

# REPRO TRACKS

by Cliff Lamb, Texas A&M University

## Understanding Embryo and Fetal Losses in Beef Heifers and Cows

*Knowledge can help producers ensure healthy calves hit the ground each year.*

Beef heifers and cows are crucial to the sustainability and productivity of the industry. Cattlemen aim to ensure females produce a viable calf once a year, however, at times, they may experience embryo and fetal losses during their pregnancies. This can occur due to various reasons, including nutritional deficiencies, genetics, health issues or stress. I share the common reasons for these losses and identify at what stages of pregnancy they occur. Additionally, opportunities exist to introduce preventive measures to ensure healthier pregnancies and minimize the risk of losses.

Prior to the development of ultrasound for pregnancy diagnosis in cattle, technicians were unable to determine the viability or number of embryos or fetuses accurately. Because the heartbeat of a fetus can be detected at approximately 22 days of age, one can now accurately assess whether or not a pregnancy is viable. Ultrasound technology has vastly enhanced our opportunity to understand embryonic losses.

### Reasons for embryo and fetal losses

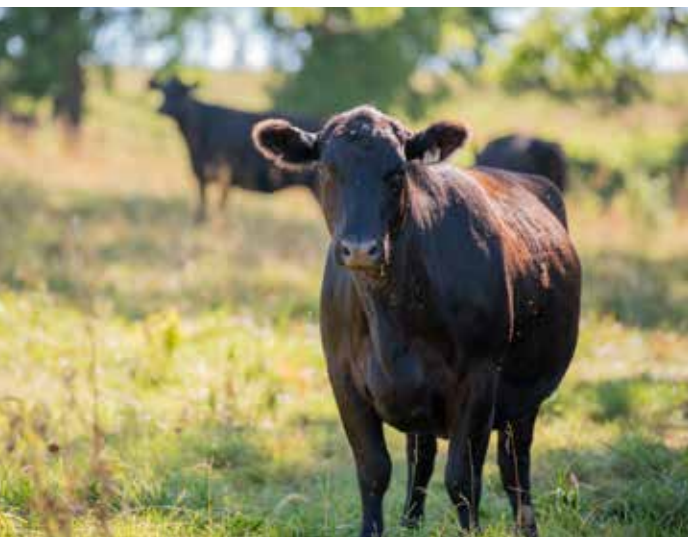
**Nutritional deficiencies:** Proper nutrition is essential for the healthy development of the embryo and fetus. If beef heifers and cows do not receive adequate nutrients, there can be reduced fertility and an increased likelihood of embryo loss. Nutritional deficiencies are often evident during early pregnancy when the demands on the cow's body increase significantly in early lactation. Ensuring females receive a balanced and nutritious

diet is crucial to preventing losses. Proper nutrition prior to calving and approaching the breeding season should be provided to enhance embryonic/fetal survival.

**Genetics:** Genetics play a crucial role in the reproductive performance of beef cattle. Some embryos or fetuses may inherit traits that make them more prone to pregnancy failures. These genetic factors can influence embryo development and increase the risk of early losses.

Breeding programs should focus on selecting cattle known to have excellent fertility and longevity traits. This involves selecting bulls from known genetic lines to attain puberty at a younger age and other beneficial reproductive traits.

**Health issues:** Inadequate herd health management can disrupt the delicate balance required for a successful pregnancy. Diseases, infections, a failure to have a solid vaccination regimen, and reproductive disorders can adversely affect the development of embryos and fetuses, leading to losses at various stages of pregnancy. Regular veterinary consultation to ensure herd health is monitored and addressing health issues immediately will reduce the incidence of embryonic/fetal loss.



In addition, ensuring you have a vaccination program and protocols for parasite control and disease prevention in place will enhance embryo/fetal survival.

**Stress:** Stress is another significant factor that can contribute to embryo and fetal losses in beef heifers and cows. Stress can be caused by various factors, such as changes in environment, handling, transportation or social disruption.

High stress levels may negatively affect the female, making it difficult for embryos to implant or survive in the uterus. Efforts should be made to reduce stress. This can include maintaining a calm and consistent environment, and gentle animal handling techniques for the herd.

## Stages of pregnancy when losses occur

**Early pregnancy:** The first few weeks of pregnancy are critical for embryo development. During this time, embryos undergo vital processes such as attachment to the uterus (implantation) and the formation of essential structures.

Nutritional deficiencies and genetic factors often play a role in early pregnancy losses. This is also the stage at which a majority of losses occur.

**Mid-pregnancy:** Mid-pregnancy is a relatively stable phase for the developing fetus, but it is not without risks. Health issues or severe stress during this period can still result in fetal losses, albeit less frequently than during the early stages.

**Late pregnancy:** As cows approach the end of their gestation period, the fetus undergoes rapid growth. Late pregnancy losses can occur due to health problems, inadequate nutrition or stressful events during this critical phase.

**Table 1: Incidence of embryonic/fetal loss in beef cows after an initial diagnosis of pregnancy by ultrasound, followed by a second diagnosis prior to or at calving (Adapted from Lamb et al., 2003).**

Experiment	No. of Pregnancies (d of gestation)	No. of embryos lost	Embryonic mortality, %
Beal et al., (1992) - Cows	138 (25 days)	129 (45 days)	9 6.5
	129 (45 days)	127 (65 days)	2 1.5
	138 (25 days)	127 (65 days)	11 8.0
Lamb et al., (1997) - Heifers	149 (30 days)	143 (60 days)	6 4.0
	271 (35 days)	260 (75 days)	11 4.1
	105 (30 days)	100 (90 days)	5 4.8

The incidences of embryonic loss by study in beef cattle are summarized in Table 1. The fertilization rate after insemination either through natural service or artificial insemination (AI) usually exceeds 90%, whereas embryonic survival rate is 93% of pregnancies by Day 8 and only 56% by Day 12 after AI. The incidence of embryonic loss in beef cattle appears to be significantly less than that in dairy cows, with about a 6.5% incidence of embryonic loss in beef cows from days 25 to 45 of gestation and about 1.5% from days 45 to 60.


Similarly, we have noted a 4.2% incidence of embryonic loss in beef heifers initially undergoing ultrasound at Day 30 of gestation and subsequently palpated for pregnancy between days 60 and 90 after insemination.

In suckled beef cows, we evaluated three herds examined via ultrasonography on days 29 to 33 followed by a second ultrasound on days 54 to 61 to determine embryo survival. Overall, about 11% of the embryos first detected by

ultrasonography on days 29 to 33 did not survive to days 57 to 61 when the second diagnosis of pregnancy was measured.

## Successful pregnancies

Embryo and fetal losses in beef heifers and cows can occur due to a combination of factors, such as nutritional deficiencies, genetics, health issues and stress. Understanding these reasons and the stages of pregnancy when losses are more likely to occur can help producers take appropriate preventive measures.

By focusing on proper nutrition, genetic selection, regular health checks and the minimization of stress, we can increase the likelihood of successful pregnancies, leading to healthier and more productive herds in the beef industry. 

*Editor's note: Cliff Lamb is the animal science department head and a professor at Texas A&M University in College Station, Texas.*