Factors Affecting Early Pregnancy Loss In Cattle

Researchers look at four factors that contribute to early pregnancy loss: embryo, cow, bull and environment.

MAGGIE MALSON • April 04, 2025 11:29 AM

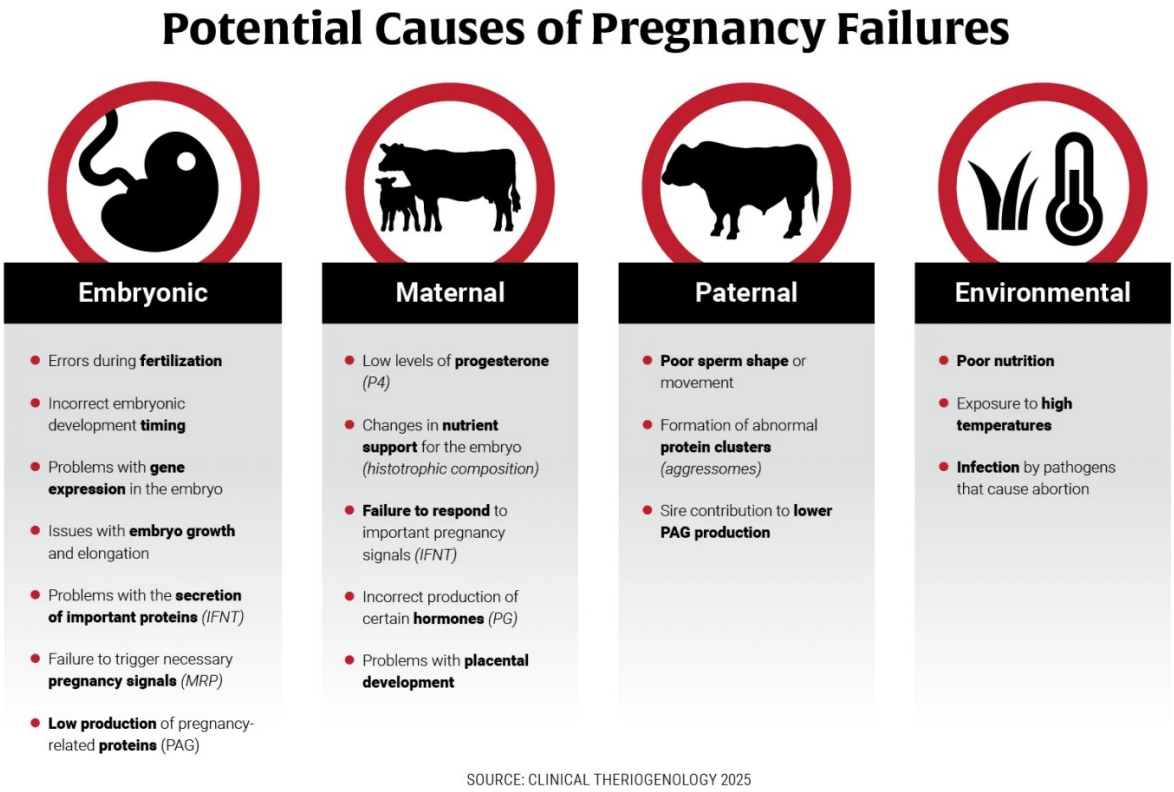
Preg testing cows through ultrasound. (Maggie Malson)

Open cows are a costly problem for producers. Less cows bred and birthing a live calf means less profit in the hands of producers. Researchers continue to look at factors related to why cows are open.

On a Beef Cattle Institute podcast reproductive physiologist, Bob Larson, DVM and Brad White, DVM, discuss a recent study, based on more than 80 research articles, compiled by researchers at Texas A&M University.

“There’s still a lot of questions about this very early time frame, because it’s hard to research, but one of the things we do know is that when we take a fertile cow and a fertile bull and mate them together, 30 to 40% of the time we don’t end up with a live calf, and most of that loss is in the first 20 to 35 days,” Larson says.

If after the sperm and egg get together and the cells begin to divide, but then don’t progress beyond those first few days to weeks resulting in early pregnancy loss, it is due to issues with the embryo, cow, bull or environment.



Pregnancy loss is a multi-factorial issue and is likely a reflection of inadequacy at the embryonic, maternal, paternal and environmental levels.(Texas A&M/Lori Hays)
Embryos produce proteins like interferon tau and pregnancy-associated glycoproteins to signal the cow to maintain pregnancy.
“We know some embryos make more interferon tau than others,” Larson explains. “The ability of that early embryo to make those proteins at a sufficient level and timing, has to be quick enough and at the right dose in order to signal to the cow to maintain pregnancy. A cow has a 21-day estrus cycle, and typically will lyse the CL around day 17, so the embryo likely has to send that signal around day 15.”

When we see a cow come back into heat 21 days after she was last in heat, there are usually two possibilities.

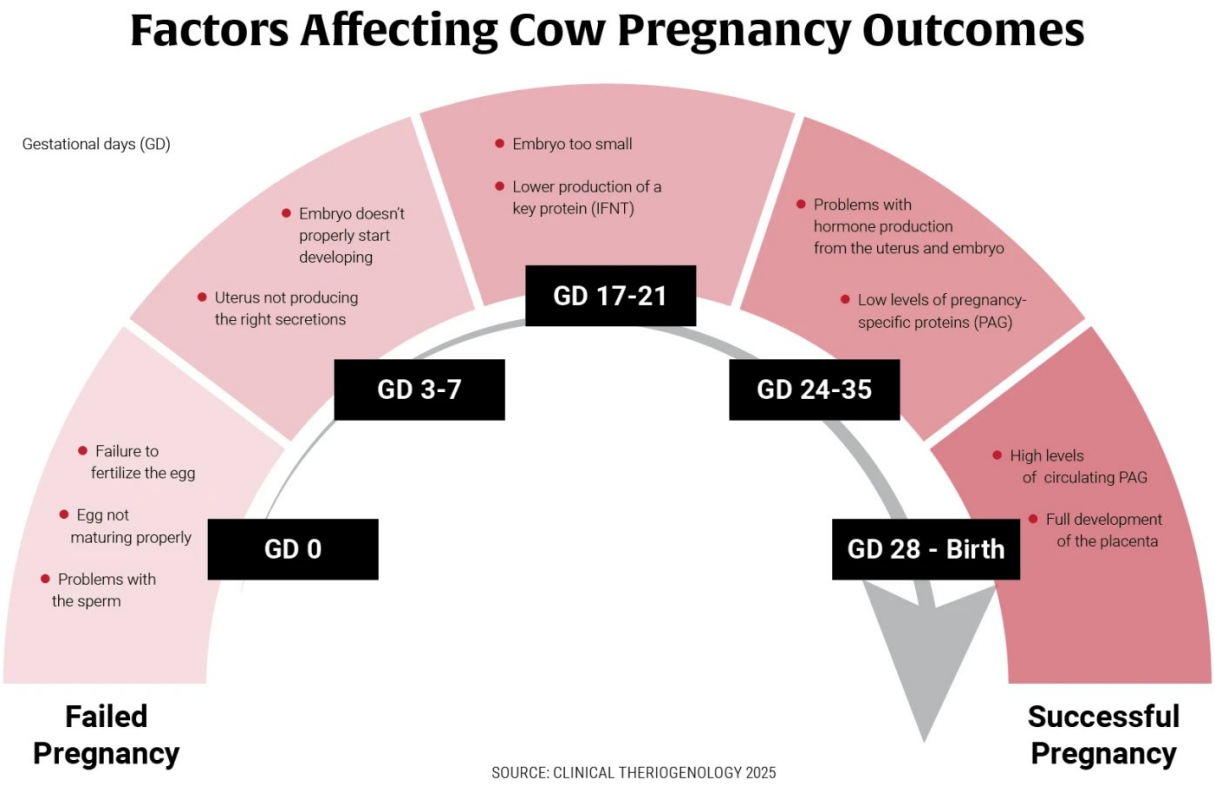
“One, she was never mated, or the egg was never fertilized. But it’s also possible, as one of these animals, where the sperm and egg did get together, started some cell divisions, but the embryo didn’t progress far enough or well enough for her to recognize pregnancy and to maintain it, and so she loses it. When the embryo is so small and not yet attached to the uterus, there is no delay in her coming back into estrus,” Larson says.

Cow responses to these embryonic signals are crucial.
Researchers have looked at how well the cow responds to the INFT and glycoproteins the embryos sends and what proteins the cows make in response.

“Different cows produce a different amount, and typically, the more a cow is responding to the embryo, the more likely that pregnancy is to establish and be maintained,” Larson says. “We’re thinking about cells lining the uterus as well as cells in the corpus luteum and in other parts of the body as well. The signals sending from the embryo need to be coming at an appropriate dose and time, and then the cow needs to respond to those signals in a number of different ways.”

Larson says ultrasound can show differences in the follicle sizes cows ovulate.

“If we’re following their follicular waves with an ultrasound, cows that ovulate larger follicles are more likely to end up as a successfully completed pregnancy than smaller follicles,” he says. “We don’t know for certain, but genetics and environment, nutrition, stress, probably are impacting her. So now we’re talking about the cow having an impact on the egg even before it’s fertilized. She might make an egg that is fertilizable, but it isn’t going to be as likely to maintain that pregnancy if that egg isn’t quite as good a quality.”



Schematic of critical factors contributing to pregnancy success and failure. (Texas A&M/Lori Hays)

Bulls also influence pregnancy through their sperm's role in placenta development. "What we're learning is bulls differ in their ability to influence that embryo to be maintained," Larson says. "The sperm cell is more involved with producing the placenta than the egg cell is. The early placenta is where all this signaling is coming from. One of the things we know is that embryos from some bulls make more of these pregnancy associated glycoproteins than embryos from other bulls, so bulls are influencing this embryonic signal, but we're not able to detect pregnancy maintenance differences between bulls with our typical breeding soundness exams."

Breeding soundness exams look at the cell morphology of the sperm cells, which is a good prediction of the probability of fertilization.

"We know there's something going on with the male side in the area of not only becoming pregnant, but maintaining that pregnancy, particularly really early in those first few days but no way to measure this in the bull currently," Larson says.

Environmental factors, including heat and nutrition stress, also significantly impact pregnancy success.
“We know that heat stressed cows don’t express estrus as well — not as frequently, not as long, and the quality the oocyte ovulated is not as good.” Larson says. “Even if the oocyte is fertilized and we go through the first few cell divisions, that early embryo maintenance is less in heat stress. You could see why that would mess up this, fine-tuned connection between the early embryo and the cow.”

These signaling mechanisms rely on, protein secretion and receptor creation, so nutritional deficiencies or a stressful situations, can affect not only the cow becoming pregnant, but also maintaining this pregnancy through this really early critical time, he adds.

More research to identify and measure some of these factors is still needed, however producers can keep in mind their management practices and how they influence pregnancy loss.

Select heifer calves born early in the calving season, as they are more likely to have dams that conceived and maintained pregnancy early.
“Put selection pressure on heifer calves that are born early, because that tells me two things, her dam conceived early and her dam maintained that early pregnancy,” Larson says. “A heifer that is born a little bit later, it’s possible that her dam conceived and then lost it, then conceived and maintained it. If there’s a genetic component, and we think there is, I don’t want to bring that into the herd. So a cow that conceived early in

the breeding season and maintained that pregnancy is exactly the type of cow that I want to bring in her daughters into the herd as much as possible."

Ensure cows are in a low-stress environment with good nutrition around the time of breeding, especially during the critical 12 to 17-day window for maternal recognition of pregnancy.

"I'm going to start with back when the cow is getting ready to calve, because that's going to set up how quickly she comes back into estrus," Larson explains. "I want her on a good plane of nutrition. I want her in a housing situation so she's not in mud; she's not fighting weather. I want her in as good a low stress environment as possible. So nutrition and housing and then the human activities. If I could do nothing to her during that time frame that would be my best choice keep her as comfortable as possible."

When moving cows after timed AI, do so either immediately after breeding or wait until at least 45-50 days past breeding, avoiding the critical 7-21 day window.

"Fertilization happens in the oviduct, and that's a little safer place for the embryo to be than in the uterus," Larson says. "It's in that uterine tube for about the first seven days. So that's probably the safest time to be moving the cattle. Once that embryo goes into the uterus it's starting to interact between what will become the placenta and the uterine tissue. And they're not really attached yet, but they're starting to send signals back and forth, and that's when I really don't want to do anything to disrupt that. So basically, if you're going to do an AI mating, and you need to move the cows, I would probably do it as soon as possible after the mating, or wait till six weeks out before moving them."