

# Effect of calving season on cow/calf production in the Northern Great Plains - calf performance -

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## Abstract

There is current interest in the Northern Great Plains in shifting calving season away from the traditional late winter and early spring period. Records from North Dakota cow/calf herds over 6 years (1994-1999) were available to evaluate the effect of calving season on cow/calf production. Records (718 herd-years) were obtained from the central-processed CHAPS database of the ND Beef Cattle Improvement Association. Specific calving seasons were chosen based upon the distribution of mean annual calving dates in the database. Herd-years representing summer (10) and fall (5) calving seasons were excluded due to insufficient data. Remaining calving seasons and associated mean calving dates were late winter (LW; March 7), spring (S; April 2) and late spring (LS; April 20). Calf birth weight ( $P < .05$ ) was greatest in calves born in LW, least in S and intermediate in LS. Differences in fall weaning weight ( $P < .01$ ) and age at weaning ( $P < .01$ ) among calving seasons were inversely related to birth dates. Thus, calves born in earlier calving seasons were heavier (596, 544 and 507 lb for LW, S and LS, respectively) and older (217, 199 and 186 d, respectively) at weaning. This resulted from similar weaning dates ( $P > .1$ ) across calving seasons (October 13, 18 and 20, respectively). Measures of individual growth performance, weight per day of age (2.8 lb/d;  $P > .1$ ) and average daily gain (2.4 lb/d;  $P > .1$ ), were not affected by calving season. Although differences among calving seasons in actual weaning weight of bulls ( $P < .1$ ), steers ( $P < .01$ ) and heifers ( $P < .01$ ) paralleled overall weaning weight and age, adjusted weaning weights (597 lb steer equivalent at 205 days of age;  $P > .1$ ) did not differ. The effect of calving season on production efficiency (lb of calf weaned per cow exposed to breeding;  $P < .01$ ) also paralleled weaning weight and age (527, 480 and 435 lb, respectively). In ND cow/calf herds, selection of a calving season seems to be made independent of selection of a weaning date. Weaning date appears to be dependent upon factors other than calving date or age of calf. Individual growth parameters of calves is also independent of calving season. Thus, calf production in the Northern Great Plains is largely a function of earlier calving dates and older ages at weaning. Producers wanting to adopt later calving seasons in the Northern

Great Plains will need to focus on overall cost reduction to offset these inherent reductions in calf production.

## Objective

Determine the effect of calving season on calf performance of beef cattle operations in North Dakota.

## Materials and Methods

The analysis was conducted on records from North Dakota herds using the CHAPS record keeping system from 1994 to 1999. Seven hundred eighteen (718) herd years were available for use in the analysis. The purpose of the analysis was to evaluate the effect of calving season on standard production variables. Calving seasons chosen were based on the distribution of mean calving dates represented in the database. Herd years representing summer (10) and fall (5) calving seasons were excluded from analysis due to insufficient data for these seasons. Remaining calving seasons were late winter (LW; 115 individual herd years), spring (S; 503 individual herd years), and late spring (LS; 85 individual herd years). Beginning and mean calving dates (tables 5a and 5b) for LW, S, and LS were February 13 and March 7, March 12 and April 2, and March 28 and April 20, respectively.

Data were analyzed using the GLM procedure of SAS (SAS, 2002). Analysis included the effects of calving season, herd year within calving season, calving year and the interaction between calving season and year. Herd year within calving season was used as the error term to test for significant effects of calving season.

## Results

There were significant differences ( $P < .05$ ) between years for all measures of calf performance, with the exception of beginning of calving season date (Table 1a). Significant differences ( $P < .05$ ) between calving seasons were observed in birth weight, weaning weight, age at weaning, and weight weaned per cow exposed (Table 1a). With the exception of birth weight, calf weight and age were greatest in LW and least in LS (Table 1b). In general, birth weight was greatest in LW and least in S. Differences in birth weight were

minimized in 1997 (Figure 1). Nonetheless, there were no production efficiency differences ( $P > .1$ ) between calving seasons with respect to average daily gain, weight per day of age and sex-adjusted 205 day weight. Significant differences in pounds of calf produced between LW, S and LS appear to be simply related to the age of calves at weaning. Actual average weaning weights (Table 1b) for LS, S and LS were 631.1, 592.5 and 553.2 pounds respectively. Pounds weaned per cow exposed (Table 1b) for LS, S and LS were 526.9, 479.5 and 435.1 pounds, respectively.

### **Implications**

In ND cow/calf herds, selection of a calving season seems to be made independent of selection of a weaning date. Weaning date appears to be dependent upon factors other than calving date or age of calf. Individual growth parameters of calves is also independent of calving season. Thus, calf production in the Northern Great Plains is largely a function of earlier calving dates and older ages at weaning. Producers wanting to adopt later calving seasons in the Northern Great Plains will need to focus on overall cost reduction to offset these inherent reductions in calf production.

**Table 1a.** Effect of calving season and year of calf performance.

Item	Mean <sup>b</sup>	SD <sup>b</sup>	Probability <sup>a</sup>		
			Season	Year	Interaction
Beginning of the calving season, d	68.1	6.1	***	-	-
Birth date, d	89.4	4.8	***	***	-
Birth weight, lb	87.5	2.9	**	***	**
Wean date, d	289.2	9.9	-	***	-
Weaning weight, lb	551.6	25.9	***	***	-
Age at weaning, d	199.9	10.0	***	**	-
Weight per day of age, lb/d	2.79	.13	-	***	-
Average daily gain, lb/d	2.35	.13	-	***	-
Actual weaning weights					
Bulls	597.5	46.7	*	**	-
Steers	560.5	28.9	***	***	-
Heifers	533.5	26.1	***	***	-
Steer adjusted 205-d weight	597.4	25.1	-	***	-
Weight weaned per cow exposed, lb/cow	486.1	38.5	***	***	-

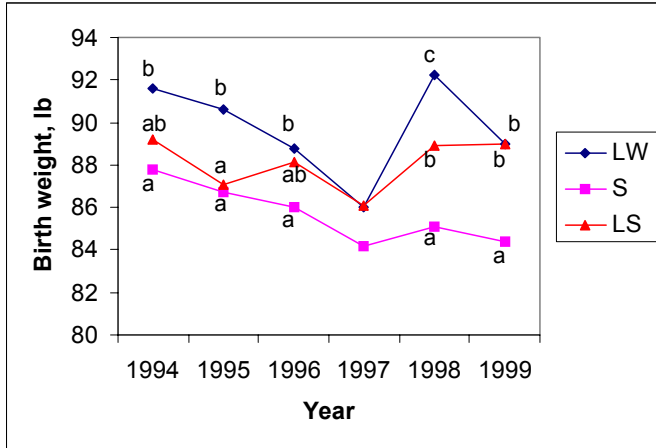
<sup>a</sup> \*\*\*, \*\*, \* and - indicate probability levels of P < .01, .05 and .10 and P > .1, respectively.

<sup>b</sup> Mean and SD refer to the overall average and standard deviation.

**Table 1b.** Least squares means for effects of calving season and year on calf performance.

Item	Calving Season			Year of weaning					
	Late Winter	Spring	Late Spring	1994	1995	1996	1997	1998	1999
Beginning of the calving season, d	44.1 <sup>a</sup>	70.5 <sup>a</sup>	86.7 <sup>a</sup>	65.5	67.2	67.2	67.1	68.7	66.8
Birth date, d	66.4 <sup>a</sup>	91.7 <sup>a</sup>	110.4 <sup>a</sup>	87.2 <sup>a</sup>	89.0 <sup>b</sup>	90.4 <sup>bc</sup>	90.0 <sup>bc</sup>	91.3 <sup>c</sup>	89.1 <sup>ab</sup>
Birth weight, lb	89.7 <sup>a</sup>	85.7 <sup>a</sup>	88.1 <sup>a</sup>	89.5 <sup>c</sup>	88.1 <sup>b</sup>	87.6 <sup>b</sup>	85.4 <sup>a</sup>	88.7 <sup>bc</sup>	87.5 <sup>b</sup>
Wean date, d	285.8	291.2	292.8	288.1 <sup>a</sup>	288.1 <sup>a</sup>	289.1 <sup>a</sup>	287.8 <sup>a</sup>	290.7 <sup>a</sup>	295.7 <sup>b</sup>
Weaning weight, lb	596.2 <sup>a</sup>	544.1 <sup>a</sup>	506.9 <sup>a</sup>	554.4 <sup>b</sup>	553.5 <sup>b</sup>	529.8 <sup>a</sup>	536.9 <sup>a</sup>	555.8 <sup>b</sup>	564.0 <sup>b</sup>
Age at weaning, d	217.2 <sup>a</sup>	199.4 <sup>a</sup>	185.5 <sup>a</sup>	201.5 <sup>ab</sup>	200.0 <sup>a</sup>	199.3 <sup>a</sup>	197.7 <sup>a</sup>	200.1 <sup>a</sup>	205.5 <sup>b</sup>
Weight per day of age, lb/d	2.77	2.75	2.77	2.78 <sup>bc</sup>	2.79 <sup>bc</sup>	2.68 <sup>a</sup>	2.74 <sup>b</sup>	2.81 <sup>c</sup>	2.76 <sup>bc</sup>
Average daily gain, lb/d	2.35	2.32	2.32	2.33 <sup>bc</sup>	2.35 <sup>bc</sup>	2.24 <sup>a</sup>	2.31 <sup>b</sup>	2.38 <sup>c</sup>	2.37 <sup>bc</sup>
Actual weaning weights									
Bulls	631.1 <sup>a</sup>	592.5 <sup>a</sup>	553.2 <sup>a</sup>	604.1 <sup>b</sup>	614.1 <sup>c</sup>	582.4 <sup>ab</sup>	596.9 <sup>bc</sup>	558.2 <sup>a</sup>	597.6 <sup>bc</sup>
Steers	609.2 <sup>a</sup>	552.9 <sup>a</sup>	509.4 <sup>a</sup>	557.4 <sup>bc</sup>	560.2 <sup>cd</sup>	535.2 <sup>a</sup>	546.7 <sup>ab</sup>	570.8 <sup>cd</sup>	572.6 <sup>d</sup>
Heifers	574.6 <sup>a</sup>	527.2 <sup>a</sup>	493.3 <sup>a</sup>	535.2 <sup>b</sup>	537.0 <sup>b</sup>	516.0 <sup>a</sup>	520.2 <sup>a</sup>	536.0 <sup>b</sup>	545.8 <sup>b</sup>
Steer adjusted 205-d weight	600.5	591.2	582.9	595.7 <sup>bc</sup>	596.8 <sup>c</sup>	574.7 <sup>a</sup>	586.3 <sup>b</sup>	600.7 <sup>c</sup>	594.9 <sup>bc</sup>
Weight weaned per cow exposed, lb/cow	526.9 <sup>a</sup>	479.5 <sup>a</sup>	435.1 <sup>a</sup>	496.3 <sup>b</sup>	482.8 <sup>b</sup>	465.9 <sup>a</sup>	453.7 <sup>a</sup>	485.9 <sup>b</sup>	498.4 <sup>b</sup>

<sup>a,b,c,d,e</sup> Means within an effect with differing superscripts differ (P<.05).



**Figure 1.** Effect of calving season and year on calf birth weight. Average calving dates less than 75 (March 16), between 75 (March 16) and 105 (April 15), and greater than 105 (April 15) were classified into a late winter (LW), spring (S) and late spring (LS) calving season, respectively. Means within year with differing superscripts differ ( $P < .05$ ).