W 996

Replacing Late Calving Beef Cows to Shorten Calving Season

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Introduction

There are many factors that impact profitability in cow-calf beef production. For example, retaining a female that suffers a failed pregnancy decreases the likelihood of a beef cow or heifer being profitable over her life[1]. Several factors can cause a failed pregnancy, but retaining females that calve late within a defined calving season (days between birth of the first and last calf of an individual herd and/or multiple herds) can increase the likelihood of future failed pregnancy (Mousel et al., 2012). Late calving females get less time for uterine repair (involution) and overcoming postpartum anestrous before the next breeding season (postpartum interval), reducing the likelihood of the female becoming pregnant during the next breeding season. For example, a study found heifers that calved within the first 22 days of the defined calving season were more likely to remain in the herd longer (or increased longevity) than heifers that calved on day 23 or later (Mousel et al., 2012).

A long calving season generally results in a lighter average weaning weight with a wider range of calf weights. Most cow-calf producers in the United States sell calves at weaning, and weaning typically happens when time allows regardless of calf age or weight. Therefore, calves born late in the calving season will be younger and lighter weight than early born calves. Lighter weight calves and less uniformity in calf weights can impact profitability of the herd. Calves are typically sold in lots grouped on weight ranges, and buyers commonly pay higher prices for cattle sold in larger lots (i.e., more uniform) to fill and ship truckloads more efficiently. Shortening the calving season provides an opportunity to capture price premiums from weaning weight uniformity when marketing calves (Boyer, Griffith and Pohler, 2020). However, identifying a strategy to shift to a shorter calving season can be difficult. This publication analyzes not just what happens to net returns when shortening the calving season but also what is the most profitable strategy for shortening the calving season length.

[1] Mathews and Short, 2001; Ibendahl, Anderson, and Anderson, 2004; Mackay et al., 2004; Boyer, Griffith, and DeLong, 2020 can be seen in "References" section.

Scenarios

We analyzed partial returns per exposed cow for two herd sizes: 25 head and 250 head. For each herd size, five combinations of different replacement rates and calving season lengths were analyzed. These scenarios were: 1) baseline or no change to 120-day calving season, 2) annually replace 10 percent of the late calving females to reach a 60-day calving season, 3) annually replace 20 percent of the late calving females to reach 60-day calving season, 4) annually replace 10 percent of the late calving females to reach 45-day calving season, and 5) annually replace 20 percent of the late calving females to reach 45-day calving season. Late calving females were identified by the timing they became pregnant during the breeding season. The percentage of late calving cows that were replaced were in addition to annually replacing open cows. The analysis assumed all replacement heifers were developed on-farm. We used partial budgets that only considered the change in the development costs for each scenario, meaning all other production costs were included since they were likely to not vary much across scenarios. Additionally, we assume the breeding season starts on April 25. Table 1 displays the heat cycles for the herd.

Table 1. Dates for Each 21-day Estrous Cycle Used in the Analysis.

Estrous Cycle	Day 1	Day 16	Day 21
1st	April 25	May 11	May 16
2nd	May 17	June 1	June 7
3rd	June 8	June 23	June 29
4th	June 30	July 15	July 21
5th	July 22	August 8	August 12

Data

We used data from a spring-calving herd located at the Ames AgResearch and Education Center, near Grand Junction, Tennessee, spanning from 1990 to 2008, to estimate calf weaning weight as a function of calving date and calf sex. Calves born in the spring were assumed to be sold at weaning during the months of September, October and November. The average prices for 400- to 500- and 500- to 600-pound steers and heifers were collected along with cull cow prices. The average of these prices over this time period is shown in Table 2 (USDA, 2017). Cull cow revenue was found by multiplying the cull cow price by an average cull cow weight of 1,400 pounds. The discount rate was assumed to be 5.5 percent.

Table 2. Summary Statistics of September, October and November Steer, Heifer and Cull Cow Prices for Tennessee from 2000-2018 ($/lb)

Variable	Average	Standard Deviation	Minimum	Maximum
300 - 400 Steer Price	1.70	0.46	1.25	3.21
400 - 500 Steer Price	1.55	0.41	1.15	2.86
500 - 600 Steer Price	1.43	0.36	1.05	2.56
300 - 400 Heifer Price	1.46	0.40	1.05	2.74
400 - 500 Heifer Price	1.36	0.37	0.97	2.53
500 - 600 Heifer Price	1.28	0.34	0.93	2.34
Cull Cow Price	0.62	0.17	0.44	1.12

Results

Table 3 shows the change in total annual return from switching from the baseline 120-calving season to a shorter calving season. The values in this table show how annual returns would change as late calving cows are replaced with early calving heifers. For the 25-head herd, the annual partial returns for the baseline scenario of 120-day calving season was $622 per head. When choosing to annually replace 10 percent of the late calving females to achieve a 60-day calving season, returns decrease in the first two years due to selling more breeding cattle and selling fewer heifer calves, but by year three, the calving distribution has shifted to produce more earlier born, heavier calves, resulting in a higher return per exposed female. By year five, returns were $24 per head higher than the baseline scenario. The same pattern of results is found for the other scenarios where late calving females were replaced. When the 20 percent annual replacement rate was used, partial returns decreased more in the first year but increase at a faster rate. Replacing 20 percent of the late calving females to achieve a 45-day calving season produced the highest annual return per exposed female for the 25-head herd.

The larger herd size (250 head) had a similar pattern of results as the small herd size. The larger herd had a higher return per head than the smaller herd. This is due to the larger herd receiving higher prices due to selling larger lot sizes, which was considering in prices of cattle. The scenario of annually replacing 10 percent of the late calving females to reach a 60-day calving season had the highest partial returns per exposed female. However, the returns increase by $13 per head relative to the baseline scenario. This gain in returns was not as much as the small herd, showing the small beef cattle operation in this study had more to gain from shortening calving season length than the larger beef cattle operation.

Table 3. Summary of Changes in Annual Returns ($/head) from the Baseline 120-day Calving Season for a 25-head and 250-head Herd

Year	10% to 45-Day[a]	20% to 45-Day[a]	10% to 60-Day[a]	20% to 60-Day[a]
25 Head Herd*				
Year 1	-29.91	-101.18	-32.69	-52.19
Year 2	-47.02	14.43	-42.06	18.24
Year 3	-36.44	25.71	19.60	23.32
Year 4	18.58	25.71	24.69	23.32
Year 5	23.79	-	24.69	-
Year 6	23.79	-	-	-
250 Head Herd*				
Year 1	-30.19	-108.59	-33.03	-55.20
Year 2	-57.34	11.23	-51.82	12.11
Year 3	-48.04	11.50	12.26	11.73
Year 4	7.85	10.52	13.44	11.25
Year 5	8.95	-	12.96	-
Year 6	8.95	-	-	-

[a] 10% to 45-day = Replace 10% of Late Calving Females to 45-day Calving; 20% to 45-day = Replace 20% of Late Calving Females to 45-day Calving; 10% to 60-day = Replace 10% of Late Calving Females to 60-day Calving; and 20% to 60-day = Replace 20% of Late Calving Females to 60-day Calving

*25 head herd had a baseline of $622 returns and the 250 head herd had a baseline of $664 returns

Conclusions

The goal of this study was to show how shortening a 120-day calving season to a 45- and 60-day calving season by replacing late calving cows impacts southeastern United States beef cattle producers' returns. We analyzed replacing 10 percent and 20 percent of the latest calving cows with heifers that become pregnant in the first 21 days (i.e., first estrous cycle) of breeding season until the 120-day calving season has shifted to a 45- and 60-day calving season. These scenarios were analyzed for herds of both 25 head and 250 head. A small and large herd would choose to replace 10 percent of their late calving cows to move from a 120- to 60-day calving season. However, the small producer would receive a larger return to shift the calving season than the large producers. This is likely due to smaller producers realizing a larger price increase from premiums paid for larger lots of cattle.

The management choice of replacing late calving cows and shortening the calving season will benefit both small and large cattle producers. The publication shows the importance of reproductive management and the benefits on a calving season length, both of which impact profitability to beef cattle producers.

References

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