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Transitioning Beef Cattle to a Defined Breeding and Calving Season

Authored by John Benner, Virginia Cooperative Extension Agent, Augusta County; Rachel Grosse, Virginia Cooperative Extension Agent, Powhatan County; Jennifer Ligon, Virginia Cooperative Extension Agent, Buckingham County, and Laura Siegle, Former Virginia Cooperative Extension Agent, Amelia County
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Introduction

Cow-calf producers are continually seeking ways to increase their profitability (Ward et al. 2008). While numerous best management practices exist, one of the most impactful is establishing and maintaining a defined breeding and calving season. Controlling the length of the breeding season with a defined period of no more than 60-90 days is positively correlated with reduced annual costs per cow and increased profitability (Ramsey et al. 2005). This practice can result in a more uniform group of calves that can be managed and marketed more effectively. Other benefits include improved herd management, optimization of labor, enhanced herd health, and conservation of feed and forage resources.

Defining a breeding and calving season is perhaps the most important management decision by cow-calf producers (Dyer 2012). Yet, as many as 54 percent of beef producers throughout the United States have not adopted this basic management practice (USDA 2009). Some of the reasons for this low rate of adoption include certain management challenges that must be overcome in order to make the transition from a continuous to a defined calving season. This publication will address these challenges, elaborate on the advantages of moving to a defined calving season, and present one possible method for making the transition.

Challenges to Moving to Defined Breeding and Calving

Beef producers that intend to transition to a defined calving season from a year-round season must first overcome several major obstacles. These obstacles include, but are not limited to:

1. Perception of lost calf revenue from late-born calves from short-bred cows and heifers.
2. Difficulty managing and effectively housing bulls separate from the cows for the majority of the year (e.g., infrastructure concerns relating to effective paddocks or fence).
3. Fear of reproductive herd failures in any attempted transition, with the possibility of large numbers of the herd being culled because they might not make the defined breeding/calving window.
4. Perception that more calves are born annually because cows have more time to be bred in a continuous calving system.
5. Concern about increased risk of calf mortality during a more concentrated calving season due to adverse weather or similar conditions.
6. Concern that these management programs will require more time and preparation than the management of a year-round calving system.

Benefits to Moving to Defined Breeding and Calving

Benefits to having a defined calving season are tangible to beef operations through increased returns to management, equity, and labor. Adopting a defined breeding/calving season is crucial to implementing these and other profitable management practices for beef cattle operations. Specific examples include:

1. Greater reproductive management of the cow herd. Cows identified as highly fertile, productive females that raise calves with superior growth when compared to their uniform constituents could, in turn,

have their daughters identified as potential replacements. In fact, it has been shown that heifer calves that are born within the first 21 days of the calving season will become mature cows that wean heavier calves and have greater longevity in the herd compared to heifer calves that are born later in the calving season (Cushman et al. 2013).

2. Calf management, identification, vaccinations, deworming, and processing can be done on the entire group of calves at scheduled times, improving overall herd and calf health. VCE publication 400-007, "Beef Cow/Calf Herd Health Program and Calendar," is an excellent reference for herd health schedules and protocols.

3. Forage and feed resources can be adapted to meet cow nutrient needs more efficiently and more cost-effectively than continuous calving programs (Wilson et al. 2011). Producers can prioritize feeding their highest quality hay and stored forage to first-calf heifers and cows near parturition and in early lactation. This is particularly critical because feed costs can be as high as 63 percent of total annual cow costs (Miller et al. 2001). In a continuous calving herd with cows, calves, and heifers at various stages of growth and gestation, producers cannot effectively manage their feed and forage resources.

4. A defined calving season results in reduced variation in calf age, which in turn results in a greater number of heavier and more mature calves that can undergo preconditioning and participate in improved marketing options that are not feasible with year-round calving. A goal of 95 percent of the calf crop born within a 60-day period is recommended (Dyer 2012). Preconditioning is a management program designed to ensure that a calf's nutritional background and health background have optimally equipped it to thrive throughout other levels of the beef industry (Lincoln and Hinman n.d.).

5. A shorter calving window increases the likelihood that cows will be open when giving bovine respiratory disease complex vaccines. This is critical when modified live products are first used. For calving seasons that are longer than 90 days, it is not recommended to use modified live products for bovine respiratory disease because there is a greater risk of aborting early pregnancies. With a 60- to 75-day breeding season, all cows will have calved before respiratory vaccines are administered, prior to bull turn in. These respiratory immunizations are critical for the success of calf preconditioning programs (Thrift and Thrift 2011).

6. Cost-efficient and productive uses of estrus synchronization and artificial insemination protocols are more pragmatic. VCE publication 400-013, "GnRH Based Estrus Synchronization Systems for Beef Cows," and publication 400-302, "Estrus Synchronization for Heifers," provide detailed information on using these tools to improve herd fertility.

Before beginning a transition to a defined season, producers must determine which calving season or seasons offer the greatest number of benefits. Concerns with large reproductive losses during transition are real, and producers must manage against them. Often, cow herds with a continuous calving season tend to have a greater concentration of calves born in a certain time of year versus other seasons — in other words, calving is not distributed evenly throughout the year (Triplett 1977). If the period of heaviest calving in the existing continuous calving system suits marketing and other producer purposes, it may be considered for use as the basis of the defined calving season. This "natural" distribution or cluster of calving births should have as much weight as any other factor in determining when the controlled calving season should be. Choosing such a timeframe could reduce the time of transition and number of cows culled in making the transition. Producers are encouraged to take inventory of any high-calving concentrations before continuing the planning process.

Planning the Defined Calving Season

In addition to any observed calving cluster, the producer's individual herd goals and objectives should dictate his or her calving season choices. Forage resource availability could dictate preference for spring calving over fall calving or vice versa, while environmental conditions might lead to a preference for fall calving. Dual calving or split calving seasons can also be considered. Accepted advantages of dual/split systems include greater utilization (lower cost) of bulls because they can be used for up to six months instead of three, and improved distribution of cash flow from sales of calves at two different times throughout the year. However, drawbacks of such a system can include a greater labor requirement, the need for facility changes or upgrades, and increased

difficulty managing pastures effectively due to the need to constantly maintain females in breeding or calving groups.

Specific considerations for time of calving can vary but generally include:

1. Feed/forage resources. Feed and stored forage costs are widely considered to be responsible for more than half of the costs of cow-calf production. To ensure success with acceptable weaning weights, producers who decide to convert to a concentrated calving season must consider their hay and pasture resources and stored feed supplies. For example, in a fall-calving scheme, producers need a large reserve of stockpiled forage, stored feed, or hay to sustain an entire cohort of lactating animals with high nutritional demands through the winter. In a continuous calving system, individuals within the herd undergo their periods of greatest feed demand at staggered intervals throughout the year, which often results in underfeeding or overfeeding specific animals.
2. Marketing. A marketing plan with realistic marketing goals is critical to maximizing the value of a uniform group of calves. Producers may find that calving during a particular season enables them to participate more in special local feeder calf sales or value-added, preconditioned load lots of cattle sold in conjunction with peers or producer groups.
3. Weather. Planning the calving season to avoid adverse weather (severe cold) or winter storms will help to minimize weather-related calf mortality and morbidity, resulting in reduced costs and greater returns.
4. Fescue toxicosis. Endophyte-infected tall fescue can pose greater breeding issues with spring calving herds. Producers with a large number of fescue pastures for summer grazing could see improved reproductive performance with fall calving.
5. Labor. Labor is a critical resource for checking on cows and heifers during the calving season and providing additional care for newborn calves and cows that may need assistance. Though labor will be intensified during a short and defined calving season, labor will be reduced throughout the remainder of the year, allowing for better management of labor needs.

Making the Transition to a Defined Calving Season

Switching from a continuous calving season to a defined calving season is best accomplished through a progressive three- to four-year transition (Wilson et al. 2011). It is not advisable to attempt the transition in a shorter duration unless the decision is to cull the majority of animals and obtain replacements that fit within the parameters of new management protocols.

There are several steps that are recommended at appropriate junctions to ensure success and avoid a large cull (adapted from Wilson et al. [2011] and Triplett [1977]):

1. Construct, utilize, or improve facilities that will house the herd bull(s) for the off-season. If these facilities must be constructed from scratch, choose areas with adequate space and water and areas that are well-removed from the majority of the pastures where cows will be grazing after the breeding season. Once these facilities are constructed, a veterinarian may have the opportunity to perform breeding soundness exams on herd bulls to minimize the chance of bull fertility failures. See VCE publication 400-009, "Predicting Bull Fertility," for more on the importance of bull breeding soundness exams.
2. Define the appropriate targeted calving season and remove the bull at the date corresponding with the date desired to end the calving season. An example of fall calving would be to pull the bull(s) out on Jan. 21, with the goal of eventually having the first calves of the fall season on Aug. 1 and the last calf born on Oct. 31.
3. Sixty days after bull removal, pregnancy-check all cows and breeding-age heifers. Cull any nongestating, dry cows that are confirmed open after bull exposure. Cows with bull exposure that have nursing calves aged 5 months and older and are found open should also be culled after the calf is weaned.
4. Replacement heifers weighing at least 750-850 pounds (or 60-65 percent of expected mature cow weight) should be scheduled to be bred or exposed to a bull 20-30 days ahead of the initiation of the breeding season for the mature herd.
5. Six months after bull removal, bull(s) may again be introduced into the cow herd, targeting (or shifting

to) a breeding season of six months before again being removed from the herd.

6. Sixty days after bull removal, repeat the process in step 3.
7. In year 2, repeat the process in steps 4 and 5, except this time leave the bull(s) in with cows so that the breeding season is 4 1/2 months long. Repeat process in step 3.
8. In year 3, repeat process in steps 4 and 5, but remove bull(s) after three months of exposure. Pregnancy-check all females 60 days after bull removal and cull all open females regardless of age of calf.

The use of an estrous synchronization protocol can increase the percentage of females cycling at the beginning of the breeding season. Estrous synchronization, and primarily exposure to the hormone progesterone, can therefore be a powerful tool in reducing breeding season length. Estrous synchronization protocols that do not include exogenous progesterone will have limited benefit to reducing breeding season length. Ensure that facilities and labor resources are available to work cows and heifers at scheduled times to increase the chances of success.

Another option for producers intent on tightening their calving season is to buy cows guaranteed bred to calve in a specified window. The producer may then sell any cows in his herd that do not calve in the desired window. This method can speed up the transition to a defined season, but does require the producer to spend capital for the bred cow purchase.

The timelines shown in figures 1-5 provide an example of a five-year transition from a continuous to a defined fall-calving season of Aug. 31 to Oct. 31. A reference gestation table is also provided in table 1. For additional planning resources, contact your local extension agent or veterinarian.

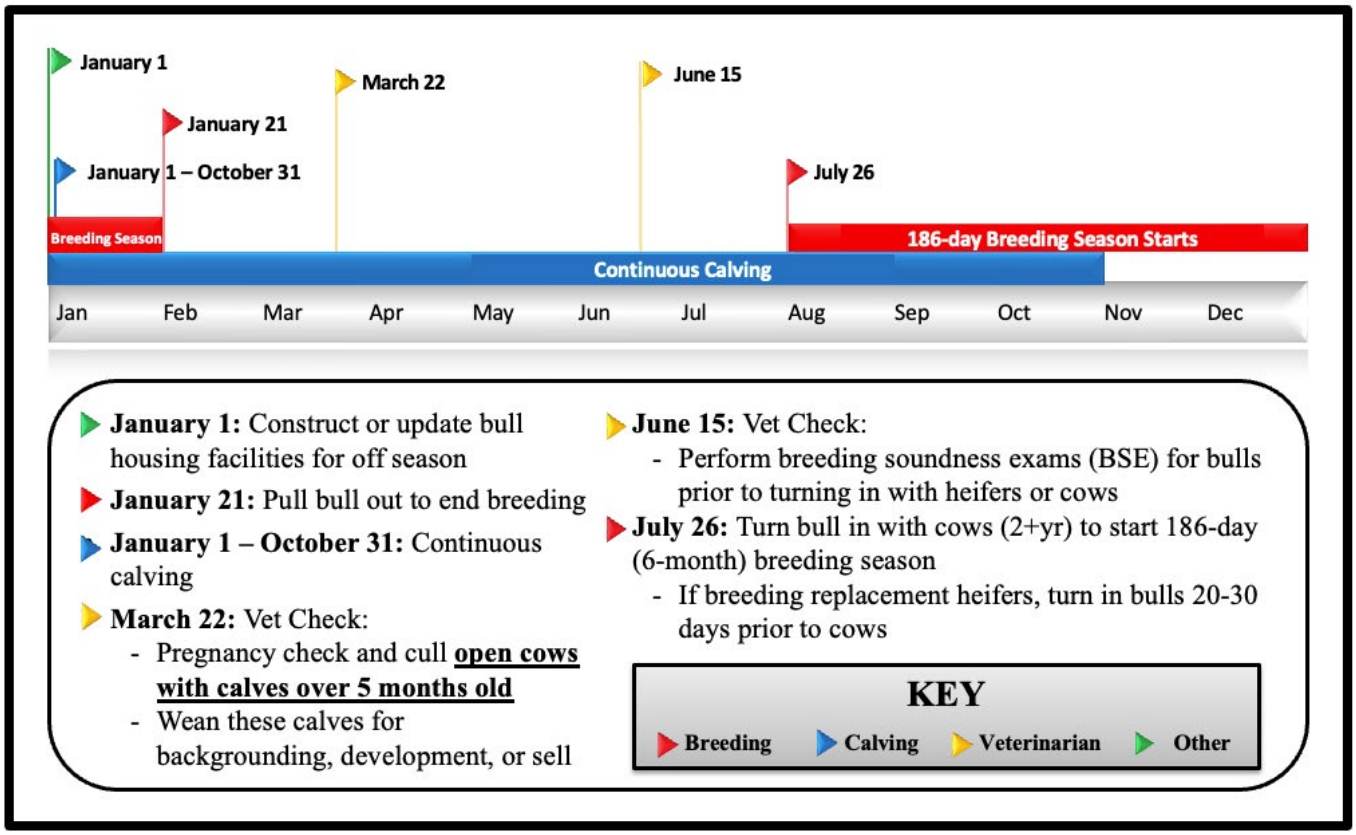

Figure 1. Controlled breeding season (fall calving), year 1.

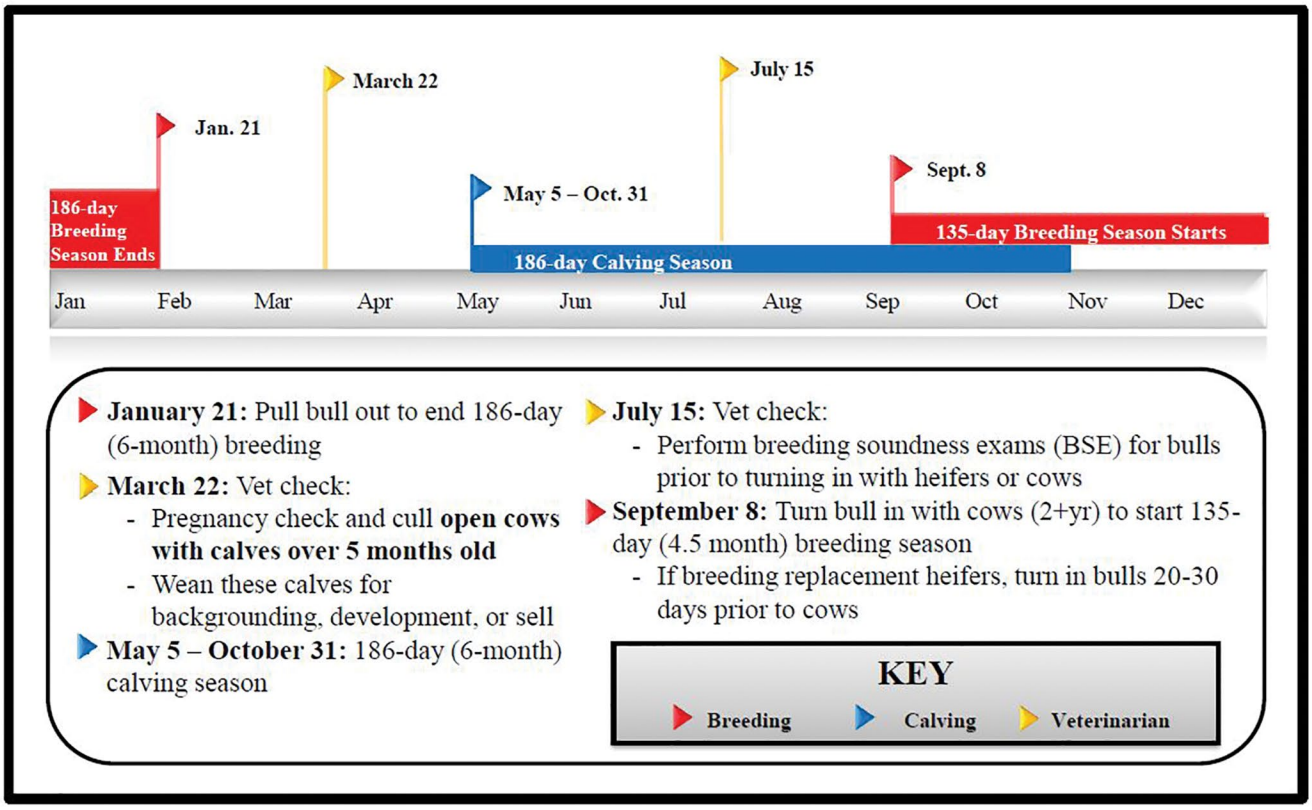

Figure 2. Controlled breeding season (fall calving), year 2.

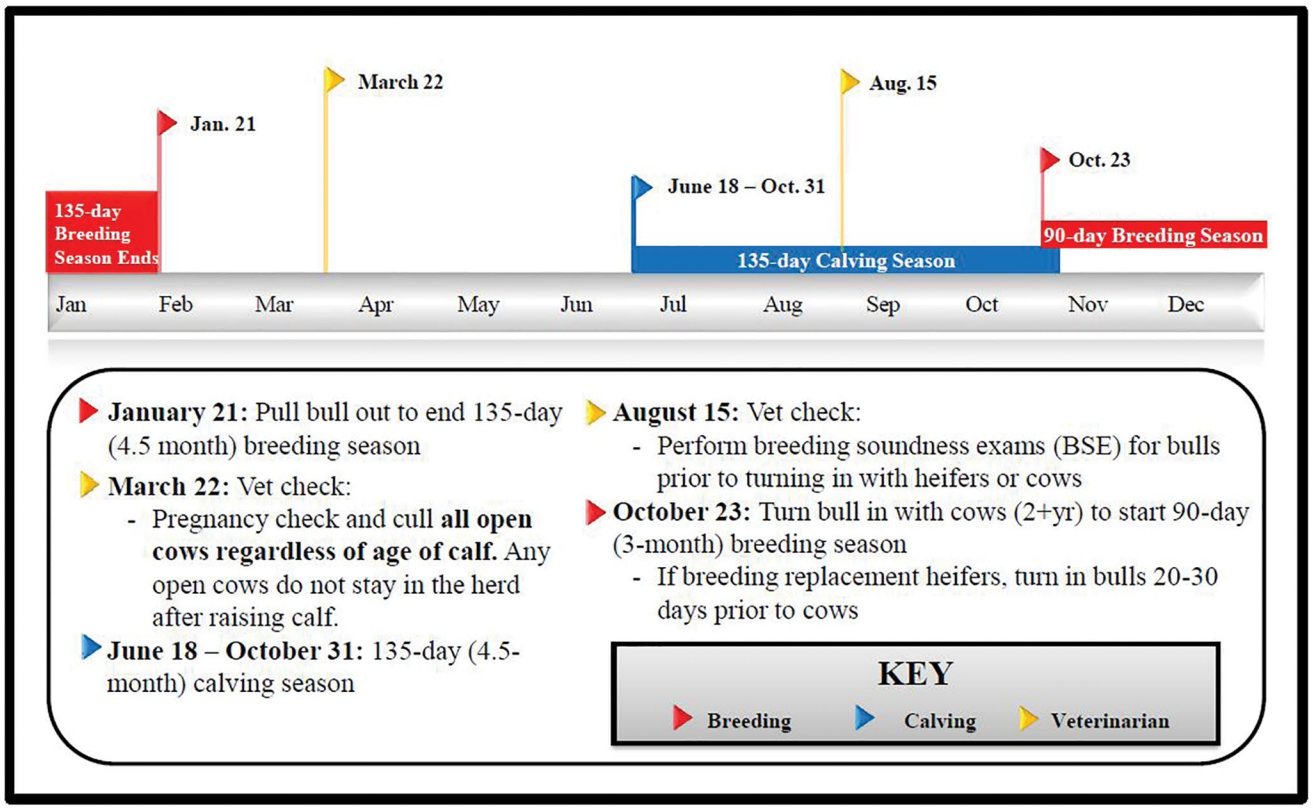

Figure 3. Controlled breeding season (fall calving), year 3.

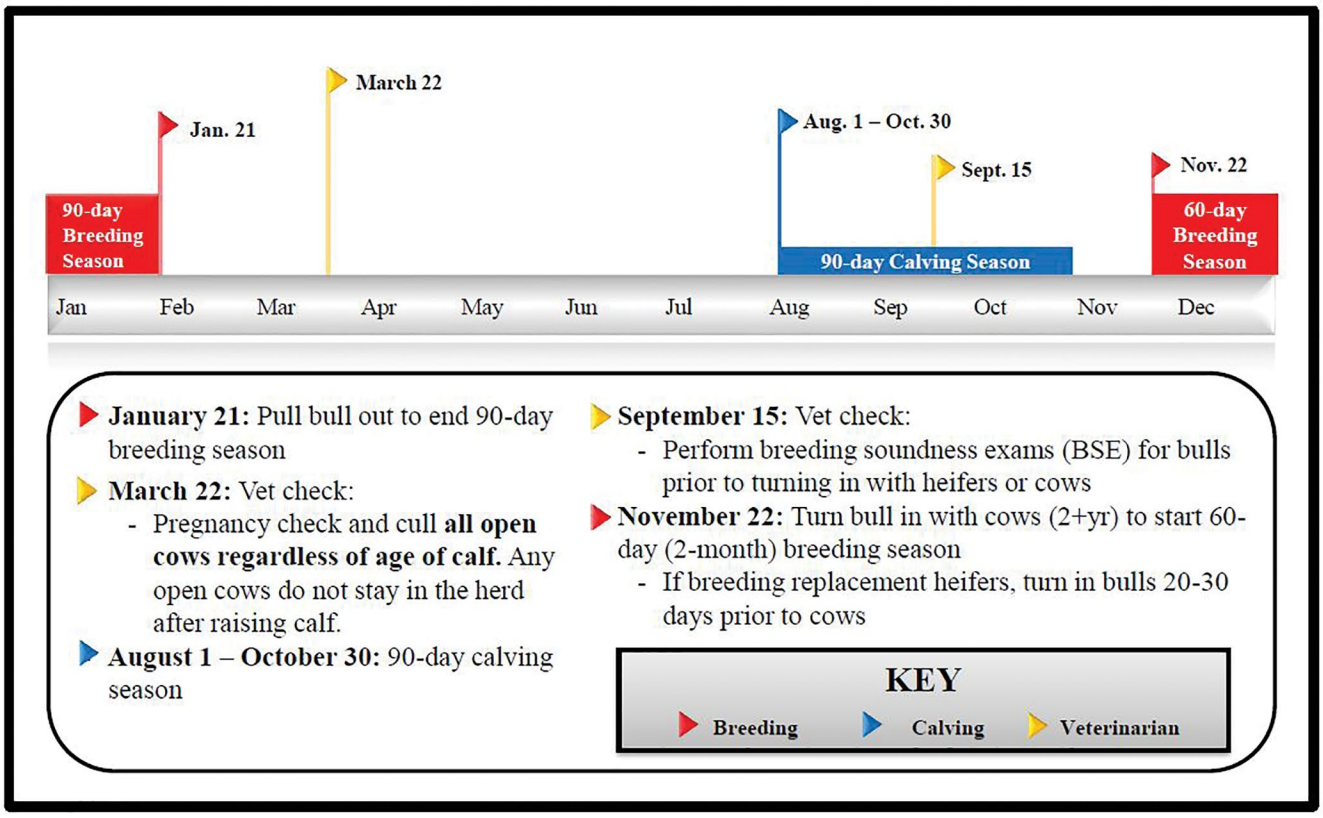

Figure 4. Controlled breeding season (fall calving), year 4.

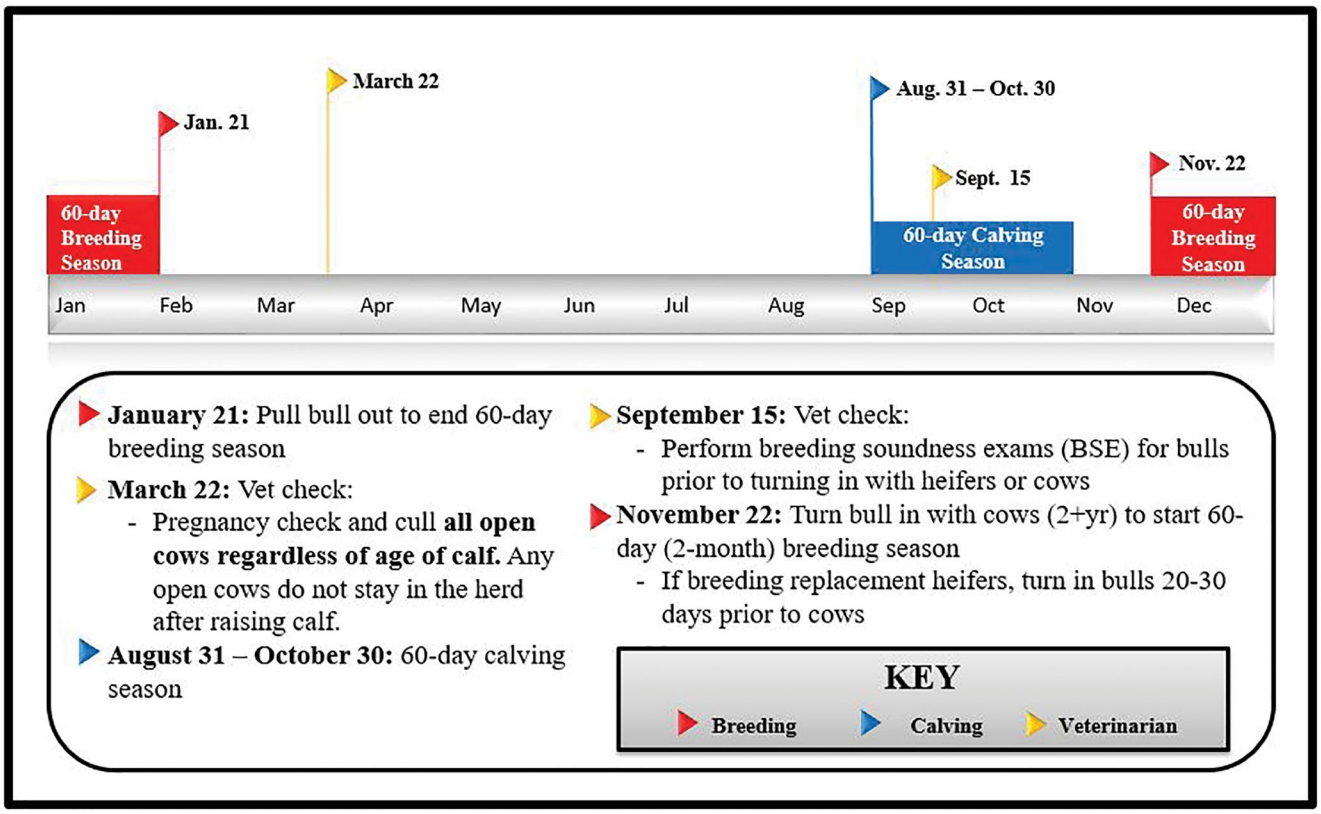

Figure 5. Controlled breeding season (fall calving), year 5.

Table 1. Reference gestation table based on 285 days of gestation.

Bred	Due	Bred	Due	Bred	Due
1/1	10/13	5/1	2/10	9/1	6/13
1/15	10/27	5/15	2/24	9/15	6/27
1/31	11/12	5/31	3/12	9/30	7/12
2/1	11/13	6/1	3/13	10/1	7/13
2/15	11/27	6/15	3/27	10/15	7/27
2/28	12/10	6/30	4/11	10/31	8/12
3/1	12/11	7/1	4/12	11/1	8/13
3/15	12/25	7/15	4/26	11/15	8/27
3/31	1/10	7/31	5/12	11/30	9/11
4/1	1/11	8/1	5/13	12/1	9/12
4/15	1/25	8/15	5/27	12/15	9/26
4/30	2/9	8/31	6/12	12/31	10/12

Source: Little et al. 2016.

Defined Calving Systems vs. Continuous Calving Systems: A Comparison

The decision to narrow breeding/calving intervals is as much a marketing decision as it is a reproductive one. To illustrate this, here is a hypothetical example.

Producer A uses a continuous calving system and runs 50 cows with one herd bull. The largest group of calves born in any two-month period (19) arrive in March and April, with the rest of the year's total calf crop (16) spread out in zero to four calvings per month. In August, Producer A sells only his larger March and April calves weighing 490 pounds at $155/100 pounds (cwt), bringing in $759.50/head for a total of $14,430.50. His calving percentage (35 calves born/50 cows exposed = 70 percent) is low, and his weaned (sold) calf crop percentage per cow exposed (19 calves sold/50 cows exposed = 38 percent) is even lower. Producer A is able to sell 12 more calves weighing approximately 400 pounds at $160/cwt during the year, bringing his total receipts to $22,110.50 and improving weaned-calf crop percentage per cow exposed to 62 percent.

Producer B also runs 50 cows but uses a 90-day breeding season with 45 calves born in February, March, and April, and a calving percentage of 90 percent. He loses two calves in March due to a late winter blizzard and sells all of his calves in a value-added weaned and preconditioned sale in October. His weaned calf crop percentage per cow exposed is 86 percent. At sale, Producer B's calves weigh 695 pounds and bring $142/cwt with help from a $0.10 weaned and preconditioned premium. Each calf is valued at $986.90, and even after feed expenses are deducted ($0.82/head/day for 45 days), total sales revenue comes to $42,750.00, which is $22,110.50 more per year than the continuous calving system! For further reading on calving percentage, percent weaned per calf exposed, and other herd performance measures, see VCE publication 400-791, "Virginia Cow Herd Performance Check-Up."

Summary

The positive economic impact of a defined breeding and calving season of 60-90 days cannot be overstated. Once a 90-day breeding/calving season is established, implementation of other profitable management practices, such as a further reduction to a 60- to 75-day breeding season with estrus synchronization and artificial insemination is much more realistic. Other management improvements such as weaning and preconditioning of calves on the farm — which are not economically feasible in most continuous calving systems — are now possible. A defined breeding and calving season is perhaps the single most impactful management practice to all aspects of the cow-calf operation because it greatly increases one of the most important factors in beef profitability — reproduction and herd fertility.

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