

# REPRO TRACKS

by Cliff Lamb, Texas A&M University

## Pregnancy Diagnosis

*Two main methods are used to diagnose pregnancy in cattle: direct and indirect.*

As most cattle producers know, pregnancy diagnosis is an important part of productive cattle operations. However, the decision is often made not to assess the pregnancy status of cows, and for multiple reasons.

Nonetheless, the bottom line is that maintaining a non-pregnant cow for an entire year has negative economic implications. That cow accrues the same cost of a pregnant cow without producing offspring to market. In fact, with the advent reproductive technologies such as artificial insemination (AI) and estrus synchronization, abstaining from pregnancy diagnosis may no longer be economically viable or practical.

Establishing a pregnancy diagnosis program allows producers to make management decisions to increase reproductive efficiency, such as culling infertile females and resynchronizing females that are not pregnant. Current research by Ky Pohler at Texas A&M University is focused on refining newer methods of pregnancy diagnosis that will provide producers with opportunities for earlier diagnosis of pregnancy status.

The ideal pregnancy test should have high sensitivity (correctly identify pregnant animals), high specificity (correctly identify non-pregnant animals), and be simple and inexpensive to conduct under field conditions. There are two

categories of pregnancy detection tests: direct and indirect methods. Direct methods allow the pregnancy to be palpated or seen while indirect methods rely on biological markers that indicate a pregnancy.

### Direct methods

Rectal palpation and transrectal ultrasonography are the most widely used direct methods for early pregnancy diagnoses. Both techniques are efficient, but require a skilled technician and provide static information on pregnancy status at the specific moment of diagnosis. Rectal palpation is an accurate form of pregnancy diagnosis that can be performed after day 35 of gestation. Most veterinarians are proficient at rectal palpation pregnancy diagnosis, and it requires little time in the cattle handling facility. However, rectal palpation does not necessarily provide any information about the viability of the embryo/fetus. Therefore, some animals with a nonviable embryo/fetus might be diagnosed as pregnant.

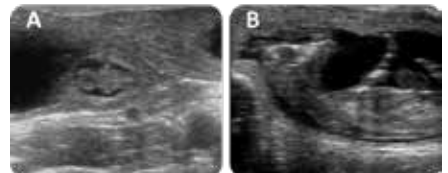
Transrectal ultrasonography can be used to detect early pregnancy, as early as 26 days of gestation for heifers and 28 days of gestation for cows, with a high degree of accuracy (Figure 1). For a skilled technician, the procedure is as fast as rectal palpation and may provide additional information in terms of embryo/fetus

viability, incidence of twins, and potentially the sex of the fetus.

### Indirect methods

In some areas, veterinary support is limited and alternative approaches of pregnancy detection are needed. Recent research has aimed to develop indirect methods of pregnancy diagnoses that use measures of hormones or conceptus-specific markers in maternal blood as indicators of a viable pregnancy.

**Figure 1: Ultrasound images of a bovine embryo on day 35 (A) and a fetus on day 63 (B) of gestation.**



After decades of research on potential biological markers of pregnancy, the measurement of pregnancy-associated glycoproteins (PAGs) in blood circulation has been established as the most reliable conceptus-derived marker for use of early pregnancy diagnosis in cattle. It is commercially available for cattle producers. This test is commonly referred to as 'the blood test.'

### PAGs

Produced by a specific cell population of the placenta, PAGs

enter the maternal circulation as early as Day 22 to 24 of gestation and reach concentrations currently acceptable for accurate pregnancy diagnosis at day 28. Today, commercial PAG testing is extremely accurate providing 95% to 99% true positive reading, with false positive rates ranging from 1% to 5%. Some false positives may be due to embryonic mortality and not to test inaccuracy. Blood tests are highly accurate and can serve as a reliable strategy to determine pregnancy

in cattle. Tests currently available include BioPRYN® (BioTracking LLC), IDEXX Bovine pregnancy test (IDEXX Laboratories Inc.) and DG29™ pregnancy test (Genex Cooperative Inc.).

The PAG-based blood tests cost between \$2.40 and \$5 per cow, plus the cost of a sample tube and needle. Shipping expenses must be added if the tests are not processed locally. A drawback of this method is that results are not immediate. Producers must wait 2 to 5 days to receive the

results. However, chuteside blood tests have been recently developed and are now commercially available for beef and dairy producers. These tests can be performed on-farm with whole blood samples and can accurately determine pregnancy status in less than 30 minutes after the blood sample was collected.

There is no one-size-fits-all approach when it comes to pregnancy diagnosis, and choosing a method is entirely dependent on what works best for each operation. A summary of the advantages and disadvantages of rectal palpation, ultrasonography and blood tests (PAG) is provided in Table 1. [AJ](#)

**Table 1: Important characteristics of commercially available pregnancy diagnosis methods.**

|                  | How early detects pregnancy | Determines gestational age | Determines fetal gender | Requires experienced technician | Cost per cow | Chuteside results   |
|------------------|-----------------------------|----------------------------|-------------------------|---------------------------------|--------------|---------------------|
| Rectal Palpation | 35-50 days                  | Yes                        | No                      | Yes                             | \$3-10       | Yes                 |
| Ultrasound       | 28 days                     | Yes                        | Yes*                    | Yes                             | \$7-15       | Yes                 |
| Blood Test (PAG) | 28 days                     | No                         | No                      | No                              | \$3-5        | Depends on the test |

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



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