

EFFECTS OF HEIFER CALVING DATE ON LONGEVITY AND LIFETIME PRODUCTIVITY

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Objective

Longevity and lifetime productivity are important factors influencing profitability for the cow-calf producer. The objective of this study was to investigate the influence of calving early as a heifer on cow longevity and lifetime productivity.

Data Source and Analysis

Data were aggregated into a database from the Western Beef Development Centre's (WBDC) beef cattle research herd production records. Data for the spring calving herd collected between 2001 and 2017 were used for this study. The breeding season at WBDC began approximately June 20 each year and lasted for ~65 days. Weaning occurred each year in late October (at ~160 d of age) and weight was measured. Data were trimmed to remove heifers that produced a twin at any point during their herd life. Females sold or culled for non-breeding reasons (e.g., mothering, milk, conformation, temperament) were removed from the data set. The final data set for this study consisted of 211 Black Angus and Angus crossbred heifers born from 1999 to 2008. An initial calving period was determined for each heifer based on the relative birth date of her first calf. Two-year old first-calf heifers were assigned to one of three 21-day calving periods based on the date their first calf was born. Each subsequent calf born to the cow was also assigned to a calving group (or period), but for analysis purposes the female remained in the group number assigned for her first parturition. Average lifetime production was calculated as the mean production of all weaned calves whose dams were classified in a particular calving group as heifers. Weaned calf revenue was calculated, \$/cow = Calf cumulative weaning BW, lb/cow × WCP, \$/lb, where WCP equals \$1.67/lb and represents the average price for 550 lb calves (heifers and steers) for the last nine years (2008-2017) in Saskatchewan, Canada (CANFAX, 2016).

Results and Discussion

Cow Retention and Longevity

Figure 1 depicts percentages of cows remaining in the herd over time out to 9th calving based on retention data. Retaining percentage of period 1 cows was 6.5-18.3 and 2.9-24.1% greater than those of period 2 and period 3 cows, respectively. Thus, heifers that calve later in the calving season for their first calving fail to remain in the herd as long as heifers that calve earlier (first 21 days) for their first calving.

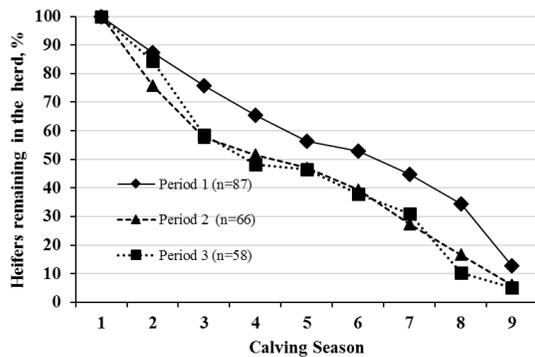


Figure 1. The influence of heifer calving period on herd retention after nine calving seasons. Results from Angus and Angus crossbred heifers (n = 211) from WBDC. Period 1 = calved in the first 21 days, 2 = calved between day 22-42, 3 = calved day 43 and after as a heifer.

The longevity of a beef female is important to the sustainability and profitability of any beef operation (Cushman et al., 2003). As indicated previously, in the current study, cows were culled if they were open. **Figure 2** presents influence of calving period on beef cow average longevity from WBDC.

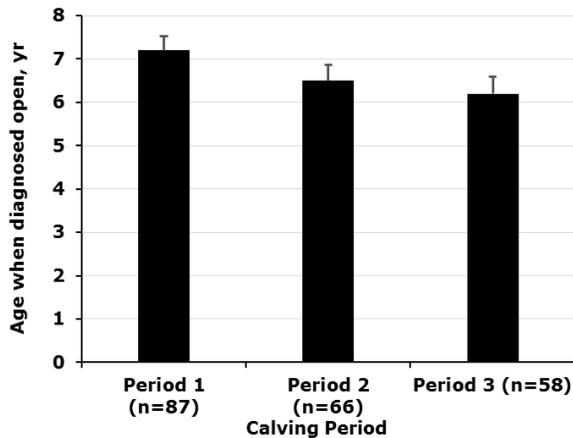


Figure 2. Influence of heifer calving period on average life time in herd for WBDC heifers. Period 1 = calved in the first 21 days, 2 = calved between day 22-42, 3 = calved day 43 and after

In the current study, heifers that had their first calf during the first 21-day period of the calving season had increased longevity compared to heifers that calved in the second and third 21-day periods (7.2, 6.5, and 6.2 yr old when diagnosed open for period 1, period 2, and period 3, respectively). However, no difference was observed between period 2 and period 3 groups in longevity. The observed results on cow retention time and longevity can be explained as Bridges (2013) noted, if a heifer conceives late and subsequently calves late, she has less time to heal after calving before the start of the next breeding season, so she is more likely to be anestrous, or not having estrous cycle, at the start of the breeding season and will likely conceive late again; this cycle continues to repeat until eventually she fails to conceive in a confined breeding period and is culled from the herd.

Effect of Initial Calving Group on Cow Lifetime Productivity

Effect of first calving period on a beef cow's lifetime productivity are presented in **Table 1**. The age at first calving was ranged from 731 to 778 d. Heifers that calve early in their first calving season may be the best phenotypic indicator of fertility. When production data for each year was pooled, cow groups were different from each

other in calving date; and were 107, 110, and 119 d for period 1, period 2, and period 3 cows, respectively. This result indicated that the females that calved early as heifers tended to calve earlier throughout the remainder of their productive lives than the females that calved later in their first calving.

Item	Calving period ¹		
	Period 1	Period 2	Period 3
Initial heifer, n	87	66	58
Age at first calving, d	731	751	778
Calf birth date, Julian day	107	110	119
Calf birth BW, lb	88	88	88
Calf age at weaning, Julian day	167	164	149
Calf weaning BW, lb	481	478	445
Pre-weaning ADG, lb/d	2.42	2.42	2.21
Calf adjusted 205-d weaning BW, lb/cow	582	578	562
Calf cumulative weaning BW, lb/cow	2551	2088	1854
Calf cumulative adjusted 205-d weaning BW, lb/cow	3089	2549	2346
Total produced calves, n/cow	5.4	4.5	4.2

¹Period 1 = calved in the first 21 days, Period 2 = calved between day 22 to 43, Period 3 = calved day 44 or later.

When lifetime productivity for each animal was pooled, calf actual average weaning weights were 36 and 33 lb heavier and average adjusted 205-d weaning weights were 20 and 16 lb heavier for the period 1 and 2 cows than period 3 cows, respectively. Calf gain to weaning (ADG) was slightly lower for the calves from period 3 cows (2.2 lb/d) than for the calves born to period 1 (2.4 lb/d) and period 2 cows (2.4 lb/d).

Reproductive performance is one of the biggest factors affecting beef cow production efficiency and profitability. Average lifetime calves weaned for WBDC cows that calved in the 1st, 2nd, and 3rd 21-day intervals was 5.4, 4.5, and 4.2 calves per cow, respectively. Due to combined effects of greater average number of calves weaned over lifetime and actual calf weaning weights, cows that had their first calf during the first 21-day period had greater total weight weaned (2551 lb) compared to heifers that calved in the second (2088 lb) or 3rd (1854 lb) 21-d period.

One of the most important findings of this study was females that calve early as heifers can produce more cumulative pounds of weaned calf in their lifetime than females that calved later (after first 21 days) as heifers (i.e., cumulative pounds of calf weaned was 18.2% and 27.3% greater than that of period 2 and period 3 cows, respectively).

The Period 1 cows were greater than period 2 and period 3 cows; generated an additional \$718 to \$1077 in weaned calf revenues over their lifetime (**Figure 3**). Given the small margins in cow-calf production (\$82 per cow was 25-year average returns from 1991-2016) (CRSB, 2016), the additional lifetime pounds weaned from early calving heifers represents a large financial advantage for cow-calf producers.

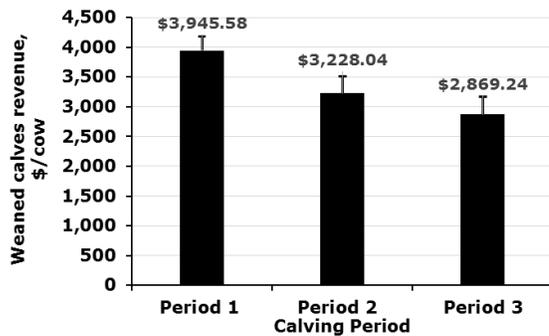


Figure 3. Influence of calving period on lifetime weaned calf revenue†.

†Revenue calculated as cumulative pounds weaned x estimated market value of \$1.67 per lb (which represents the 2008-2017 average price for 550 lb calves in Saskatchewan).

The differences in average lifetime production between cow groups in the current study were likely associated with differences in total number of calves weaned over lifetime, but some differences were associated with calf weaning weight. In general, in western Canada, where cost of production has been measured at just under \$962 per cow wintered (AAF, 2016) a heifer will need to wean a minimum of five consecutive calves to recoup her development costs (K. Larson, Western Beef Development Centre, personal communication). This economic threshold of needing to wean five calves was only reached by the females that calved early as heifers. Thus the findings of this study demonstrate why it is so important for cow-calf producers to ensure that their replacement heifers conceive as early as possible in their first breeding exposure.

Conclusions

We reviewed sixteen years of production records from Western Beef Development Centre and found calving period influenced a heifer's herd performance with heifers that were born in the first calving period having a large financial advantage for cow-calf producers.

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