

Understanding Pregnancy Diagnosis in Beef Cattle¹

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Overview

Generally, 55 to 70 percent of the input costs associated with a beef cattle operation are related to nutrition, primarily from stored feed. The ability to cull non-pregnant, or open, cows is an essential management practice to reduce feed costs, because feed resources should only be provided to cattle that are going to produce a calf the subsequent year. This is only possible, however, through utilization of pregnancy diagnosis.

Producer surveys indicate that many cattlemen still are not utilizing pregnancy diagnosis performed after the breeding season. The National Animal Health Monitoring System (NAHMS) survey indicates that less than 20 percent of producers use a form of pregnancy diagnosis. These numbers are surprisingly low considering the opportunity cost of diagnosing non-pregnant cows. Generally, herd pregnancy rates after a 60–120-day breeding season tend to range from 80 to 94 percent. Pregnancy diagnosis identifies the 6–20 percent of open cows in the herd so they can be culled after their calves at side are weaned instead of waiting until the end of the subsequent calving season. Considering that the annual feed/forage costs associated with maintaining a mature cow can be as high as \$400 to \$500 per year, culling open cows can save as much as \$200 per head that can be diverted to the purchase or development of replacement females, sire selection, increased nutritional management, and other management-related costs.

Pregnancy diagnosis can be performed simply at the time that producers work their cattle during their vaccination schedule or even at the time of weaning. There are three practical methods that can be utilized for pregnancy diagnosis in beef herds: 1) rectal palpation, 2) transrectal ultrasonography, or 3) use of a blood sample that is submitted to a laboratory for analysis and results returned to the producer within a few days.

Methods of Pregnancy Diagnosis

Palpation

Rectal palpation is an accurate form of pregnancy diagnosis that can be performed by a skilled technician after day 35 of pregnancy throughout gestation until birth. Most veterinarians are proficient at pregnancy diagnosis in the form of rectal palpation and it is a simple procedure that requires little time in the cattle-handling facility. However, rectal palpation does not provide any information about the viability of the embryo/fetus. Therefore, some animals with a nonviable embryo/fetus or an embryo/fetus in the process of degenerating might be diagnosed as pregnant. Costs of rectal palpation vary widely based on the number of females to be handled, the distance that a veterinarian must travel, or the time and facilities used. Generally, rectal palpation costs will range from \$2.50 to \$15.00 per female. A primary advantage of rectal palpation is that the result is chute-side, with an immediate diagnosis that allows a producer to make a decision while the cow is in the chute.

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Ultrasound

Transrectal ultrasonography, more commonly called ultrasound, can be used to detect 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 (usually performed around day 55 of gestation). Prior to the development of ultrasound for pregnancy diagnosis in cattle, technicians were unable to accurately determine the viability or number of embryos or fetuses. Because the heartbeat of a fetus can be detected at approximately 22 days of age, one can accurately assess whether or not the pregnancy is viable. Producers also should be aware that early embryonic loss is a natural occurrence in cattle and may be evident between the time of pregnancy diagnosis and calving and that this is not the result of the actual pregnancy diagnosis procedure. For example, we have observed about a 4.2 percent incidence of embryonic loss in beef heifers initially ultrasounded at day 30 of gestation and subsequently palpated rectally between day 60 and day 90 after insemination. In beef cows embryonic loss ranges from 3 to 8 percent from 30 to 75 days of gestation, whereas in dairy cattle, pregnancy loss from 28 to 56 days after artificial insemination was 13.5 percent. Therefore, ultrasonography provides a tool to accurately differentiate between the failure of a female to conceive and the incidence of embryonic mortality, because a heartbeat is detectable at 22 days of gestation.

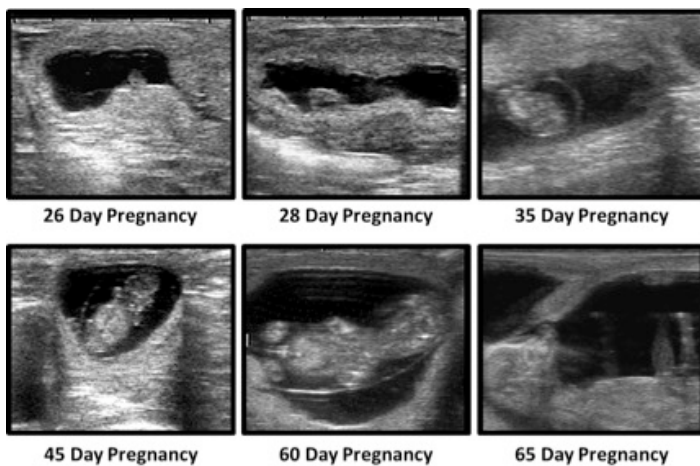


Figure 1. Ultrasound images of the bovine fetus at various stages of development.

Ultrasound also gives producers an opportunity to diagnose the sex of the fetus, which can occur between day 55 and day 80 of gestation. Many cattle operations are developing strategies to use fetal sexing as either a marketing or purchasing tool. At approximately day 55 of gestation, male

and female fetuses can be differentiated by the relative location of the genital tubercle and development of the genital swellings like the scrotum in male fetuses and the vulva in female fetuses. Ultrasound was used in an experiment conducted by the authors, in which the sex of 112 fetuses in Angus heifers was determined with 98.2 percent accuracy. In beef cattle operations, fetal sexing remains limited to purebred operations, especially in conjunction with an embryo transfer program. Determination of sex, especially after the successful transfer of embryos to recipients, allows marketing of male and female embryos before the pregnancy is carried to term. This strategy can be used effectively in dairy operations trying to produce bull calves of a particular mating for sale to bull studs. From a commercial cattle operation standpoint, heifer-development operations are utilizing fetal sexing as a marketing tool to provide potential buyers with females that are pregnant with fetuses of a specific sex. As more technicians become proficient at fetal sexing, commercial operations will utilize this technology to enhance the marketability and efficiency of their cattle operations. As with the costs of rectal palpation, ultrasound costs for diagnosis of pregnancy vary widely for many reasons, such as the number of females to be handled, the distance that a veterinarian would travel, or the time and facilities used. Generally, ultrasound costs will range from \$4.00 to \$25.00 per female. As with rectal palpation, ultrasound provides an immediate diagnosis that allows a producer to make a decision while the cow is in the chute.

Blood Test

Blood samples are now a suitable alternative for determination of pregnancy. There are at least two primary blood sample pregnancy test kits (BioPRYN and PG29). Both work effectively, and the contact information for producers interested in either test is listed on the sample sheets. Blood samples are taken to evaluate for pregnancy-associated glycoproteins (PAG).

Heifers and lactating cows can be tested 30 days or later after breeding. Lactating cows carry residual PAG from the previous pregnancy until 90 days after calving. To prevent receiving a false-positive test result, producers should sample blood 30 days or more after the conclusion of the breeding season and 90 days or more after calving. Thus if a cow is bred 60 days after calving, it is appropriate to take the sample 30 days post-breeding, which is 90 days after calving. If she is bred 55 days after calving, then the post-breeding sample should be taken at 35 days so that the cow is 90 days post-calving.

The blood tests are greater than 99 percent accurate if the result is negative or not pregnant, with less than 1 percent showing false-open (false-negative). The false-pregnant (false-positive) rate for the test is approximately 5 percent. In practice, high-producing dairy cows tend to show slightly higher false-positive rates of 7 to 8 percent, especially during periods of extremely hot weather. It is presumed that a portion of this variance is due to greater early embryonic death and not to the inaccuracy of the blood test.

The tests cost between \$2.40 to \$4.00 per cow from the laboratory that processes and conducts the test, plus the cost of a sample tube and needle. Shipping expenses also must be added if the tests are not processed locally. A primary drawback of this method of pregnancy diagnosis is that results are not immediate. A producer must wait for the results to be sent from a laboratory before a diagnosis is confirmed. This period varies between 2 and 5 days depending on when the laboratory receives the samples.

Producers interested in using a blood test can find additional information on the following websites:

<http://www.biotracking.com/?q=beef> (BioPRYN)

<http://genex.crinet.com/page3429/DG29BloodPregnancyTest> (DG29™)



Figure 2. Picture depicting the correct location for collection of blood samples from the tail vein.

Summary

Cattle producers should consider pregnancy diagnosis for the cattle in their herds. This simple management practice will allow you to make critical management and economic decisions based on pregnancy status several months prior to calving. Precious feed resources can be reserved for cattle that will be productive in the year ahead. Replacement animals can be retained or purchased in advance to maintain the total production of the herd. Contact your local UF/IFAS Extension Livestock Agent if you have any questions related to pregnancy diagnosis for a beef cattle operation.

Examples of Submittal Forms for Blood Sample Pregnancy Diagnosis

DG29™ Blood Pregnancy Test Sample Submission Form

Date: _____
 Contact Name: _____
 Farm Name: _____
 Address: _____
 City: _____
 State: _____ Zip: _____
 Phone: _____
 Fax: _____
 E-mail: _____
 AgSource Herd Code Number: _____
 or
 Genex Account Number: _____

Preferred Method of Receiving Results:

- E-mail Fax Mail

BLOOD SAMPLE INSTRUCTIONS

Pull at least a 2cc blood sample after a minimum of 29 days post breeding and 90 days post calving. Note: If testing an embryo transfer recipient, blood sample should be pulled after a minimum of 32 days (embryo is at day 7 when implanted + 25 days = Day 32). With a permanent marker, label each tube with tube number and animal identification.



TUBE #	ANIMAL ID	# DAYS POST BREEDING	# DAYS POST CALVING	✓ E REPIER
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

TUBE #	ANIMAL ID	# DAYS POST BREEDING	# DAYS POST CALVING	✓ E REPIER
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

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Animal Reproduction Technologies
www.conception-animal.com

Available Through



Cooperative Resources
 International

Genex 800-235-1763 • AgSource 800-214-0887
www.criinc.com

Return samples to the appropriate lab:

AgSource Laboratories - Menomonie, 403 Cedar Avenue W, Menomonie, WI 54751

AgSource Laboratories - Jerome, 150 Briden Way, Jerome, ID 83338

601/01 12/04/15



Submittal Form

BioPRYN® Pregnancy Test, CAE
IDEXX: BVD-PI & Johne's

Office Use Only
Amount Enclosed \$ _____
Log # _____

CFLA, LLC
43 E 17th St
Saint Cloud, FL 34769

E-Mail: cflavs@embarqmail.com
Website: www.centralfloridalargeanimal.com
Phone: 407-892-2034 Fax: 407-891-7811

You may use FedEx, UPS or USPS overnight or second day for timely delivery, No Ice Required.

Payment must be included with submission unless prior arrangements have been made.

Report Sent to:
Company: _____ Phone: _____
Name: _____ Fax: _____
Address: _____ Email: _____

Label Tubes as Illustrated



Beef Breed _____ Dairy Breed _____ Goat/Sheep _____
Payment Included \$ _____ Report by: Fax _____ Phone _____ Email _____ Mail _____

◀ **Tube #**

◀ **Animal ID**

2cc or more of whole blood
Red or gray top tube

Bio PRYN Test after the minimum Days Post Breeding (DPB)		
Species	When to Sample	Cost/Sample
Cattle	28 DPB & 90 days post-calving	\$2.50
Cattle	25 days post-implant or	
(Embryo Transfer)	32 days post-heat	\$2.50
Sheep/Goat	30 DPB	\$6.50*
(*\$10.00 setup fee additional if < 5 samples)		
Additional test		
Cattle – BVD PI (ear notch or blood/serum)		Call or see web site
Cattle – Johne's ELISA (from blood/serum)		\$4.50
CAE		\$5.00

Date Drawn: _____ # samples: _____

Tube #	Animal Tag/ID #	Days Bred	Added Test	Tube #	Animal Tag/ID#	Days Bred	Added Test
1				19			
2				20			
3				21			
4				22			
5				23			
6				24			
7				25			
8				26			
9				27			
10				28			
11				29			
12				30			
13				31			
14				32			
15				33			
16				34			