Vet Call

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Reproductive expectations for cow herds

At fall preg-check time, I am often asked why some of the cows are open. Of course, there can be many reasons why a cow may not be pregnant after being exposed to bulls for several weeks. Some of these reasons are due to infertility or sub-fertility on the part of either the cow or the bull; but fertile cows can also be open after a breeding season. In fact, researchers estimate that the likelihood of a live calf being born following a single mating of a fertile cow and bull is about 60%-70%.

Mathematical look at pregnancies

If the bull and female are both fertile (i.e., producing a fertile egg and sperm, respectively) 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. But reproduction is complex, and there are many opportunities for problems to arise that halt the normal progression of 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 recycle, and if the bull is still in the breeding pasture, she will be bred again and have another 60%-70% likelihood to carry a calf all the way to birth.

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 fetal membranes (placenta). Losses at this stage will result in a delay before the cow resumes cycling. If she became pregnant early enough in the breeding season, she may recycle before the bull is removed (but it is becoming less likely).

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 that have made it to Day 42 to fail, but a few do. Some investigators have estimated that 2%-5% of pregnancies that reach 42 days will lose the fetus sometime before the birth of a live calf. Cows that lose later pregnancies are unlikely to still be exposed to bulls unless the breeding season is very long.

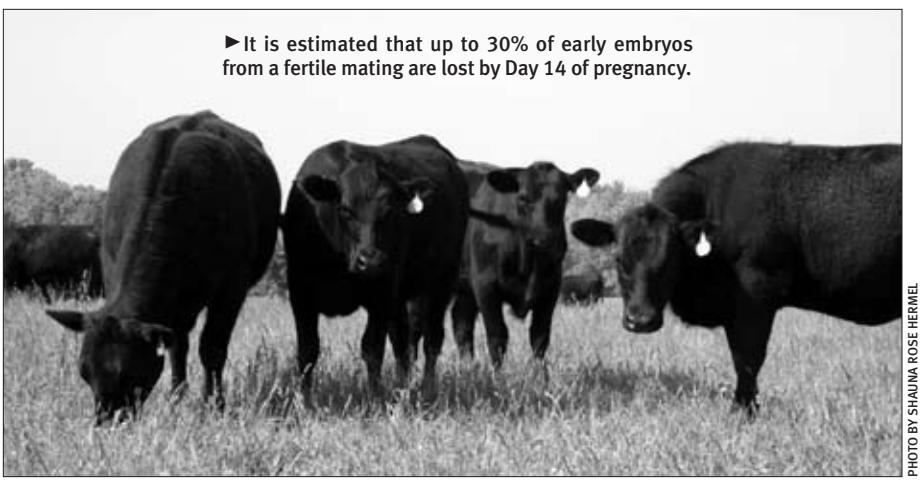
Because only 60%-70% of fertile matings will result in the birth of a live calf, it is important that all or most of the cows in the herd have the opportunity to be bred for more than one cycle before the bulls are removed from the breeding pasture. Using a 65-day breeding season as an example, cows that cycle within the first three weeks of the breeding season have the opportunity to recycle 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 recycle.

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 have two opportunities to become pregnant (because they resumed cycling in 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. The average length of time to resume cycling is expected to be about 40-50 days; therefore, cows that calve later than 30-40 days after the start of the calving season are unlikely to be cycling at the start of the next breeding season. And, cows that calve more than 60 days after the start of the calving season are unlikely to start cycling until well into the following breeding season.

All of my calculations assume that the cows and bulls are fertile. Sub-fertile bulls, thin cows, and reproductive diseases will all reduce the likelihood of successful fertilization and maintenance of pregnancy below my predictions.

In summary, in order to reach the goal of 95% of cows pregnant during a 65-day breeding season, a high percentage of the herd needs to calve early in the calving season and cow body condition, bull breeding soundness, and reproductive disease control must all be optimal. Any reduction of cow or bull fertility or a long previous calving season will make it mathematically impossible to reach the goal of high reproductive success during a controlled breeding season.



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