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Pregnancy Testing in Beef Cattle

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Introduction

PREGNANCY TESTING IN BEEF CATTLE is a particularly important and useful management tool that producers can use to determine the pregnancy status of breeding females. Pregnancy determination will identify candidates (i.e., nonpregnant or “open” cows) which should be culled (removed from the herd) and sold. Timely detection and marketing of open cows can increase ranch profitability by allowing the producer to strategically market cows when prices are the most lucrative and saves on unnecessary feed, veterinary, and production costs of nonproductive cows. Some methods of pregnancy detection can also provide additional information regarding the beef herd and help producers make informed management and business decisions. However, only 32% of US beef operations use any form of pregnancy detection. The use of pregnancy diagnosis ranges from 22% for small operations (1–49 head), 51% for medium operations (50–199), to 99% for large operations (200 or more) (United States Department of Agriculture-National Animal Health Monitoring System 2017). Opting to keep nonproductive cows, or cows that fail to produce a calf every year, decreases operation profitability. This is due to the prohibitive costs of maintaining a nonproductive cow. The average cost of maintaining a cow in the Pacific Northwest ranges from \$380 to \$900 per cow per year (Gray et al. 2012).

Pregnancy testing is also a tool that can be used to optimize heifer management, such as determining the breeding success of estrous synchronization and artificial insemination (A.I.) programs shortly after breeding has concluded. Heifers can then be kept or sold depending upon pregnancy status. Plus, they can be grouped according to pregnancy stage for easier calving management. Information on pregnancy status can as well be used to make improvements in heifer management for the next year. For example, if pregnancy rates are low, a producer might look at changes needed in bull and heifer selection, nutrition, animal health, or breeding programs to improve pregnancy rates the following year.

Pregnancy testing can be most profitable when used at two different times during the year. The first would be a minimum of thirty days (dependent upon method used) after the breeding



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season ends. The second would be when calves are weaned and before gestational feeding programs begin. Pregnancy testing at this time would ensure that only cows that are carrying a calf would be fed until calving.

Pregnancy detection at these key times offers several advantages:

- It gives early warning of breeding and/or reproductive problems, such as infertility in males and problem breeders in females, and alerts producers to the possibility of disease, particularly trichomoniasis, in the herd.
- It serves as a decision tool to determine if females should be rebred or sold as nonpregnant females.
- It allows for timely marketing of open cows.
- It allows for separation and grouping of females as pregnant (and stage of gestation in some cases) and nonpregnant, which provides opportunity for proper management regarding nutrition, health, late-calving cows, and culling.
- Late-calving cows can be discovered through specified pregnancy checking methods and separated from the main herd or sold to improve the uniformity of calf crops.
- It makes it possible to guarantee open cows and the pregnancy status of females, according to the date of last pregnancy checking that are for sale.
- Information from pregnancy diagnosis, such as pregnancy status, stage, and fetal gender, can be utilized for marketing purposes.
- It can be used to predict calving dates and calving-season length.

Trained veterinarians and technicians most often conduct pregnancy detection. However, some pregnancy detection methods are relatively easy to learn and can be utilized by producers. As innovative technologies emerge for pregnancy diagnosis in cattle and ranching input costs continue to rise, more producers may consider pregnancy checking their own cows as an option. Developing pregnancy testing skills is also advantageous as the number of large animal veterinarians continues to decrease and scheduling ranch visits becomes more difficult. The option of not utilizing pregnancy testing methods can be expensive and it provides the operator with

fewer marketing options and little to no reproductive information regarding a herd.

In most states, pregnancy diagnosis for a fee, or for cattle owned by others, is restricted to licensed veterinarians or veterinary technicians. In some states, individuals can work in cooperation with a licensed veterinarian to conduct pregnancy detection for other producers. It is important to know the laws of your state regarding these practices.

The three pregnancy detection methods are rectal palpation, ultrasound, and biochemical tests and are described in the following sections.

Rectal Palpation

Pregnancy is routinely detected in cows by inserting the hand into the rectum and palpating through the rectal and uterine walls for a fetus, which can be detected during the latter first and second trimester of gestation. When palpating, it is important to locate and identify the reproductive tract and signs of pregnancy. Four signs determine pregnancy, which include detection of 1) the mid-uterine artery, located in the broad ligament; 2) the amniotic vesicle (fluid that surrounds the embryo) and/or the placentomes (commonly referred to as “buttons,” which are round to oval structures that increase in size as the pregnancy progresses) within the uterus; 3) a fetus; and 4) fetal membrane slip. Fetal membranes are the first palpable structure within the uterus. The palpator can gently apply pressure to the uterus and feel the membranes move or “slip” between their fingers as a sign of early pregnancy. Training for pregnancy detection by rectal palpation involves taking a course on pregnancy diagnosis or working with an experienced palpator. Palpation requires practicing on thousands of animals to become proficient in determining pregnancy status and in detecting other existing reproductive health conditions.

Accuracy in pregnancy testing depends upon a palpator’s ability to locate the cervix, which feels like a turkey neck or piece of gristle and serves as a landmark when palpating and recognizing changes in the tone, size, and location of the uterine horns as well as changes in the uterine arteries. Developing a systematic approach for palpating structures and identifying at least two positive signs of pregnancy to confirm status improves accuracy. Fetal size and characteristics used

in determining pregnancy are given in Table 1. A well-trained palpator can detect pregnancy thirty-five days after insemination. Accuracy at thirty days postbreeding or less is reduced and a second examination is often required. The highest accuracy is achieved at 45–120 days of gestation. Experienced palpators can achieve 95%–99% accuracy when testing during this stage of gestation. Fetal age can also be determined during this time period.

In addition to pregnancy detection, experienced, knowledgeable palpators can determine if reproductive problems or other conditions exist in open cows. Open cows can be determined by the absence of the four signs of pregnancy. Both uterine horns will feel thick, meaty, and similar in size. An open uterus is small enough to be held in a hand. Palpation can help determine cyclic status, presence of ovarian cysts, uterine infections, and the presence of uterine adhesions. This method provides valuable information regarding the number of days for pregnant and calving dates. Rectal palpation costs \$4–\$6 per head plus any off-site visit fees when conducted by a veterinarian or technician.

Rectal Palpation Methodology

Rectal palpation for pregnancy diagnosis should not be attempted by untrained individuals. The proper steps involved in rectal palpation (Figure 1) include the following:

- Wear a veterinary grade plastic sleeve covering the hand and arm up to the shoulder. Palpation is normally done with the left arm regardless of



Figure 1. Rectal palpation method used to determine pregnancy status.

Table 1. Fetal size and characteristics used in determining pregnancy.

Days of Gestation	Fetal Weight	Fetal Length (inches)	Identifying Characteristics
30	1/100 oz	2/5	One uterine horn is slightly enlarged and thin; embryonic vesicle is the size of a large marble. Uterus in approximate position of nonpregnant uterus. Fetal membranes of 30–90-day pregnancy may be slipped between fingers.
45	1/8–1/4 oz	1 1/4	Uterine horn is somewhat enlarged, thinner walled, and prominent. Embryonic vesicle is the size of a hen's egg.
60	1/4–1/2 oz	5–6	Uterine horn is 2 1/2 to 3 1/2 inches in diameter, fluid filled, and pulled over pelvic brim into body cavity. Fetus is the size of a mouse.
90	3–6 oz	6–8	Both uterine horns are swollen (4–5 inches in diameter) and pulled deeply into the body cavity (difficult to palpate). Fetus is the size of a rat. Uterine artery 1/8–3/16 inch in diameter. Cotyledons are 3/4–1 inch across.
120	1–2 lb	10–12	Similar to 90-day but fetus more easily palpated. Fetus is the size of a small cat with a head the size of a lemon. Uterine artery 1/4 inch in diameter. Cotyledons are more noticeable and are 1 1/2 inches in length. Horns are 5–7 inches in diameter.
150	4–6 lb	12–16	Difficult to palpate the fetus. Uterine horns are deep in the body cavity with fetus the size of large cat with horns 6–8 inches in diameter. Uterine artery is 1/4–3/8 inch in diameter. Cotyledons 2–2 1/2 inches in diameter.
180	6–10 lb	20–24	Horns with fetus still out of reach. Fetus is the size of a small dog. Uterine artery is 3/8–1/2 inch in diameter. Cotyledons are more enlarged. From sixth month until calving, movement of fetus may be induced by grasping the feet, legs, or nose.
210	20–30 lb	24–32	From seven months until parturition, fetus may be felt. Uterine artery is 1/2 inch in diameter.
240	40–60 lb	28–36	Age is largely determined by increase in fetal size. Uterine artery is 1/2–5/8 inch in diameter.
270	60–100 lb	28–38	The uterine artery continues to increase in size. Uterine artery 1/2–3/4 inch in diameter.

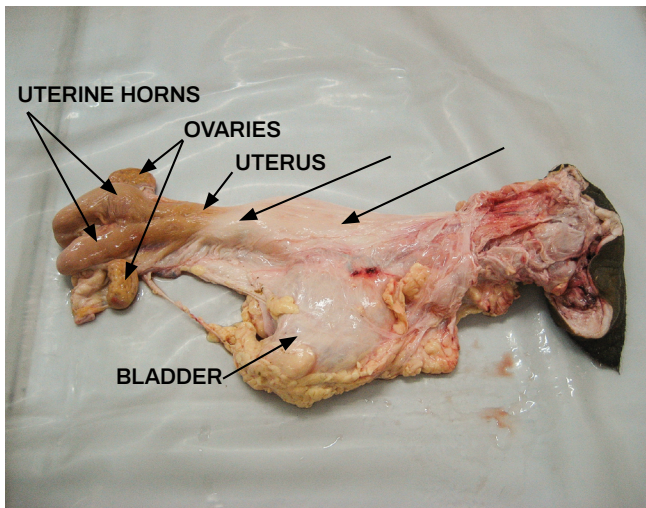


Figure 2. Female beef reproductive tract. Courtesy of Scott Jensen, University of Idaho Extension.

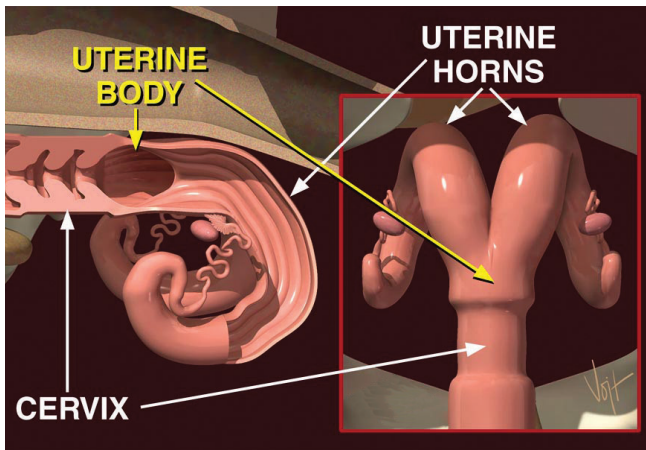


Figure 3. Diagram of the female beef uterus. Courtesy of Select Sires, Plain City, Ohio.

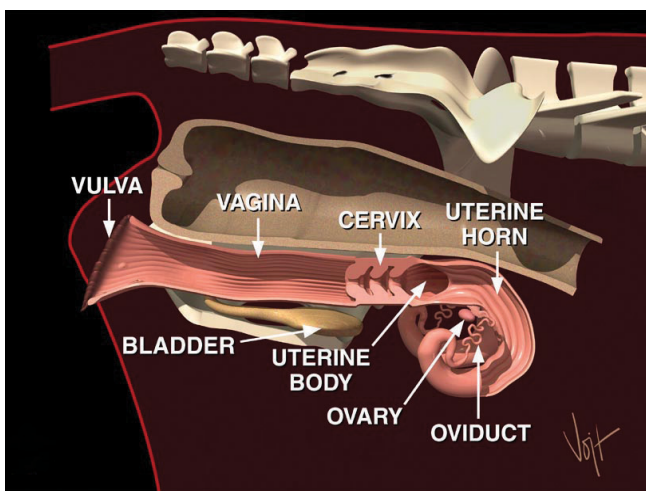


Figure 4. Diagram of the female beef reproductive tract. Courtesy of Select Sires, Plain City, Ohio.

your dominant hand due to the position of the rumen on the left side. Some palpators prefer to place a veterinary grade latex glove over the sleeve. It is helpful to secure the plastic sleeve to your clothing with forceps or a clip to ensure the sleeve is positioned properly and does not slip.

- Apply obstetrical lubricant to the sleeve for the first palpation.
- Carefully insert the hand, with fingers held together in a wedge shape, and arm into the rectum. Experienced palpators will be able to identify the cervix, uterus, ovarian, and pregnancy structures (Figures 2–4). Palpators must find a positive sign of pregnancy to diagnose a cow as pregnant. Identification of two positive signs will improve accuracy. The only positive signs of pregnancy in a cow are a fetus, the mid-uterine artery, placentomes (cotyledons and caruncles), the amniotic vesicle, and fetal membrane slip.
- When entering the rectum, move fecal material aside or move the hand underneath the material by maintaining contact with the rectal floor.
- Do not mistake the rumen as an enlarged uterus.
- In most cases, it is not necessary to change sleeves and gloves for each cow. However, if blood or other discharge is discovered in a cow, change the sleeve immediately before palpating additional cows. Some diseases, such as anaplasmosis and lymphoma, among others, can be transmitted via rectal palpation. In herds with these diseases, use a new plastic sleeve for each cow. To promote good herd health and management practices, consider changing sleeves periodically to reduce the incidence of spreading disease. Also replace torn sleeves.
- Most producers choose to mark the cow on the hips with chalk or bleach to aid in sorting cows following pregnancy checking. For example, a straight mark on both sides of the hip can be used for pregnant cows while an “O” can be used to designate open cows. Cows can also be marked according to stage of pregnancy. For example, first trimester marks can be made on the shoulder, second trimester on the rib, and third trimester on the hip.

- Record information on animal identification and pregnancy status and summarize it on record sheets of your choosing.

Key Points

If rectal palpation is the method selected for your cows, a few key points should be followed.

- First, cows should be kept calm to avoid potential pregnancy loss. Follow handling procedures as recommended by your state's [Beef Quality Assurance Guidelines](#).
- Second, cows should be properly restrained to prevent injury to the handler, the cow, and fetus.
- Third, internal body tissues are delicate and subject to tears or additional damage by the palpator. Always be gentle when entering the rectal cavity and palpating the uterine environment. Care should be used with finger positioning and movement. Fingernails should be clipped short to avoid tearing tissue. In addition, rough rectal palpation prior to day 45 of pregnancy can cause damage to the developing embryo and even pregnancy loss.

Ultrasound

Real-time ultrasound has become the method of choice for early pregnancy diagnosis by many veterinarians and some producers. With this method, an ultrasound transducer is inserted in the rectum of the cow and an image of reproductive structures, the fetus, and fetal membranes is obtained on an attached screen or monitor (Figures 5–6). Two types of transducers are available for use in cattle. There is a linear probe, which is inserted into the rectum of the cow with your arm. Convex probes are also available, which can provide more detail and image depth. Convex probes can be utilized in extension arm ultrasound probes (Figure 7), which eliminates the need to insert a hand or arm into the rectum. They also allow the individual to determine pregnancy status on more animals since the arm will not tire as quickly as with insertion-type probes. Utilize caution while using any of these probes since sudden movements or a rough, forceful technique can cause rectal tearing.

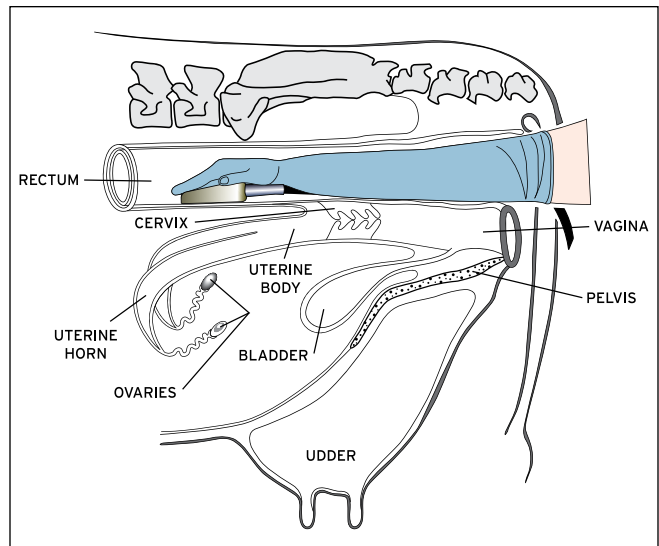


Figure 5. Transrectal Ultrasonography with Easi-Scan. Courtesy of BCF Technology.



Figure 6. Ultrasound machine used to determine pregnancy status.



Figure 7. ReproScan XTC with extension arm probe. Courtesy of Andrew Bronson, DVM, ReproScan.

Compared to rectal palpation, pregnancy determination by ultrasound is easy to learn. Several commercial cattlemen's schools and ultrasound companies offer ultrasound training. Contact your Extension educator or specialist to find where and when ultrasound training is offered in your area. Most people can learn to accurately detect pregnancies at forty-five days postconception in only a few training sessions.

Learning to identify the nonpregnant reproductive tract is the most challenging. Experienced operators can detect pregnancies as early as twenty-five days postbreeding with accuracies up to 85% and higher levels (>96%) at thirty days of gestation.

In addition to pregnancy detection, ultrasound examination provides the producer with excellent information. This technology can determine the viability of the fetus, presence of multiple embryos, fetal age, calving date, and occasionally fetal defects. Also, experienced ultrasound technicians can determine fetal sex when ultrasound is performed at 55–120 days gestation. Information on reproductive health or other health problems with open cows can also be assessed.

Only real-time ultrasound equipment specifically designed for veterinary applications should be purchased and utilized for your operation. These units are portable, durable, and often battery powered. Some units may require an electrical source. Ultrasound equipment ranges in cost from \$10,000 to \$20,000. Due to the high purchase costs of this equipment, veterinarians tend to be the primary purchasers. However, several large ranches may consider purchasing units jointly, given that using ultrasound units on several thousand animals a year reduces costs per cow. In many cases, the cost of the unit can be recovered in a few years versus paying for professionals to conduct a field call and pregnancy checking several hundred head of cattle.

Ultrasound examination provides the producer with the most marketing information of any technique used. Most veterinarians and/or technicians charge approximately \$4–\$10 per head for ultrasounding and may charge an off-site visit fee. If fetal age and sex determination are requested, the ultrasound fees increase.

Ultrasound Methodology

Ultrasound imaging for pregnancy diagnosis should not be attempted by untrained individuals. Those who choose to conduct ultrasound as a pregnancy checking method should follow these steps:

1. Charge the equipment battery and have an extra charged battery on hand before beginning, especially if an alternative power source is not available.
2. Set up and screen-adjust the equipment to optimize the image and improve reading accuracy. Direct sunlight can make screen interpretation difficult, so it is often necessary to place a temporary structure, such as a tarp, over the screen to aid in reading results if facilities are outdoors and uncovered.
3. Wear a veterinary grade plastic sleeve covering the hand and arm up to the shoulder. Ultrasound is normally done with the left arm, as described in Rectal Palpation Methodology.
4. A veterinary grade latex glove can be fitted over the sleeved arm. It is helpful to fasten the plastic sleeve to your clothing to ensure the sleeve is positioned and secured properly. A pair of forceps or a clip works well.
5. Apply lubricant to the probe. The lubricant helps obtain an accurate picture on the screen and aids in insertion into the cow.
6. Gently insert your hand and transducer into the rectum. Once inside, apply firm, but gentle pressure on the rectal floor. A slow, gentle sweeping motion from side to side of both uterine horns helps to obtain pictures of the uterine environment, other reproductive structures, and pregnancies.
7. In most cases, it is not necessary to change sleeves and gloves for each cow. However, if blood or other discharge is discovered in a cow, change the sleeve immediately before ultrasounding additional cows. Some diseases, such as anaplasmosis and lymphoma, among others, can be transmitted via fluids on the sleeves and probe. When ultrasounding herds with these diseases, sleeves should be changed

for each cow and the probe should be cleaned with a mild disinfectant and rinsed with water before inspecting the next cow. To promote good herd health and management practices, consider changing sleeves periodically to reduce the incidence of spreading disease. Immediately change sleeves if they tear.

8. Most producers choose to mark the cow on the hips with chalk or bleach to aid in sorting cows following pregnancy checking. For example, a straight mark on both sides of the hip can be used for pregnant cows while an “O” can be used to designate open cows. Cows can also be marked according to stage of pregnancy. For example, first trimester marks can be made on the shoulder, second trimester on the rib, and third trimester on the hip.
9. Record information on animal identification and pregnancy status and summarize it on record sheets of your choosing.

Key Points

If ultrasound is the method selected for your cows a few key points should be followed.

- First, keep the cows calm to avoid potential pregnancy loss. Follow handling procedures as recommended by your state’s [Beef Quality Assurance Guidelines](#).
- Second, properly restrain the cows to prevent injury to the handler, damage to the ultrasound machine and probe, and injury to the cow and fetus. Carefully handle the ultrasound machine and probe. Striking the probe against a hard object such as a chute or dropping the probe on a hard surface can damage and even crack it. Damaged probes cannot produce good ultrasound images and their repair or replacement costs thousands of dollars.
- Third, internal body tissues are delicate and subject to tears or additional damage by an ultrasound technician. Always be gentle when entering the rectal cavity to obtain images of the uterine environment. Move the probe carefully during insertion and while obtaining images.
- Fourth, many ultrasound machines are now battery operated. Have at least one

extra, fully charged battery available while pregnancy checking.

Ultrasound Technology with Extension Arm Probes

Ultrasound transducers can also be inserted into extension arm probes (Figure 7). Extension arm probes eliminate the need to place the arm in the rectum. They are safe, effective, and easy to use. In addition, a convex probe used in an extension arm easily detects 60–150-day pregnancies. To use ultrasound technology with an extension arm and convex probe, insert the probe into the extension arm and lubricate the extension arm. Then use the right arm to gently insert the probe into the rectum. Apply light pressure on the probe to maintain contact with the rectal floor and to obtain a clear image of the uterine environment. Use caution and be gentle when inserting and scanning with the extension arm probe to avoid damaging the rectum.

With extension arm ultrasound, it can be difficult to detect pregnancies six months along and further. This is because the fetus is generally located deep in the cow and its weight pulls the uterus over the pelvis. At this stage, the pregnancy is not always easily detected with the extension arm probe; one might call the cow open when, in fact, she is pregnant. In addition, deep-bodied cows, older cows, dry manure, full rumens, and large, obese cattle can make pregnancy detection at six months and older even more difficult with the extension arm. Additional techniques are required to detect these advanced pregnancies.

For deeper-bodied cows and/or advanced pregnancies, insert the extension arm all the way to the handle. Then work the extension arm down onto the pregnancy, which is most often in the right lower quadrant of the abdomen. It may be necessary to lift up firmly on the handle and rotate the probe from one side of the uterus to the other to locate an advanced pregnancy. Remember that the pregnant uterus will be located to the right of the rumen. To improve accuracy, move the probe so it is over the right edge of the pelvis. Lift up on the handle of the extension arm probe while pressing down on the extension arm at the anus of the cow (Bronson personal communication). Application of

this technique pushes the ultrasound probe over the brim of the pelvis, enabling you to find the advanced pregnancy. Figures 8–13 depict pregnancies and uterine structures.

Biochemical Tests

In recent years, blood tests using biochemical detection have become a practical alternative to ultrasound and palpation. These tests rely upon a change in the secretion pattern of a hormone or detection of a specific protein in the maternal system when an embryo is present in the uterus. Biochemical tests are useful to determine what animals were conceived via A.I. in synchronization programs or they help operators to clean up bulls any time after thirty days postbreeding. It is an easy, cost-effective method to determine pregnancy status.



Figure 8. 32-day pregnancy. Courtesy of Andrew Bronson, DVM, ReproScan.



Figure 9. 45-day pregnancy. Courtesy of Andrew Bronson, DVM, ReproScan.

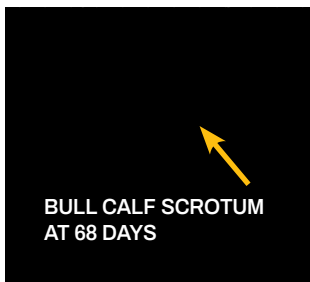


Figure 10. 68-day pregnancy, bull calf. Courtesy of Andrew Bronson, DVM, ReproScan.

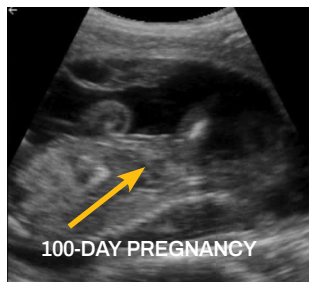


Figure 11. 100-day pregnancy. Courtesy of Andrew Bronson, DVM, ReproScan.

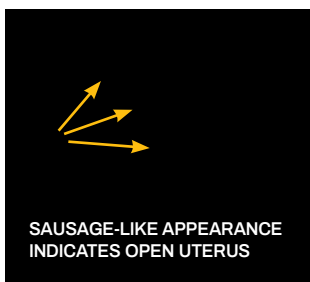


Figure 12. Open uterus. Courtesy of Andrew Bronson, DVM, ReproScan.

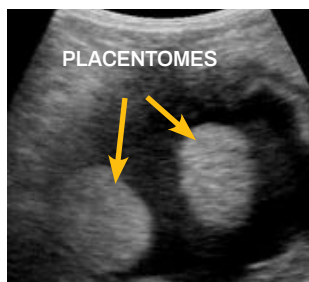


Figure 13. Placentomes. Courtesy of Andrew Bronson, DVM, ReproScan.

Biochemical tests can only determine pregnancy status. They do not have the capability to determine fetal sex or gestational age. This is an easy method for a producer to incorporate into the herd management program. However, depending upon the test you select, some tests must be returned to the company for processing. Consequently, receiving the results may take a week or less, so information is not available immediately to determine management strategies. Others may be read and interpreted chute-side with results ready in twenty minutes or less.

Pregnancy-Associated Glycoproteins (PAGs)

The placenta of the developing calf produces proteins that are secreted and appear in the maternal circulatory system. These proteins can be detected at 25–30 days after breeding. PAGs will remain in the cow's system and can be detected for up to sixty days after calving. Therefore, cows need to be at least 60–90 days postpartum to ensure an accurate reading. In practice, blood samples to detect pregnancy in beef cows are usually taken from cows that are more than 80 days postpartum. Measuring these proteins is an accurate way to determine pregnancy in cows.

Three companies that offer PAG tests in cattle include BioTracking (two tests; one chute-side and one that must be mailed to a certified laboratory for test results), Genex (mail to a certified laboratory for test results), and IDEXX (one chute-side test). The company information is as follows:

BioPRYN—BioTracking, LLC; Moscow, Idaho, www.biotracking.com. Accurate twenty-eight days after breeding. Cows must be at least seventy-three days postcalving.

Pregnostx-BioTracking, LLC; Moscow, Idaho, www.biotracking.com/pregnostx/. Accurate twenty-eight days after breeding. Cows must be at least seventy-three days postcalving. Results are available chute-side within thirty minutes of conducting the test.

DG29—Genex, CRI; Shawano, Wisconsin, https://catalog.genex.coop/products/herdmanagement/dg29-blood-pregnancy-test?gad_source=1.

Accurate twenty-nine days after breeding. Cows must be at least ninety days postcalving.

Alertys—IDEXX labs; Westbrook, Maine, <https://www.idexx.com/en/livestock>. Accurate twenty-eight days after breeding. Cows must be at least seventy days postcalving. Results are available chute-side within thirty minutes of conducting the test.

Accuracy varies slightly for each test, but research indicates accuracy of 93%–99% compared to palpation or ultrasound. If used early (<35 days) in pregnancy, these tests might give more “false” positives due to possible embryo loss that was able to establish but that died early in pregnancy. Follow directions carefully to obtain accurate results.

Progesterone Tests

The steroid hormone progesterone is secreted by the corpus luteum into the blood or milk at different rates, depending upon the day of the heat cycle. It elevates during most of the cycle and lowers at time of heat. If a cow conceives, progesterone remains high until the end of pregnancy and is required at this level to maintain the pregnancy. If a cow is bred and does not conceive, progesterone declines as usual at the end of the cycle when heat occurs.

Blood or milk progesterone test kits can be purchased to analyze progesterone concentrations. To use these kits, a single blood or milk sample is collected at 21–24 days after breeding and analyzed. If progesterone is low, the cow is designated “not pregnant.” If progesterone is high, she is designated “pregnant.” The reason is that if the cow has not conceived, she will have lost her corpus luteum at testing time and progesterone production will be low. The cow may have just been in heat or coming in heat soon if progesterone concentrations are low. Progesterone remains high if conception occurs.

Accuracy of determining a cow to be “not pregnant” (low progesterone) is almost 100%. Even if a cow were pregnant, she would abort with a low progesterone testing level. Accuracy of determining a cow “pregnant” (high progesterone) is less than 85%. In this case, progesterone may be high at the time of testing because certain cows have shorter or longer estrous cycles or an embryo is present, resulting in high progesterone production. However, if an embryo dies just prior to or shortly after testing, the test may inaccurately designate the cow as pregnant. Therefore, embryo loss contributes to the inaccuracy

of progesterone for identifying “pregnant” cows. Early embryonic loss in beef herds can average 2%–3% every year.

The lack of accuracy combined with the necessity to take the sample at a specific day postbreeding makes progesterone tests problematic for pregnancy detection in commercial beef operations. Therefore, progesterone testing is limited in its use in the beef industry and may be more effective in dairy cattle when obtaining milk samples for testing.

Biochemical Test Methodology

Biochemical tests are conducted by drawing blood from the coccygeal vein in the tail or the jugular vein in the neck. A minimum of 2 ml of blood must be obtained from each female. Needles must be changed for each cow to prevent cross contamination. Vacutainers used to collect the blood sample should be labeled according to the female’s identification number and kept cool during the collection event and before and during shipment to a laboratory. If you have a chute-side test, carefully follow each test’s set of instructions for blood collection and shipping or test interpretation for chute-side results. Many laboratories will send you the necessary equipment with a detailed set of instructions. You may also obtain sample instructions online or through wholesale animal-supply companies.

Biochemical tests have a turnaround time of seven days or less. Some companies offer a same-day test. Turnaround times may also be impacted by distances and/or the availability of mailing services. Overnight the blood samples to the laboratory. Biochemical tests range in cost from \$2.50 to \$3.50 per head. A few limitations exist with biochemical tests. They cannot be used to determine fetal sex or age and cows cannot be sorted until test results are obtained. At the time of this publication, limited chute-side tests are available.

Have an individual trained in bovine blood collection assist you when first learning how to collect blood. Use the following steps:

1. Purchase at least 1–2 needle holders or “hubs.” Also purchase 3 ml syringes should the need arise to draw a blood sample without a vacutainer. For the beginner, syringes may be easier to use than vacutainers.

2. Purchase one vacutainer per cow with a few extra on hand if a vacuum is lost or a vacutainer breaks.
3. Purchase one 18-gauge x 1-inch needle per cow with a few extra on hand in the event that a needle is dropped or becomes damaged. **A new needle must be used for every cow.** Cross contamination of blood will affect test results.
4. Screw the needle into the needle holder or hub (Figures 14a–14c).
5. Insert the vacutainer (Figure 14d) into the needle holder, taking care not to puncture the rubber stopper.
6. Properly restrain the cow.
7. To locate the coccygeal vein, raise the cow's tail to a 45° angle. A groove or depression lies in the ventral (underside) midline (middle) position of the tail 3–6 inches from the tail base.
8. Insert the needle a half-inch deep, perpendicular to the underside of the tail, midline, and about 3–6 inches from the tail base (Figure 14e) in the groove as described in step 7.
9. Blood should appear at the back portion of the needle upon insertion into the vein. If blood does not appear, insert the needle in a different direction until the vein is punctured.
10. Once blood is obtained, push the vacutainer rubber stopper onto the needle, taking care to not change the needle position. The vacutainer has a vacuum that will draw blood. If you puncture the stopper and for some reason lose the vein, the vacuum is lost. At this point, you must use a syringe to draw blood or must use a new vacutainer.
11. You must collect a minimum of 2 ml of blood.
12. Once you have obtained enough blood, withdraw the needle from the tail and remove the vacutainer.
13. Label the vacutainer with the corresponding cow identification number using a waterproof, permanent marker. Number the vacutainer sequentially as well.
14. Place the vacutainer in a cooler with ice until shipment.

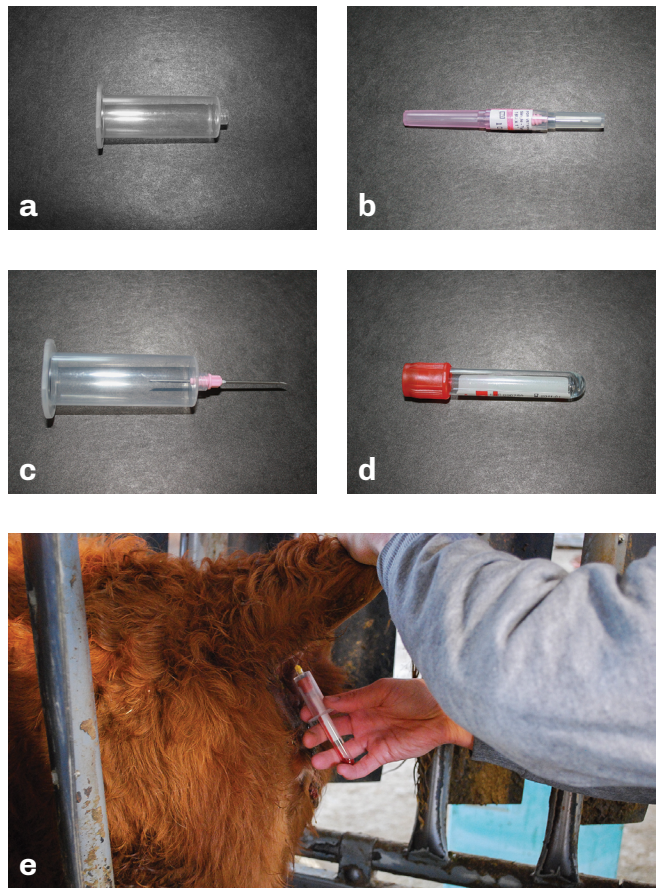


Figure 14a–e. Obtaining blood samples for pregnancy evaluation. (a) Needle holder or hub; (b) needle for blood draw; (c) assembled blood draw equipment; (d) vacutainer; (e) coccygeal blood draw.

15. Unscrew the used needle and discard the needle into a “sharps” container. If the needle holder becomes bloody, clean thoroughly with water and reuse.

Key Points

- Cross contamination can easily occur when collecting blood from animals. Take care to keep equipment and the working area clean.
- Use caution when handling needles to avoid puncturing your skin.
- Keep animals properly restrained at all times.
- If you are unable to obtain blood from the coccygeal vein, you may obtain a sample from the jugular vein. When obtaining blood from the jugular vein, use a halter and additional caution to restrain the animal's head. Have an experienced handler hold the animal's head up and away from

you. This position exposes the jugular vein and makes it quite simple to obtain a blood sample. The jugular vein lays in a groove located from the head to the brisket in the lower half of the neck. It is the size of a garden hose and will be taut to the touch. Use your fingers to press and feel the vein roll under the fingers. Once you have located the vein, puncture it with the needle pointing upwards toward the animal's head and proceed with steps outlined in Biochemical Test Methodology.

- Keep good records to ensure the accuracy of your tests for each individual animal.

Achieving Optimum Success

Regardless of the method you select, keep in mind a few key factors to ensure testing accuracy.

- It is especially important to keep animals calm to avoid potential pregnancy loss. Handle cattle with care, particularly when utilizing rectal palpation and ultrasound, to avoid rectal tears, any other tissue damage, and/or embryonic loss.
- Obtain adequate training for the method you select or locate a reputable veterinarian or technician to perform pregnancy testing.
- Follow your state's [Beef Quality Assurance guidelines](#).

- Record and maintain accurate records so testing efforts and results can be utilized in making optimum herd-management decisions.

Summary

Pregnancy testing is a beneficial management tool because it provides a pregnancy diagnosis with minimal hazard to the animal and saves production costs. It also helps manage any potential disease issues in the herd. Cows should be pregnancy tested as part of the weaning or early postweaning operation. Cows may also be early pregnancy checked depending upon your ranch practices thirty days after artificial insemination or when the breeding season ends. Pregnancy checking ensures that only cows carrying a calf will be kept through gestation and calving. Selling open cows saves on feed and operating expenses valued at \$380–\$900 per head or more, depending on the type of operation and preferred management practices. In addition, pregnancy testing can help you group cattle according to gestational stage and provide information for culling strategies. Pregnancy testing is a very practical, economical tool to help manage a beef cow herd. Table 2 provides a summary of pregnancy testing methods.

Table 2. Summary of pregnancy-testing methods.

Item	Palpation	Ultrasound	Blood Test
Earliest embryonic age at detection	35–45 days	28–30 days	28–32 days
Fetal aging	Yes, certain stages	Yes, certain stages	No
Identify the presence of twins	No	Yes	No
Fetal viability	No	Yes	No
Fetal gender	No	Yes - 55 days or more	No
Immediate answer	Yes	Yes	Only if a chute-side test is purchased and used
Experience impacts accuracy	Yes	Yes	No
Price	Low - \$3–\$5/head	High - \$4–\$10/head	Low - \$2.50–\$4.00/head + mailing costs

Further Reading

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