



# SheepSense

an applied research brief

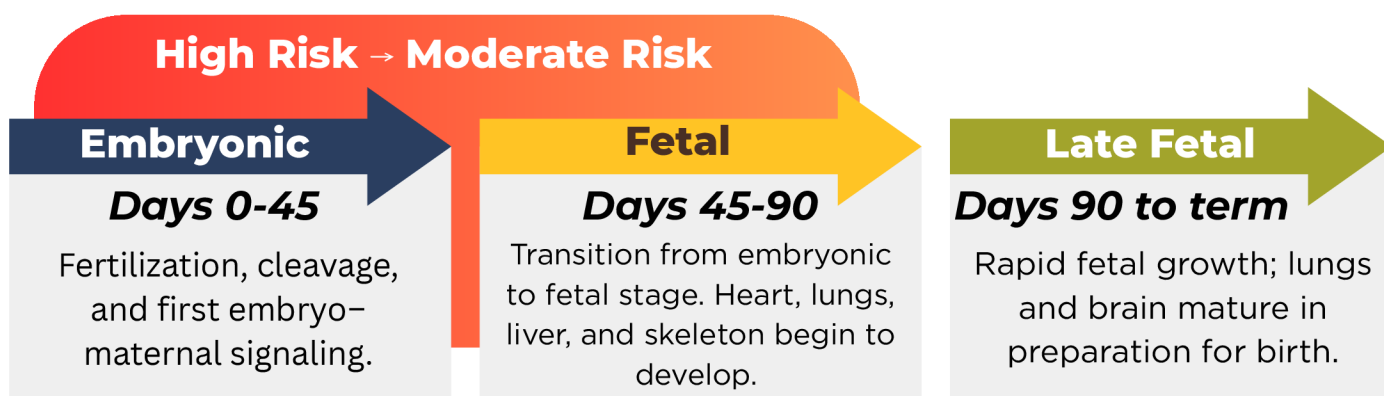
## Understanding & Reducing Pregnancy Loss in Ewes

### The Problem

Many sheep producers have experienced the frustration of ultrasound scanning a ewe flock in mid-pregnancy with high expectations, only to find later that the lambing percentage doesn't quite match the scanning results. Where do those "missing lambs" go? Research on fetal loss in sheep provides important lessons about management, nutrition, and why what happens in the first trimester of pregnancy matters so much.

### Overview of Fetal Development

Sheep pregnancy can range from 142 to 152 days, progressing from the embryonic to fetal stages. The first 45 days—the embryonic stage—involve implantation and rapid development of vital systems like the nervous system, heart, and limb buds, making this period especially vulnerable to stress, illness, or poor nutrition. Around day 40 to 45, the pregnancy transitions to the fetal stage, as organs mature, the skeleton hardens, and the fetus gains most of its weight (**Figure 1.**). Because early losses are difficult to detect, consistent nutrition and minimal stress—especially in the first trimester—are critical to lamb survival.



**Figure 1.** Gestation in sheep progresses through embryonic, fetal, and late fetal stages from days 0-45, 45-90, and 90 to term, respectively. The period of highest risk of loss occurs early in pregnancy and declines as time passes.

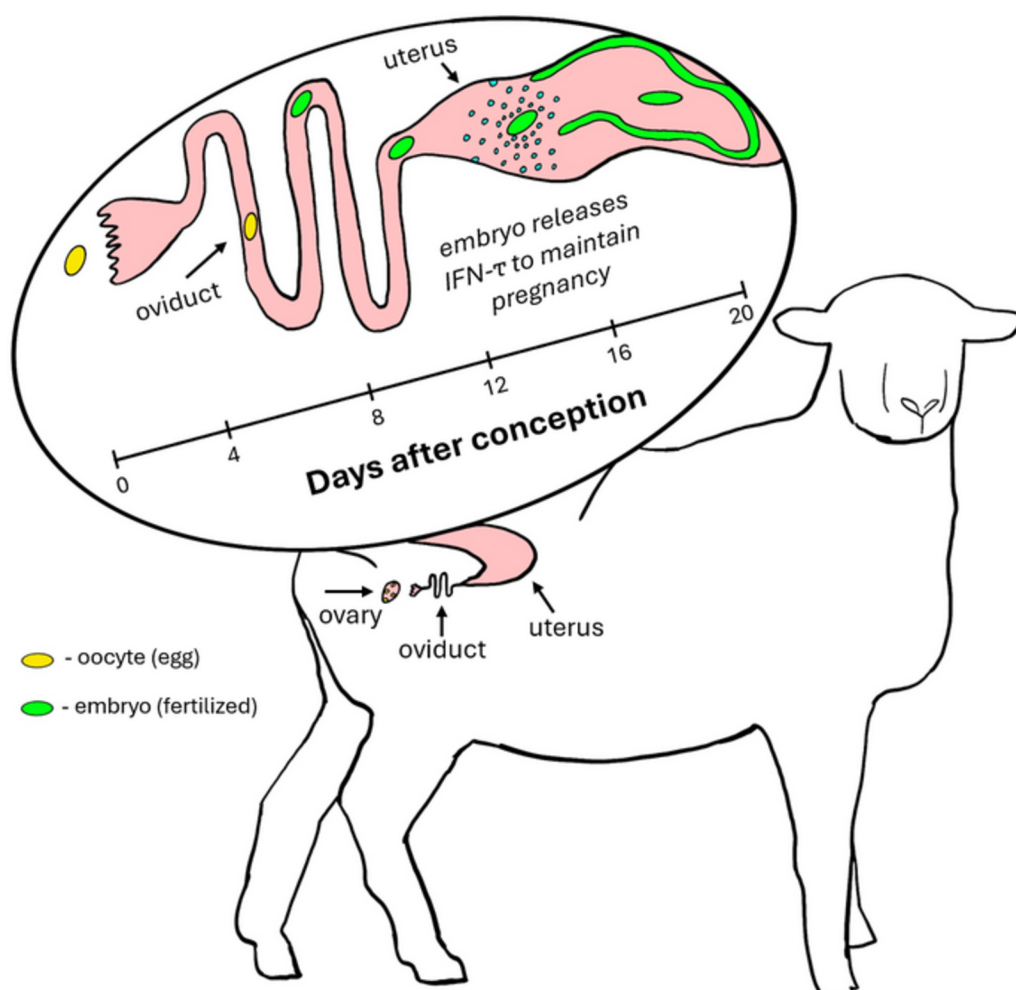


## Early Pregnancy: Factors Contributing to Success and Failure

Underlying these stages is a delicate cascade of hormonal and immune signals that facilitate maternal recognition of early pregnancy.

After ovulation of an oocyte (egg) from a mature follicle on the ovary, the remnant tissue is reconstructed into a corpus luteum (CL) that secretes progesterone, a hormone of pregnancy. If fertilization does not occur, there is no embryo to signal pregnancy, and the uterus secretes prostaglandin F<sub>2α</sub> to lyse (breakdown) the CL and eliminate the source of progesterone. Estrous cyclicity resumes.

If fertilization does occur, in the first 12–15 days post-conception the embryo secretes interferon tau (IFN- $\tau$ )—a protein signal critical for maintaining pregnancy (**Figure 2.**)—which prevents prostaglandin F<sub>2α</sub> from triggering regression of the CL. The CL, in turn, continues producing progesterone, which maintains the uterine lining and embryo viability. Cyclicity is paused in response to maternal recognition of pregnancy. **Disruptions in this signaling—due to stress, nutritional deficits, or sudden environmental changes—can lead to early embryo loss.** Simultaneously, vascular endothelial growth factor (VEGF) promotes uterine and placental blood vessel development, supporting implantation and fetal nourishment.

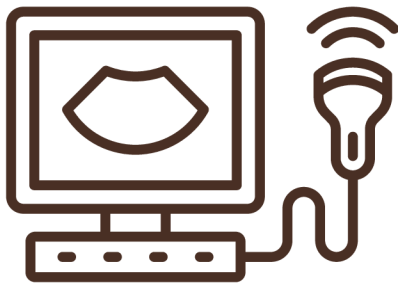


**Figure 2.** Maternal recognition of pregnancy occurs in the first trimester, around days 12–15 of gestation, in response to embryonic secretion of interferon tau (IFN- $\tau$ ). Adapted from: *Pathways to Pregnancy and Parturition*, 3rd ed. P.L. Senger. Current Conceptions Inc., 2012.

## Factors continued

The first 30–45 days of gestation are especially vulnerable. During this time, embryos must implant, establish a placenta, and initiate stable hormonal communication with the ewe.

**Research shows that 20–40% of potential lambs are lost in the first month of gestation—often before pregnancy can be detected.** Many of these early losses are linked to embryonic developmental issues, including genetic abnormalities, chromosomal defects, or hormonal imbalances in the ewe. Advanced tools like transrectal ultrasound confirm that most losses occur before day 29, with some happening as early as day 14.



In real-world commercial production environments, pregnancy is typically assessed by ultrasound between days 45 and 90 of gestation. This window offers the most accurate fetal counts available and captures pregnancies that have already survived the high-risk early embryonic stages. However, not all fetuses present at mid-gestation survive to term, which can lead to overestimation of lambs that will reach the ground. Because commercial flocks on range often operate under variable environmental conditions, ewes can face significant stress, disease, or undernutrition which are known to contribute to rates of mid-gestation fetal loss.

**Supporting ewe health and minimizing stress throughout gestation**—especially in the first trimester—helps reduce the gap between scanning percentages and actual lambing results.

Not every pregnancy loss means the ewe loses the whole litter. Many losses are partial, where one lamb is lost but others survive to birth. Research has shown this is fairly common. For example, more than a third of ewes that experienced loss only lost a single fetus, while far fewer lost the entire litter. More recent work reported that about 18% of twin- or triplet-bearing ewes had partial litter loss, with survival often depending on the mix of males and females — litters with more male fetuses were more likely to lose one or more lambs before birth. Other studies have shown that some rams sire pregnancies where partial loss is more common, while others are more likely to sire pregnancies that either hold or lose the entire litter.

**Taken together, these findings show that fetal loss in sheep often reduces litter size rather than causing complete pregnancy failure, which helps explain why a ewe may scan with twins but only lamb with a single.**

## Related Reading

*Considerations to Prevent the Importation of Parasites and Diseases in Your Operation*

Link: <https://bit.ly/3OcENl5>

*Winter Ewe Management: Meeting Nutritional Needs*

Link: <https://bit.ly/4gul9wk>



# Nutritional, Handling, and Health Strategies to Minimize Fetal Loss

Managing fetal loss under extensive rangeland conditions requires a proactive and holistic approach (**Figure 3.**). Adequate nutrition from the pre-breeding phase through the first 50 days of gestation is essential. Strategies like flushing—short-term supplementation before and during breeding—stimulate ovulation and increase the number of oocytes released, helping to boost potential litter size. But sustained nutrition matters even more. Maintaining elevated nutritional levels during the first 45 days of pregnancy is critical, as abrupt decreases in feed quality or quantity can be more detrimental than a consistent shortage. In low-forage years, strategic supplementation—such as increasing the feed allotted when pasture biomass is limited, or rotating and stockpiling pastures to give ewes access to higher-quality forage—helps prevent the energy and protein deficits that compromise early pregnancy. Regularly tracking body condition scores is one of the most practical ways to assess whether ewes are maintaining adequate energy reserves during this time.

Second, handling ewes gently and minimizing stress during early gestation plays a critical role in embryo survival. Stress disrupts hormonal balance and immune function needed to support pregnancy. Producers should avoid unnecessary gathering, aggressive dogs, or loud environments during breeding and early pregnancy. Vaccinations and some dewormers should be avoided during the first 45 days post-breeding to prevent unintended stress or harm to developing embryos.

Third, flock health must be maintained through vaccination, biosecurity, and good hygiene. Infectious agents like *Chlamydia abortus*, *Toxoplasma gondii*, and *Campylobacter jejuni*, can cause mid- to late-term abortions and mummified fetuses. These diseases can spread quickly and silently in naïve or unvaccinated flocks, leading to sudden losses late in pregnancy. Following a veterinary-directed vaccination schedule and implementing a quarantine protocol for new or returning animals reduces this risk.

## Plan Feed Resources for Pregnancy Success in Ewes

Assess Pasture Quality in Late Summer and Early Fall



Estimate Hay Needs if Available Forage is Insufficient



Decide if Supplemental Feeding Could Extend Pasture



Reserve Purchased Feed Supplies in Advance

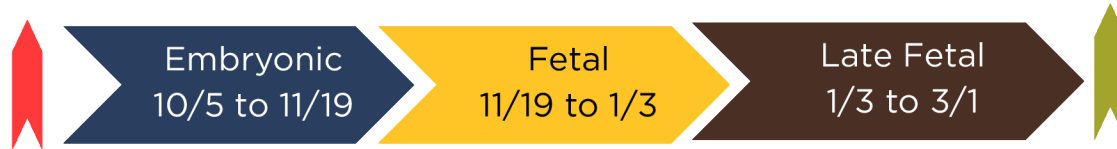



Budget Grazing Days and Supplemental Feeding to Avoid Shortages and Support Reproduction

**Figure 3.** Schematic for planning feed resources for early pregnancy success.

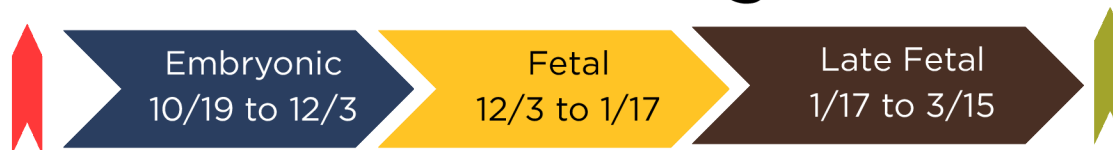
# Phases of Gestation Relative to Lambing Date

## March 1<sup>st</sup> Lambing Date



 = lambing event

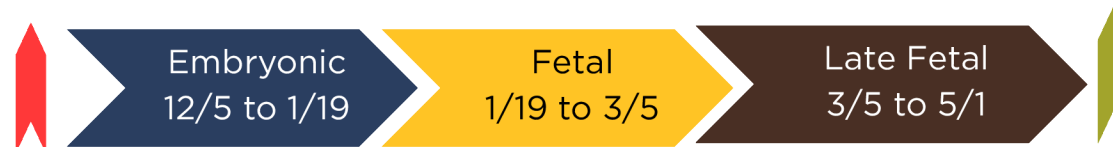
## March 15<sup>th</sup> Lambing Date



**OCT   NOV   DEC   JAN   FEB   MAR   APR   MAY**



## May 1<sup>st</sup> Lambing Date



 = conception event

## May 15<sup>th</sup> Lambing Date



Date ranges are based on an average 147 day gestation length. Adjust by one day in leap years.

## Table 1: Timeline of embryonic and fetal loss in sheep

Days of Gestation; Risk Level	Key biological events	Notes for producers
<b>0-14; High</b>	Fertilization, cleavage, and first embryo-maternal signaling.	Many losses occur here; stress, poor nutrition, or health problems disrupt signaling and cause resorption (O'Connell et al., 2016).
<b>15-29; High</b>	Implantation and placental development begin. Vascular Endothelial Growth Factor (VEGF) promotes uterine vascular growth.	Most embryonic losses occur before day 29; up to 20-40% of embryos lost during this stage (Dixon et al., 2007; Rickard et al., 2017; Reader and Juengel, 2025).
<b>30-45; Moderate</b>	Transition from embryonic to fetal stage. Heart, lungs, liver, and skeleton begin to develop.	Still vulnerable to nutritional or environmental stress. This is a critical management window.
<b>45-90; Moderate to Low</b>	Organ growth and fetal development continue; fetuses detectable via ultrasound.	Ultrasonography most reliable in this window for fetal counting; scanning percentages often exceed lambing percentages (Allworth et al., 2017).
<b>90-term (~147 days); Low</b>	Rapid fetal growth; lungs and brain mature in preparation for birth.	Further losses uncommon unless ewe faces disease, undernutrition, or severe stress (Yotov, 2012).

**This brief was created by UWyo Sheep Task Force, 26.2**

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