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# Reproductive Efficiency: The Economics of Calving Intervals and Distributions[1]

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This publication aims to discuss the economic impact of reproductive efficiency in beef cattle, increase awareness and knowledge of the importance of an efficient cow herd in maximizing profitability, and promote confidence in discussing this topic with clientele. The intended audience is cattle producers and Extension agents.

The profitability of the cow-calf operation is directly related to the herd's reproductive efficiency. Calving interval, the time from the birth of one calf until the birth of the next, is a great tool to evaluate the reproductive efficiency of an individual cow or an entire herd. An efficient cow is one that has a calf every 365 days. To calve every 12 months, a cow must become pregnant 85 days post-calving (around 280 days of gestation + 85 days = 365 days). A typical cow takes 30 to 45 days for uterine involution and postpartum recovery before resuming normal estrous cycles.

Figure 1 illustrates an efficient cow's calving interval. On day zero, the cow becomes pregnant. After approximately 280 days of gestation, she gives birth to one calf. After calving, a cow needs about 30 to 45 days to recover (uterine involution) and resume normal estrous cycles for breeding. This leaves a window of 55 days for her to become pregnant and achieve 12 months of calving interval.

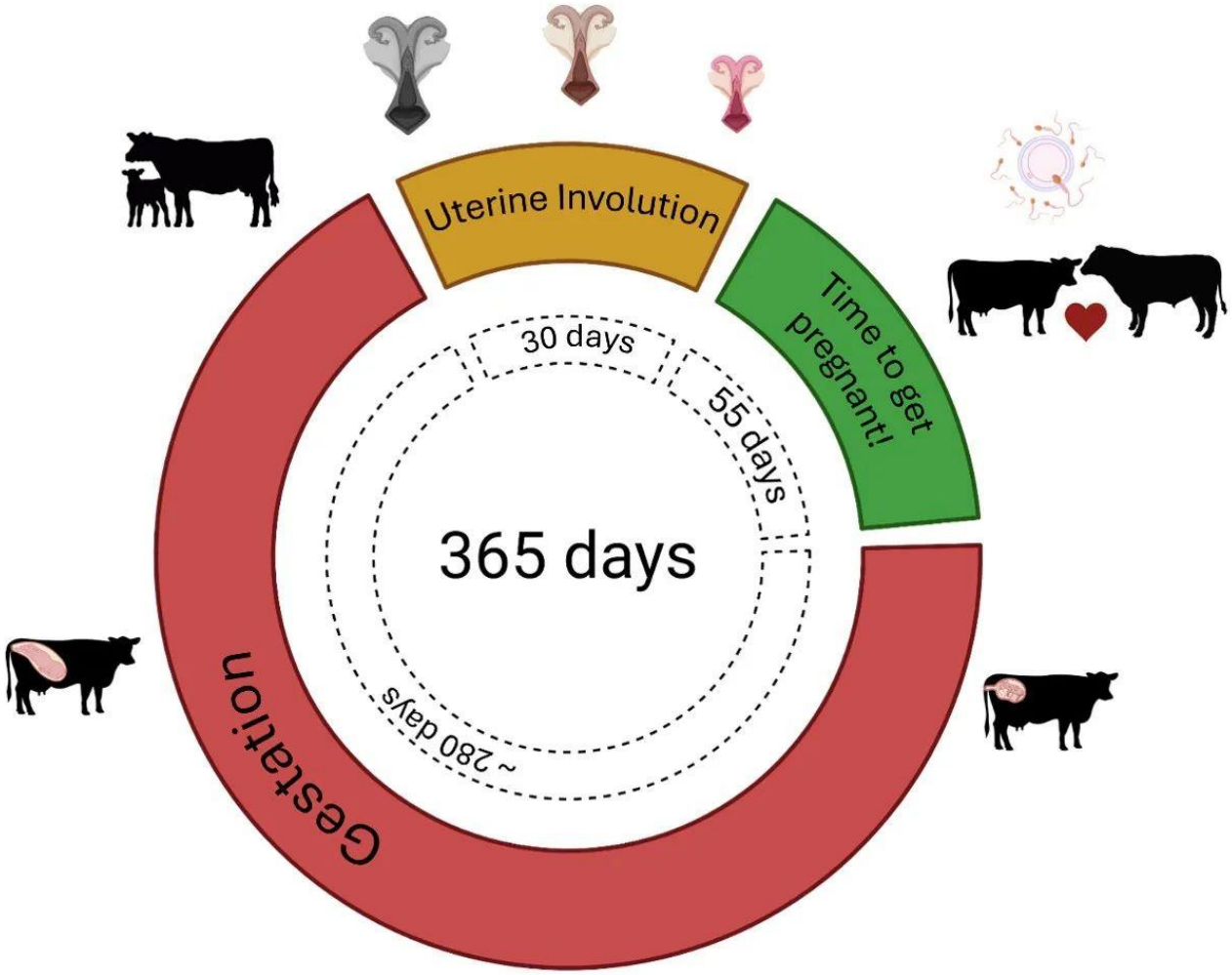



Figure 1. A 365-day calving interval timeline for an efficient cow.
Credit: Angela Gonella-Diaza, UF//IFAS.

Several factors play into a cow resuming normal estrous cycles after calving. If the cow is healthy and has no postpartum problems such as diseases, body condition issues, or calving problems, she only has 55 days to get pregnant to achieve a production rate of one calf per year. The estrous cycle in cattle is an average of 21 days. Cows only have two or three "heat cycles" to get bred before they reach the end of the 55-day window. This publication uses several scenarios to illustrate the importance of maintaining a 12-month calving interval for maximum efficiency and productivity of cow-calf operations. The first scenario (Figure 2; Table 1) will represent a farm that has a year-round breeding program, while the second scenario (Figure 3; Table 2) will represent a farm with a controlled breeding season. A controlled breeding season is defined as a short, specific time frame (e.g., 75–90 days) to mate cows and heifers and create a uniform calf crop, rather than breeding year-round.

## Effect of Calving Intervals without a Controlled Breeding Season

In Figure 2, four different cows with different calving intervals show the effects of calving intervals that are longer than 365 days in a herd without a controlled breeding season. This means that a bull or bulls are with cows throughout the entire year. Each cow had the same date of birth (01/01/2013), achieved puberty at 12 months of age, became pregnant for the first time on 03/22/2014, and calved first on 01/01/2015. The only difference among them was their calving intervals.




Figure 2. Different calving intervals without a controlled breeding season. Credit: Angela Gonella-Diaza, UF/IFAS.

Dorothy had a calving interval of 12 months and could be referred to as an efficient cow relative to cows with longer calving intervals. She consistently produced one calf per year, calving every January. After 12 years of life, she produced a total of 10 calves.

Blanche had a 13-month calving interval and also produced 10 calves during her lifetime. However, Blanche took 12 years and 9 months to produce 10 calves. Her first calving date was the same as Dorothy's: January of 2015. Every year, she needed an extra month to get pregnant.

Sophia had a 14-month calving interval and took 13 years and 6 months to produce 10 calves. She also had her first calving in January of 2015. The second time, she needed two extra months to get pregnant (compared to Dorothy).

Rose had a calving interval of 15 months. It took 14 years and 3 months for her to produce 10 calves. Rose calved for the first time on the same day as Dorothy (January of 2015), but she needed at least 3 more months every year to get pregnant.

While each cow produced 10 calves and brought in equal revenue, their long-term production costs and returns were not the same due to extended calving intervals. Table 1 illustrates the long-term variable costs and returns of each cow. A nearly seven-year average is used to account for low and high prices that occur through a cattle cycle and during a cow's life in production.

Estimates in Table 1 show that Dorothy, a cow with a 12-month calving interval, produced the highest average returns to variable expenses after having 10 calves. Sophia and Rose produced negative returns after producing 10 calves because they took longer to recover after calving and thus did not have a calf every year. Market conditions will yield years of negative returns. However, a calf sold in a bad year still brings more revenue than no calf at all. Having efficient cows means a better chance of having a calf to market every year, regardless of market conditions.

When reviewing Table 1, remember that without a controlled breeding season, it can be easy to spend more money than necessary on a herd. Open cows cost more than they make when they do not have a calf every year. For example, dry and open cows do not require the same high-quality diet as a pregnant or lactating cow. Other benefits of a controlled calving season include but are not limited to a tailored forage management system that fits the nutritional requirements of cows in a certain gestational stage, ability to monitor which cows are most

productive, a more uniform calf crop, calf management, and vaccine efficacy in the herd. A controlled breeding season can also aid in keeping organized records, which results in efficient management of input costs.

## Effect of Calving Intervals with a Controlled Breeding Season

Figure 3 shows the same cows from Figure 2, but in a herd with a controlled breeding season. In this case, the breeding season starts on March 1 and ends on June 30 (122 days). These four cows only differ in their calving intervals.




Figure 3. Different calving intervals with a controlled breeding season. Credit: Angela Gonella-Diaza and Kalyn Waters, UF/IFAS.

Dorothy had a calving interval of 12 months. She could recover within 55 days, and she was bred back in order to calve in January of each year.

Blanche started well, also calving for the first time in January of 2015. However, because her calving interval was 13 months, she eventually missed one year. She calved in February of 2016, March of 2017, April of 2018, May of 2019, and June of 2020. Because she calved in June and the breeding season in our example also finished in June, she did not have time to be exposed to breeding and therefore did not calve in 2021.

Sophia went through the same situation as Blanche, but Sophia had a 14-month calving interval. Therefore, she calved late in 2018 and 2023, so she did not have time to get pregnant in those years and she missed calving in 2019 and 2024. Rose had a calving interval of 15 months, also resulting in two missed years of production and negative impacts on her productivity.

Over 12 years, they produced 10, 9, 8, and 8 calves, respectively. Table 2 illustrates the long-term variable costs and returns of each cow.

Table 2 shows that with an average market price of $1,102.50 per calf, a cow with a 12-month calving interval produced the highest returns to variable expenses after 10 years because she was able to produce a calf each year. Cows with longer calving intervals that eventually prevent them from being bred in the breeding season result in decreased production and ultimately a decrease in profitability. The estimates in Table 2 illustrate a difference in returns of $2,205 between a cow with a 12-month calving interval and a cow with a 15-month calving interval.

## Economic Impact of Calving Distributions

Cows that become pregnant early in the example breeding season will be the most productive and profitable because their calves will be older and heavier at weaning. Calves typically gain between 2 and 2.5 pounds per day from birth to weaning. Exactly how important is their distribution in the calving season? Tables 1 and 2 showed cows that become pregnant every year are much more valuable over their lifespan than those that do not. Table 3 breaks this down on a per-year basis for a Florida cow-calf operation with a 120-day breeding season in 2024. Within a 120-day period, a cow should cycle 5 times (once every 21 days). This will result in calves being born within 21-day windows.

Table 3 shows that each estrous cycle a cow fails to become pregnant is a loss in income. Over a 120-day breeding season, cows that become pregnant during the last cycle will wean a calf that is, on average, 189 pounds lighter and worth almost $339.15 less. A price slide of $30/cwt or $0.30/lb is used in Table 3 (representative of 2024). Calves born later in the season weigh 47 pounds less than those born in the cycle before them (47 x 0.30 = $14.01 per head price slide). A lighter-weight calf will bring more on a per-pound basis, but a heavier calf will bring more on a per-head basis. Table 3 assumes all calves will be weaned as a group rather than in stages. Waiting until all calves are 525 pounds is a realistic option, but that will require more time and labor to gather and sort pairs multiple times. This puts into perspective the value of cows that become pregnant early in the breeding season and can rebreed early within the annual production cycle.

## Economic Incentive to Increase Weaning Rates and Weights

Increasing weaning rates and weights by having efficient cows that produce a calf each year and calve early in the season is an effective way to improve profitability on a cow-calf operation. By culling cows with longer calving intervals, establishing or shortening the breeding season, or both, there is an economic opportunity to increase the productivity of a herd.

Tables 4 and 5 provide three different production scenarios of a 100-head beef cow herd with different weaning rates and calving distributions in a 120-day breeding season. Table 4 illustrates the impact of weaning rates (number of calves available to market) and different calving distributions (percentage of calves born in each 21-day period). The number of calves born in each 21-day period and their value based on their estimated weaning weight are presented. For example, 45% multiplied by 80 calves means 36 calves were born in the first 21 days of the 120-day season. Table 5 illustrates the economic impact of each scenario in terms of net returns (revenue minus all expenses) per cow.

Table 5 shows that increasing weaning rates and/or increasing the number of calves born earlier in the season can increase net returns per cow. More calves and more pounds help offset the sunk costs of cows that did not raise a calf to weaning. Market prices and annual costs from 2024 are used because these tables are based on an annual production cycle, not a long-term outlook. These returns will vary based on market conditions and input costs from year to year. The takeaway from these tables is that, regardless of market conditions or commodity prices, more calves (while maintaining an optimal stocking rate) and more pounds typically mean more returns.

## Collecting Calving Interval Data

Managing efficient, productive cows that produce a heavy calf each year should be the goal of every cow-calf operation. Production records are essential to confirm whether cows are meeting these expectations. For example, when tagging individual calves, the calving interval can easily be determined based on the birth dates recorded. If individual birth records are not being kept, cattlemen can simply count the number of calves born (or the number of cows that have not calved) every 21 days. Cows and heifers calving in the last 21 days of the calving interval will have a high chance of failing to become pregnant in the subsequent breeding season. Cows that tend to have an increased calving interval from year to year will eventually fall out of the breeding season.

## Questions to Ask When Evaluating the Reproductive Performance of a Herd

1. What is the reproductive performance of the cows in the herd?
2. How many cows have a long calving interval?

3. Does the farm use an individual identification system for the cows and heifers?
4. Are accurate records kept to aid in making culling decisions?

## Take-Home Messages

1. Evaluating the reproductive efficiency of a herd is essential. Cows with low reproductive efficiency require more time and money to produce a desirable number of calves. Having a well-established breeding season helps you to identify the best cows to keep. Cows with lower reproductive efficiency can either be culled or bred to a terminal sire bull with the intent of not keeping replacement heifers from her.
2. Managing cows to breed and calve in a short and defined season can be done with advanced planning and coordination. Establishing breeding seasons makes nutritional management more efficient and less costly. Culling cows with lower reproductive efficiency allows other management practices to be applied more easily (e.g., pregnancy checking, vaccinations, single weaning date, improved marketing options, etc.). The final result is a more reproductively efficient herd and a more profitable cow-calf operation.
3. Moving from a year-round breeding program to a defined breeding season can be done slowly and progressively over a 2- to 3-year period. Binelli et al. (2023) provide more information on how to convert a herd to a controlled breeding season. To learn more, you can also contact your local Extension agent or access the Controlled Calving Season and Revenue Calculator under “Estimation Tools.”

## Reference

Binelli, M., T. Martins, T. Wilson, C. Sanders, M. Warren, M. Hersom, and C. Lacy. 2023. "Converting the Beef Cow Herd to a Controlled Breeding Season: AN267/AN267, rev. 1/2023." *EDIS* 2023(1). https://doi.org/10.32473/edis-an267-2023

Table 1. Costs and returns for different calving intervals after 10 calves: average Florida steer calf prices (April 2019–November 2025).

| Cow | Cash Cow Costs/Year* | Years to Produce 10 Calves After First Calving | Total Cost to Produce 10 Calves** | Average Calf Revenue/Year*** | Total Revenue for 10 Calves | Average Returns/Cow After 10 Calves |
|---|---|---|---|---|---|---|
| Dorothy | $996 | 12 | $9,960.00 | $1,102.50 | $11,025.00 | $1,065.00 |
| Blanche | $996 | 12.8 | $10,756.80 | $1,102.50 | $11,025.00 | $268.20 |
| Sophia | $996 | 13.6 | $11,553.60 | $1,102.50 | $11,025.00 | -$528.60 |
| Rose | $996 | 14.5 | $12,450.00 | $1,102.50 | $11,025.00 | -$1,425.00 |

*Cattle Fax — 2024 Southeast average: Cash costs + depreciation + management/unpaid labor.

**Heifer development costs (first two years) are not included and are assumed to be the same for each cow.

***USDA-AMS data source: 525-pound steer calf at $2.10 per pound (7.5-year average).

Table 2. Costs and returns for different calving intervals after 10 years: 7.5-year average Florida steer calf prices (April 2019–November 2025).

| Cow | Average Cow Cost/Year* | Total Cost After 10 Years** | Average Calf Revenue/Year*** | Calves Produced in 10 Years | Total Revenue After 10 Years | Returns |
|---|---|---|---|---|---|---|
| Dorothy | $996 | $9,960.00 | $1,102.50 | 10 | $11,025.00 | $1,065.00 |
| Blanche | $996 | $9,960.00 | $1,102.50 | 9 | $9,922.50 | -$37.50 |
| Sophia | $996 | $9,960.00 | $1,102.50 | 8 | $8,820.00 | -$1,140.00 |
| Rose | $996 | $9,960.00 | $1,102.50 | 8 | $8,820.00 | -$1,140.00 |

*Cattle Fax — 2024 Southeast average: Cash costs + depreciation + management/unpaid labor.

**Heifer development costs (first two years) are not included and are assumed to be the same for each cow.

***USDA-AMS data source: 525-pound steer calf at $2.10 per pound (7.5-year average).

Table 3. Differences in calf revenue over a 120-day breeding season.

| Cycle During the Breeding Season When the Cow Becomes Pregnant | 1st Days 1–21 | 2nd Days 22–43 | 3rd Days 44–65 | 4th Days 66–87 | 5th Days 88–109 |
|---|---|---|---|---|---|
| Birth weight (lb) | 75 | 75 | 75 | 75 | 75 |
| Average daily gain (lb) | 2.25 | 2.25 | 2.25 | 2.25 | 2.25 |
| *Weaning weight (200 days after the start of calving) | 525 | 478 | 431 | 383 | 336 |
| **Calf value at weaning ($/lb) | $2.79 | $2.93 | $3.07 | $3.21 | $3.35 |
| Calf value at weaning ($/head) | $1,464.75 | $1,400.54 | $1,323.17 | $1,229.43 | $1,125.60 |
| **Total calf value difference ($/head difference compared to cows bred in the first cycle)** | — | **-$64.21** | **-$141.58** | **-$235.32** | **-$339.15** |

*All calves assumed to be weaned on a set date and marketed as a group.

**2024 average Florida 525-pound steer calf price: $279/cwt, $30/cwt price slide.

Table 4. Number of marketable calves based on different weaning rates and calving distributions in a 100-head herd.

| Calving Distribution % in Each 21-Day Period | | 20-20-20-20-20 | | | 45-35-10-5-5 | | | 60-25-10-3-2 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Weaning Rate (Number of Calves) | | 80% (80) | 83% (83) | 86% (86) | 80% (80) | 83% (83) | 86% (86) | 80% (80) | 83% (83) | 86% (86) |
| Weight | $/Head | Number of Calves | | | | | | | | |
| 525 | $1,464.75 | 16 | 17 | 18 | 36 | 37 | 39 | 48 | 50 | 52 |
| 478 | $1,400.54 | 16 | 17 | 17 | 28 | 29 | 30 | 20 | 21 | 2 |
| 431 | $1,323.17 | 16 | 17 | 17 | 8 | 8 | 9 | 8 | 8 | 9 |
| 383 | $1,229.43 | 16 | 16 | 17 | 4 | 5 | 4 | 2 | 3 | 2 |
| 336 | $1,125.60 | 16 | 16 | 17 | 4 | 4 | 4 | 2 | 1 | 1 |

Table 5. 2024 average returns to costs per cow for a 100-head beef cow herd.*

| | Weaning Rates | | |
|---|---|---|---|
| Calving Distributions | 80% | 83% | 86% |
| 20-20-20-20-20 | $50.96 | $92.84 | $131.04 |
| 45-35-10-5-5 | $123.52 | $164.46 | $208.70 |
| 60-25-10-3-2 | $140.14 | $184.48 | $228.72 |

*Cattle Fax — 2024 Southeast average: Cash costs, depreciation, management/unpaid labor: $996/cow. 2024 average Florida 525-pound steer calf price: $279/cwt, $30/cwt price slide. Returns: ((Estimated revenue – Estimated variable expenses)/100 cows).

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