



## Bull Breeding Soundness Exams: More than a Wiggle Test

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There are very few completely sterile bulls in the world, but there are a lot of sub-fertile ones. Those are the bulls that veterinarians look for when we perform breeding soundness exams before every breeding season. Sub-fertile bulls are an economic liability to a cattle operation with regard to reduced pregnancies in the herd and prolonged calving seasons. A reduction in the potential number of calves on the ground and increased inconsistency in the age of calves, with consequently lighter weaning weights, all lead to lost dollars for the producer.

Every bull should have a breeding soundness exam done every year. Ideally, a breeding soundness exam should be completed 30-60 days before the start of the breeding season. This allows for any foot issues to be taken care of before the season, and if a bull is found to be unsatisfactory, enough

### Summary

- BBSEs should be performed before every breeding season or, at minimum, yearly.
- Correct leg and foot conformation is important to evaluate on every bull.
- Sperm motility and morphology should be carefully evaluated by the veterinarian.
- BBSEs do not evaluate libido of the bull or the ability of the bull to make intromission.

time is available for a replacement to be found. When purchasing a bull, you should request the bull breeding soundness exam (**BBSE**) form and, perhaps, consider having your trusted veterinarian recheck the bull to make sure that you bought a bull that is ready to go to work. Even if guaranteed by the seller, a sub-fertile bull will not get cows

bred in a timely manner and, therefore, becomes a liability rather than an investment.

Bulls change from season to season, and a lot can happen in six months. If a bull is being used for both spring and fall breeding seasons, ideally the animal should be examined before turnout each season. At a minimum, yearly BBSE should be done. Bulls can become sub-fertile with no outward signs of injury or illness. It is always best to be safe rather than sorry (with a reduced calf crop.) Do not try to cut costs by not performing a BBSE.

A complete bull breeding soundness exam (BBSE) has four parts: 1) a physical exam, 2) scrotal circumference measurement, 3) sperm motility, and 4) sperm morphology assessments. All parts are equal/important, and a bull must successfully pass each one to be considered a satisfactory potential breeder.

How bulls are handled in preparation for semen checks can make or break a day. Bulls that are handled quietly and are moved through the working facilities easily will usually be much calmer in the chute during the BBSE process. It is also a great time for your veterinarian to pick up on any lameness issues that a bull may be experiencing. Evaluation of conformation of the feet and legs is an integral part of the BBSE. A bull's feet and legs must be able to withstand the rigors of a breeding season as the bull travels to females in estrus and exhibits mounting behavior. Scoring of structural conformation and claw scores can allow for tracking of a bull over time and for comparison across contemporary groups.

Conformation of the feet and legs is crucial. A bull needs to be structurally sound in both the fore and hind limbs to go out and work and stay sound for the whole season. Not only does a bull pass on conformational traits to his offspring, but his conformation can be predictive of his longevity in the herd. Bulls must be very active during the breeding season, and poor conformation can lead to excessive wear and tear on joints, resulting in lameness. Some bulls may be unwilling to mount and service cows due to soreness in hind limbs resulting from poor conformation or injury.

A foot score guideline, such as the one from the

American Angus Association, is an objective way to assign a foot score to every bull. Management decisions can be made off foot scores; producers can select animals with better conformation. (The guideline can be used in the cowherd, too.)

In a BBSE, the claws will be examined for cracks, abnormal wear, or signs of corkscrew claw. If any of these conditions are noted, a bull should have a foot trim to prevent any lameness during the breeding season. Corkscrew claw is a conformational defect that affects the outside claw of the hind feet (Image 1). It is mildly heritable, so no male or female progeny from these bulls should be kept for herd replacements. Bulls with corkscrew claw require increased hoof trims at 4- to 6-month intervals to allow for reshaping of the foot so that normal wear of the sole can occur. When corkscrew claw is left unchecked, lameness is often noticed in bulls due to the uneven wear of the sole, which can create sole ulcers and other issues of the foot.



**Image 1.** Corkscrew claw. Note how outer claw curves over inner claw.

Interdigital spaces should be checked for interdigital fibromas (also called corns). These large growths between the claws can become abraded and infected during the breeding season, rendering a bull lame. Corns can be prophylactically removed before the

breeding season. Any swelling in joints should be thoroughly examined as it may indicate serious underlying issues that can affect the gait and future performance of that animal.

Assess body condition scores (BCS) at the time of semen checks. Ideally, bulls have a BCS score of 6 on a 9-point scale – slightly above average. We can expect hardworking bulls to lose 1 or 2 body condition point scores over a breeding season, leaving them with a BCS of 4 at the end of the season. We don't want bulls to be too thin, because this can affect fertility. We don't want them obese, either, as this too can affect their fertility and willingness to breed. Body condition scores can be evaluated by looking at the degree of fat that is deposited in the brisket, over the ribs, along the back, hooks, pins, and tailhead. These bulls should have a smooth appearance with some fat deposition in the brisket and over the tailhead. The ribs will be covered, and the back will appear to be rounded.

As bulls enter the chute, always look for some sort of permanent ID. These IDs are usually unique within a herd and allow for accurate recordkeeping from year to year and comparison of BBSE exams over time for that particular individual. While looking at the head of the animal, look for signs of wooden tongue or lumpy jaw to assess the wear on the teeth. We want to make sure a bull will be able to adequately graze and maintain an appropriate body condition score during the upcoming season.

Functional eyes are important. Bulls need to be able to see the females in heat and go to them. During a BBSE we assess the eyes for any squinting or tearing that could indicate ongoing disease, such as pink eye, and for pink eye scars or squamous cell carcinoma, which can affect vision.

Before electroejaculation of the bull, the bull's sheath should be thoroughly examined for swellings or abnormalities that could indicate a previous injury. The sheath should be freely movable and free of any swellings.

Following examination of the sheath, a complete exam of the scrotum and testicles will be made. The scrotum will be evaluated for shape and symmetry. There should be no more than a 10% difference in

size between the left and right testicle. If there is a difference in size, start looking for a reason. The scrotum should be evaluated for dermatitis or frostbite that could potentially inhibit the ability of the scrotum to relax during the summer or contract during the winter. If the scrotum is abnormally large or has an hourglass appearance, this can be an indication that the bull has an inguinal hernia (Image 2). The testicles should be palpated to assess firmness. The testes should move freely in the scrotum.



**Image 2.** Bull with inguinal hernia. This bull should be evaluated immediately by a veterinarian.

Scrotal circumference is one of the most discussed portions of a breeding soundness exam. Scrotal circumference is performed by placing a scrotal tape around the testicles at the widest part and pulling the tape tight to allow for accurate measurement of the testicles (Image 3). Why do we care so much about scrotal circumference? Scrotal circumference is a highly heritable trait that is associated with testicular volume and the amount of semen produced by a bull. Scrotal circumference is also positively correlated with the age of puberty in offspring. Both heifers and bull calves sired by bulls with large scrotal circumferences will reach puberty earlier as compared to progeny from bulls with smaller scrotal circumferences. Bulls must meet the minimum scrotal circumference for their age. Young bulls that barely meet scrotal circumference for their age group should be discussed and scrutinized. Testicular growth and consequent increases in scrotal circumference are minimal in later stages of maturation.



**Image 3.** Scrotal circumference should be measured at the widest point and pulled tight to allow for accurate measurement.

Once the scrotal and testicular exam is complete, transrectal palpation will be performed. This task is performed not only to assess the accessory sex glands and inguinal rings of the bull but also to begin stimulation before electroejaculation. Vesiculitis (inflammation and infection of the seminal glands) is the most common abnormality found on palpation of the accessory sex glands. Vesiculitis is most common in young bulls housed together and those fed a high grain diet. Diagnosis is based on palpation of a swollen vesicular gland and/or the presence of white blood cells in the ejaculate. Some bulls may show pain on palpation, but this clinical sign is highly variable. Vesiculitis may be responsive to systemic antibiotics, with Micotil® and Draxxin® showing good efficacy.

Semen is most commonly collected by electroejaculation. Studies show that electroejaculation by a trained veterinarian is not painful, although there may be some rise in cortisol or stress levels. Transrectal massage of the accessory glands may facilitate electroejaculation and may also be used as an alternative to electroejaculation. It should be noted that in some cases, transrectal stimulation may result in less than representative semen samples and does not allow for complete erection and extension of the penis as compared to electroejaculation. Visual inspection of the penis and prepuce must be conducted to classify a bull as a satisfactory potential breeder.

During an examination of the penis and prepuce, we look for hair rings, warts, persistent frenulums, any signs of balanoposthitis (inflammation of the penis and prepuce), or any scarring or damage of the penis or prepuce that indicates previous trauma. Most of the aforementioned conditions can be extremely detrimental to the bull's ability to breed cows, so it is vitally important to look closely at the penis and prepuce.

As veterinarians, we are equal opportunity evaluators. Veterinarians are not there to fail bulls, and we gain nothing by failing bulls. Our goal is to identify bulls that are sub-fertile or infertile to provide some insurance to the producer who is using that bull to produce a calf crop. The utmost care should be taken in handling and slide preparation by protecting the sample from the elements. All efforts should be made to control the environment, preventing the semen from cold shock, to allow for evaluation of the semen at its prime potential. Veterinarians should use equipment that allows for excellent evaluation of sperm motility and morphology. It simply is not enough for us to look in the microscope and say that there are sperm wiggling around and then call a bull satisfactory. A veterinarian must perform an in-depth examination of the whole bull, not only the semen motility and morphology.

Progressive motility is assessed to determine the number of sperm cells that are swimming in a forward motion and can traverse through the cervix, the uterus, and oviducts to the site of oocyte fertilization. A bull must have a minimum of 30% progressively motile sperm to be classified as a satisfactory potential breeder.

More bulls fail based on sperm morphology than any other part of the exam. The veterinarian will evaluate a minimum of 100 sperms under high power on the microscope and thoroughly look at the head, midpiece, and tail for abnormalities that would impede the sperm's ability to reach the site of fertilization or suggest an inability of the sperm to fertilize the egg. If abnormalities are noted, your veterinarian will categorize the abnormalities and develop a prognosis for future fertility, which can aid decisions about whether a bull should be kept or culled. A bull must have a minimum of 70% morphologically normal sperm cells to be categorized as a satisfactory potential breeder.

The veterinarian lists each bull in one of three categories. Bulls that successfully fulfill the requirements for all four parts of the BBSE are categorized as satisfactory. Deferred is a category for bulls not currently satisfactory but are considered likely to recover; such bulls are often rechecked in 4-6 weeks, depending on the affecting condition. The category of unsatisfactory is for bulls that do not meet qualifications and should be culled from the herd unless the owner is willing to keep the bull in hopes that his condition may improve with time.

The breeding soundness exam does not evaluate the libido of the bull or the ability of the bull to gain intromission. Bulls should be evaluated once turned in with cows for willingness to mount and the ability to gain intromission into the vulva of the cow. We must consider that multiple factors influence libido. For example, Brahman or Brahman-influenced bulls tend to breed more commonly at night, young bulls may show less drive, and social influence may be a factor in pastures housing multiple bulls.

If a bull raises concern either for lack of libido or inability to gain intromission, a test mating should be performed. A test mating is the only way to assess libido in the bull as well as evaluate for penile deviations and certain other problems of the penis that may prevent the achievement of intromission. Test matings usually involve one or more females in estrus and last approximately 20 minutes.

Common recommendation for bull-cow ratios are 1 bull to 25-30 females for bulls > 2 years old and 1 bull to 15-20 females for bulls < 2 years.