1999	7.05	6.78	6.70	0.31
2000	7.41	7.26	7.43	0.83
% calves with adequate serum total protein				
1998	96.6	100.0	96.9	0.69
1999	100.0	86.4	90.3	0.12
2000	95.0	100.0	90.0	0.19

[a] Number of calves alive divided by the number of pregnant cows the previous December.
[b] March calving 94.1%, May calving 83.3% (P = 0.05).

Table 4. Effect of calving time and weaning time on calf performance

Calving season starts Weaning time	March 15 late October	March 15 mid September	May 1 late October	Prob.
Calf birth weight, lb				
1997	92.5	90.7	89.5	0.47
1998	88.3	87.8	87.1	0.83
1999	92.8[de]	96.1[d]	89.8[e]	0.09
2000	89.3[a]	86.5[ab]	82.8[b]	0.03
Age at weaning, days				
1997	211[a]	175[b]	175[b]	< 0.001
1998	205[a]	175[b]	169[b]	< 0.001
1999	196[a]	159[b]	161[b]	< 0.001
2000	225[a]	176[b]	179[b]	< 0.001
Actual calf weaning weight, lb				
1997	577[d]	492[e]	515[f]	< 0.001
1998	608[a]	531[b]	538[b]	< 0.001
1999	575[a]	508[b]	510[b]	< 0.001
2000	661[a]	558[b]	557[b]	< 0.001
Calf average daily gain, lb/day				
1997	2.32[d]	2.33[d]	2.46[e]	0.08
1998	2.55[d]	2.55[d]	2.68[e]	0.07
1999	2.45[a]	2.60[b]	2.62[b]	0.04
2000	2.53[a]	2.68[b]	2.63[b]	0.03

[a, b, c] Means with uncommon superscripts differ (P < 0.05).
[d, e, f] Means with uncommon superscripts differ (P < 0.10).

Table 5. Effect of calving time and weaning time on reproductive performance

Calving season starts Weaning time	March 15 late October	March 15 mid September	May 1 late October	Prob.
% in estrus during the first week of breeding season[ab]				
1997	27.0	29.4	61.5	< 0.01
1998	55.0	37.1	55.6	0.21
1999	52.6	46.0	66.7	0.18
% pregnant[a]				
1997	91.9	91.2	89.7	0.95
1998	95.0	88.6	88.9	0.54
1999	89.7	97.3	100.0	0.07
2000	92.3	100.0	88.6	0.10

[a]Includes only cows weaning a calf.
[b]Cows were not heat detected or artificially inseminated in 2000.

Table 6. Calculated pounds weaned and income per cow exposed[a]

Calving season starts Weaning time	March 15 late October	March 15 mid September	May 1 late October
1997			
Assumed % pregnant, 1996	90.9	90.9	90.9
Weaning percentage	85.5	85.5	95.2
Actual weaning weight	577	492	515
Lb. weaned per cow exposed	448	382	446
Estimated calf sale price, $/cwt[b]	84.59	86.90	87.26
Calf income/cow exposed, $	379	332	389
1998			
% pregnant, 1997	90.9	90.9	90.9
Weaning percentage	88.8	88.8	88.8
Actual weaning weight	608	531	538
Lb. weaned per cow exposed	491	429	434
Estimated calf sale price, $/cwt[b]	75.30	73.73	77.82
Calf income/cow exposed, $	370	316	338
1999			
% pregnant, 1998	90.8	90.8	90.8
Weaning percentage	91.9	91.9	91.9
Actual weaning weight	575	508	510
Lb. weaned per cow exposed	480	424	426
Estimated calf sale price, $/cwt[b]	91.02	91.33	93.51
Calf income/cow exposed, $	437	387	398
2000			
% pregnant, 1999	89.7	97.3	100.0
Weaning percentage	94.1	94.1	83.3
Actual weaning weight	661	558	557
Lb. weaned per cow exposed	558	511	464
Estimated calf sale price, $/cwt[b]	95.25	97.68	101.52
Calf income/cow exposed, $	531	499	471
Average calf income/cow exposed, $	**429**	**384**	**399**

[a]If affected by treatment (P < 0.10), treatment means are used. If not affected by treatment, overall mean is used.
[b]Estimated from calf prices at SD sale barns, adjusted for calf weight and sex.