Real-Life Implementation of Controlled Breeding Season

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Story in Brief

Reducing the length of the calving season can be the first step toward improved beef production efficiency. The objectives of this demonstration were to reduce the length of the calving season and to document the production and economic impact when converting a long calving season (> 200 days) to a short calving season (< 90 days). A 3-part plan was developed for 6 cow-calf herds to reduce the length of the calving season. The average number of years to reach the cooperator's desired cowherd calving season was 3.8 ± 0.75 years. The percentage of cows calving during the desired calving season was higher for the final year compared to the benchmark year (92.0 ± 11.66% vs. 46.3 ± 14.01% (mean ± SD), respectively; $P < 0.002$). The mature cow calving percentage did not change from the benchmark year to the final year (89.2 ± 6.05% and 87.2 ± 9.47%, respectively; $P > 0.75$). The average length of the calving season decreased from 273.3 ± 84.88 days in the benchmark year to 85.2 ± 4.75 days in the final year ($P < 0.002$). Due to the limited number of farms and large variability, there were no ($P \geq 0.14$) differences for herd breakeven, specified costs/animal unit (AU) and income over specified cost/AU from the benchmark year to the final year; however, herd breakeven decreased 30%, specified costs/AU decreased 40%, and income over specified cost /AU increased 100%. Thus, shortening the calving season is perhaps one of the most important and cost-effective practices that can be implemented by a producer.

Introduction

In a USDA, APHIS and Veterinary Services survey, 54.8 % of the beef cattle producers in the Southeast did not have a set calving season which is more than reported for the west (16.2%) and central (32.9%) regions. With the profitability of a cow-calf operation getting more and more difficult to obtain, reducing the breeding and calving season can be the first step toward improved production efficiency.

There is a number of management advantages to a controlled breeding and calving season. With today's cattle industry demanding more uniform lots of calves, marketing may be the most important reason to reduce the calving season. Data from the 2010 University of Arkansas livestock market study demonstrated feeder calves sold in 2 to 5 head ($110.52) and groups ≥ 6 head ($112.60) sold for a higher price than calves sold one head at a time ($107.81; $P < 0.0001$). Labor and time are very important and expensive commodities for a cow-calf producer. A controlled calving season concentrates time and labor for calving, reduces expenses and increases efficiency. The herd health and management of the cow herd is better facilitated with a shortened calving season. Cow nutritional management can be improved when all cows are in the same stage of production. Culling and selection of replacement heifers based on records can be better accomplished. A summary of how different management practices are implemented in a controlled and year-long breeding programs are compared in Table 1.

One of the excuses given for failing to maintain a short calving season is removing bulls and keeping them separate. This is a problem for most small operations. However, with high tensile electric fence, bull lots can be constructed economically and double as weaning lots when preparing calves for the market. If a bull cannot be removed until weaning, pregnancy checking and culling late breeding

cows is a method of shortening the calving season. Leasing bulls may also be an option. This allows a calf-calf producer to obtain bulls for the breeding season and return them to their owners once the breeding season is over.

Long Calving Seasons Mean Lighter Weaning Weights

Long calving seasons (more than 90 days) result in a wide range in age of calves at weaning time. That age at weaning has a significant effect on weaning weight is well known, but this fact is given little management attention (Table 2). If a single weaning date is used, younger calves wean at a lighter weight. Therefore, if the calving season lasts 90 days or less, no calves will be less than 180 days old at weaning. This means that the average weaning weight for the herd with a 90 day calving season will be higher simply because there are no calves less than 180 days of age at weaning time. Average weaning weight increases even more for herds that calve in less than 90 days because the average age at weaning increases.

Breeding and Calving Season Demonstrations

Six beef cow-calf operations in Howard (n = 2), Dallas (n = 2), Union, and Montgomery counties contacted their local county Extension agent and expressed their desire to participate in the Arkansas Beef Improvement Program (ABIP) Breeding and Calving Seasons Special Project. The goals of the ABIP project were to reduce the length of the calving season and to document the production and economic impact when converting a long calving season (> 200 d) to a short calving season (< 90 d).

In collaboration, the producer, county Extension agent, and Animal Science faculty developed a 3-part plan to reduce the length of the calving season. The 3 parts included: 1) determine when the cows were calving (annual calving distribution); 2) establish the months and length of the desired calving season; and 3) develop a management plan to transition the cow herd to the desired calving season.

Part one of the plan determined the current annual calving distribution (benchmark year). It was typical for a large group of cows to calve January through May, with very few cows calving in the summer months (June, July and August) and an additional group calving in the fall. The second part of the plan was the producer determining the desired calving period (months and length). Some producers selected a fall calving season and some a spring calving season. All of the producers selected a calving season of ≤90 days. From the benchmark calving distribution, a plan was developed by the producer, agent, and Animal Science faculty to reach the desired calving season (part 3). Supplemental feeding, mineral supplementation, bull breeding soundness examinations, and other management factors that could affect reproduction rates were reviewed and changes were made if necessary.

Because of the uniqueness of each farm, a specific plan was designed for each cow herd. The projected dates for the beginning and end of the breeding and calving seasons were determined and monitored yearly. Most producers had a benchmark calving season greater than 7 months and often times the herd was split into 2 groups (fall and spring calving groups). Over time the breeding season was restricted in order to obtain the desired calving season. This entailed moving some cows from spring to fall calving or fall to spring depending upon the primary calving season desired.

The cow-calf producer was required to complete a budget for each year of the program that included herd inventory, number of animal units (AU), production information, income, and costs. The herd inventory reflected the number of animals as of January 1 of the budget year. It included mature cows (a female pregnant with at least her second calf), growing heifers (weaned heifers that had not conceived), first-calf heifers (heifers that were pregnant or nursing their first calf but were not pregnant with their second calf), bulls for breeding the mature cow herd and heifers, and growing bulls (6 to 16 months of age). Total number of AU in the cow herd was calculated based on ME requirements as described by Gadberry and Troxel (1999).

Production information for the mature cows included calf-crop percentage, culling percentage, replacement rate, death loss, and number of females exposed to the bull. Calf-crop percentages were determined by dividing the number of calves weaned by the number of females exposed to the bull.

Income summary included the number of cattle and calves sold, average bodyweight/head, and average price/lb. Included in the income section were calculated values for total pounds sold, total income, average selling price, total pounds sold/AU, and income/AU. The selling price established in the benchmark year was used to determine income in subsequent years to prevent market price fluctuations from confounding the results.

The specified costs included salt and mineral, supplemental feed, veterinarian costs, growth implants, fly control, sales commission, hauling, day labor, pregnancy testing, bull cost or AI, breeding soundness examinations, replacement heifer or cow purchase, grazing lease, fertilizer, lime, purchased hay, herbicide, and miscellaneous. No overhead items, such as family expenses, machinery, depreciation, etc., were included in the budget.Summarized values included total specified cost/AU, herd break-even (specified cost divided by pound of beef sold) and income over specified cost/AU.

Calving season length, percent of cows calving in the desired season, net calf crop, herd breakeven and income over specified costs/AU for both the benchmark year and final year were analyzed using a simple paired t-test. All means are reported as the raw mean ± the calculated standard deviation.

Results and Discussion

The average number of years to reach the cooperator's desired calving season was 3.8 ± 0.75 years (mean ± SD). The results of the benchmark year and the final year are summarized in Table 3. The percentage of cows calving during the desired calving season was higher for the final year compared to the benchmark year (92.0 ± 11.66% vs. 46.3 ± 14.01%; $P < 0.002$). The mature cow calving percentage did not change ($P > 0.75$) from the benchmark year (89.2 ± 6.05%) to the final year (87.2 ± 9.47%), but the average length of the calving season decreased ($P < 0.002$) from 273.3 ± 84.88 days to 85.2 ± 4.75 days for the benchmark year and the final year, respectively.

Due to the limited number of farms and large variability, there were no differences for herd break-even ($P > 0.24$), specific costs/AU ($P > 0.68$) and income over specified costs/AU ($P > 0.14$) from the benchmark year to the final year. When comparing means, breakeven decreased 30% from \$0.61 ± 0.22/lb to \$0.43 ± 0.25/lb from the benchmark year to the final year, respectively. Specified costs/AU decreased 40% from \$209.70 ± 145.68 to \$126.20 ± 40.41, whereas income over specified cost improved 100% from \$95.00 ± 68.27/AU to \$189.70 ± 133.50/AU, from the benchmark year to the final year, respectively. Although these differences were not statistically significant, they were financially relevant to the cooperators. These results provide evidence that these farms increased beef production efficiency and improved profitability by decreasing the length of the calving season. This project was very successful but required a cattle cooperator who was committed to reducing the calving season and would stay with the program for 4 to 5 years.

Implications

Shortening the length of the calving season is the most important cost-effective practice that can be implemented by a cow/calf producer. Cost of the change is minimal and production costs can be reduced without reducing production which leads to improved production efficiency. A short controlled calving season forms the cornerstone for additional prudent management practices. Without a short calving season (≤ 90 days), opportunities for increasing production efficiency and reducing the cost per calf weaned are limited.

Acknowledgements

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Table 1. Management practices compared in controlled vs. year-long breeding programs[a]

Basic Management	**Controlled Breeding**	**Year-Long Breeding**
Castration Vaccination Pregnancy testing Parasite control Weaning	Once or twice yearly	Three to eight times yearly
Feeding	Selectively feed before calving and after– • decrease in time for return to estrus • increase in conception rate • increase number of early born calves • decrease death loss in calves	Must feed according to average pregnancy status of herd or feed dry cows as if they are lactating (50 to 100% increase) or suffer delayed estrus and conception, late born calves, high calf mortality. Can separate lactating and non-lactating cows, but should be performed weekly.
Utilization of Forage	Can plan calving and rebreeding during times of peak forage production.	Must buy supplement for cows during low forage availability and must separate them from non-lactating cows to conserve cost.
Marketing	Gives uniformity to calf crop (near same age) • plan marketing	Cattle must be marketed over selected periods as they achieve minimum age and weight. A single marketing limits weight of late born calves and severely reduces return to dam.
Selection and Culling	• Cow/Calf Accurately evaluates calf weights as they reflect milk producing ability and genetic capabilities of cow.	• Cow/Calf No valid means of comparison; weight gain of calf and lactation level of cows varies with season of year.
	• Cows From one pregnancy testing can eliminate slow or hard breeding cows and expect progressive increase in reproductive rate of herd. Accurately identify cows calving every 365 days.	• Cows Must use multiple periods of pregnancy testing. Difficult to determine cause for open cows due to extreme variation in environment, i.e., nutrition, parasitism, disease.
Calf Mortality	• Health program Can plan comprehensive herd health plan with minimum labor while providing maximum protection. • Calving difficulty 75% of calf losses occur at birth–80% due to difficult calving. Checking frequently (3 to 4 times daily) can increase calves saved by 200% with only 50% labor increase.	• Health program Must work calves on minimum of 30-day intervals if immunization and control is to be effective. • Calving difficulty Frequent checks are difficult due to number of months over which cattle must be observed.
Heifer Development	Permits accurate and selective feeding of heifers and reduces age variability among heifers which results in a higher percentage of puberal heifers at the start of breeding.	Difficult to feed and develop due to large variation in age and weight. Must also isolate older nursing heifers due to the possible occurrence of puberty and the resulting pregnancy causing calving problems and/or death of calf and heifer.

[a]Adapted from "Long Calving Season: Problems and Solutions" by L.R. Sprott and J. R. Beverly, Texas Agricultural Extension Service, The Texas A&M University System (B-1433)

Table 2. Effect of age of calf on weaning weight[a]

Calf Age at Weaning (days)	Weaning Weight (lb)
80-99	303
100-119	304
120-139	301
140-159	377
160-179[b]	401
180-199	441
200-219	472
220-239	473
240-259[c]	503
260-279	517
280-299	538
> 300	578

[a]From J. A. Minyard and J. C. Dinkel, 1965.
[b]Calves less than 180 days at weaning will have the lightest weaning weights.
[c]Calves held beyond this age will compete with their dams for forage and supplement.
Adjustments in stocking rate and/or levels of feed may be necessary to ensure optimum performance

Table 3. Length of calving season, percentage of cows calving in the desired calving season, mature cow calving percentage, herd breakeven, specified costs per AU and income over specified cost per AU for the benchmark year and the final year of the calving season project (mean ± SD).

Production Item	Benchmark Year	Final Year
Length of calving season (d)	273.3 ± 84.88 [a]	85.2 ± 4.75[b]
Percentage of cows calving in the desired calving season (%)	46.3 ± 14.01 [a]	92.0 ± 11.66 [b]
Mature cow calving percentage (%)	89.2 ± 6.05 [a]	87.2 ± 9.47 [a]
Herd breakeven ($/lb)[c]	0.61 ± 0.22 [a]	0.43 ± 0.25 [a]
Specified costs per AU ($)[d]	209.70 ± 145.68 [a]	126.20 ± 40.41 [a]
Income over specified cost per AU ($)[e]	95.00 ± 68.27 [a]	189.70 ± 133.50 [a]

[a,b]Means within rows without a common superscript differ (P < 0.002).
[c]Specified cost divided by pounds of beef sold.
[d]The specified costs included: salt and mineral, supplemental feed, salt and mineral, supplemental feed, veterinarian costs, growth implants, fly control, sales commission, hauling, day labor, pregnancy testing, bull cost or AI, breeding soundness examinations, replacement heifer or cow purchase, grazing lease, fertilizer, lime, purchased hay, herbicide, and miscellaneous.
[e]Income over specified costs divided by the AU grazing on the farm. An AU is equal to a 1,000 lb cow.