Vet Call

▶ by **Bob Larson,** *Kansas State University*

Reproductive strategies

High reproductive efficiency is critical for beef cow herd profitability. Establishing and maintaining a management system that results in a high percentage of the herd calving in a short calving season with most of the calves born in the first 21 days requires that cows and heifers are cycling before the start of the breeding season, that bulls are fertile and physically able to mate cows, and that disease is not causing pregnancy loss. Nutrition, genetics, animal husbandry, male and female reproductive soundness and health all impact the reproductive efficiency of a herd.

Postpartum period

Several facts are important to recognize when planning a reproductive strategy for beef herds. The first is that pregnancy lasts about 283 days, which leaves only 82 days between the birth of a calf and a mating that results in a successful pregnancy for next year's calf if the cow is to maintain a one-year calving interval.

For cow herds in good body condition, the average postpartum period until the resumption of fertile cycles is reported to be 50-70 days for mature cows, which gives them one to two fertile cycles to become pregnant and maintain a one-year average calving interval. However, cows that calve in thin body condition are likely to take longer to resume fertile cycles after calving, and they may not be able to become pregnant again in a timely manner.

Heifers are also a problem because, even in herds with heifers that calve in good body condition, the average days to resume fertile cycles after calving ranges from 80 to 100 days (and longer for heifers that calve in thin body condition). This means that it is nearly impossible for a group of heifers to have an average calving date for their second calves as 3-year-olds that is as early as the average date for their first calving as 2-year olds. This problem can be addressed by having heifers bred to calve zero to 45 days ahead of the start of the mature-cow breeding season.

By requiring heifers to become pregnant before the start of the mature herd's breeding season, beef heifers need to reach puberty by 12-13½ months of age if they were born in the first 45 days of the herd's calving season and even younger if they were born later. Research has indicated that the average age for North American beef heifers to reach puberty ranges from 11½ to 14 months of age, with some variation around this estimate. This means that heifers have to be managed very well to ensure that they are having fertile cycles in time to become pregnant ahead of the mature cows.

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Embryonic loss

The next fact that affects beef herd reproductive efficiency is that even if a fertile bull mates a fertile cow, many times a live calf is not born 283 days later. If the bull and female are both fertile (i.e., producing fertile eggs and sperm) and there are no physical or behavioral barriers to mating, nearly 100% of matings will result in fertilization and the start of a new embryo.

Reproduction is complex, and there are many opportunities for problems to arise that halt the normal progression of the pregnancy. In fact, it is estimated that up to 30% of early embryos from a fertile mating are lost by Day 14 of pregnancy. If the pregnancy is lost by this time, the cow will usually re-cycle, and if the bull is still in the breeding pasture, she will be bred again and have another 70% likelihood to initiate a pregnancy.

This early loss is usually considered unavoidable and is due to the genetic complexity of mammals that halts the continued development of imperfect embryos. A few more embryos are lost between Day 14 and Day 42 of pregnancy — these can be due to problems with the embryo or the early placenta. Losses at this stage will result in a delay before the cow resumes cycling. If she became pregnant in the first few days of a 60- to 75-day breeding season, she may re-cycle before the bull is removed; however, if a cow becomes pregnant midway through the breeding season and then loses an embryo that is 14-42 days along in development, she is not likely to resume fertile cycles before the bull is removed from the breeding pasture.

By Day 42 of pregnancy, all the organ systems are in place, and we change the name from embryo to fetus. We don't expect very many pregnancies to fail if they have made it to Day 42, but a few early fetuses will be lost even in the absence of a disease challenge. Some investigators have estimated that 2%-5% of pregnancies that reach 42 days will be lost.

Because only 60%-70% of fertile matings will result in the birth of a live calf, it is important that all or most of the cows in the herd have the opportunity to be bred more than one cycle before the bulls are removed from the breeding pasture. Using a 65-day breeding season as an example, cows that cycle within the first three weeks of the breeding season have the opportunity to re-cycle by Day 42 if they lose an early pregnancy from the first mating and again by Day 63 if they lose a second pregnancy — resulting in three opportunities to get pregnant and maintain a pregnancy to calving.

In contrast, cows that do not start cycling until the second 21 days of the breeding season only have one more opportunity to be bred if they lose the first pregnancy early enough to re-cycle. Using an average of 65% successful births of a live calf from fertile matings, 95% of cows that have three opportunities to become pregnant will give birth to a live calf. In contrast, only 88% of cows that only have two opportunities to become pregnant (because they didn't resume fertile cycles until the second 21

days of the breeding season) are predicted to give birth to a live calf. These mathematical exercises are meant to illustrate the importance of having a high percentage of the herd calve early in the calving season so they have enough time to resume cycling before the start of the next breeding season.

Fertility and disease

The third fact that impacts herd reproductive efficiency is that any problem with cow or bull fertility or the presence of abortion-causing diseases can have drastic effects that result in fewer calves born and/or later average birth dates. In order to ensure adequate female fertility, mature cows should have a minimum body condition score (BCS) of 5 (using a 9-point scale, for more information, visit *www.cowbcs.info*) at the start of the breeding season and heifers should have a BCS of 6. A breeding soundness examination (sometimes referred to as a BSE) for bulls should be performed prior to the start of the breeding season on all bulls in the breeding program. Finally, a vaccination program to increase herd immunity to some of the viruses and bacteria that can cause abortion should be implemented based on your herd's specific risks.

High reproductive efficiency can only be maintained in beef herds if many details about animal husbandry, forage management, nutrition and animal health are carefully implemented. The result of high reproductive efficiency is nearly all the cows becoming pregnant in a controlled breeding season with most births occurring in the first 21 days of the calving season.

EMAIL: rlarson@vet.ksu.edu

Editor' Note: *Bob Larson is professor of production medicine at Kansas State University.*