

Bull Breeding Soundness Evaluations
Mel Pence DVM, MS, PAS, Diplomate ABVP (beef cattle)
University of Georgia, College of Veterinary Medicine

Is the bull you are about to purchase or are currently using able to successfully breed cows? Is the bull highly fertile, sub-fertile or just not a breeder? Has a complete breeding soundness evaluation been performed and did you receive a signed certificate of the results of the exam for each bull? Generally, bulls that pass a complete breeding soundness evaluation (Bull BSE) will be highly fertile. Bulls that fail may not be completely sterile but are not capable of settling a large number of cows early in the breeding season. So, bulls that fail may result in large numbers of open cows and/or cows that calve late. Since calves gain about 2 pounds per day of age, for each 21-day heat cycle they are late or open it cost you 42 pounds of calf at weaning. A complete breeding soundness evaluation offers a good return on investment. Research on 1000s of yearling bulls at numerous locations shows that normally 10 to 25% of all yearling bulls are sub-fertile or non-fertile and will not pass a bull BSE.

A bull breeding soundness evaluation (Bull BSE) is a method to standardize the evaluation of the major factors which influence the reproductive potential of the bull. The correct examination process has several components that include:

- 1) A detailed medical history about the bull
- 2) A general physical examination
- 3) A detailed examination of the reproductive system to include a scrotal measurement
- 4) An evaluation of the semen

If the medical history and general physical exam is found to be adequate, **testicle size, semen motility and semen morphology (the structure and form of the sperm cells) have all been proven to be highly related to the bull's ability to settle cows. If one of these three factors is not adequate the bull will be infertile or sub-fertile.**

At the outset of a bull breeding soundness evaluation detailed medical history should be completed by your veterinarian to include ID, age, breed, weight, specific vaccines, dates, breeding history and any previous health information. Of particular importance are health problems occurring within six to ten weeks prior to the examination. It takes a sperm cell nearly 60 days to develop, so the sperm we see today were produced two month ago and if the bull had a fever, prolonged heat stress, or a chronic debilitating disease it could affect the quality of a semen sample for a prolonged period of time.

A bull must be able to eat, see, smell and move without lameness and successfully breed cows to complete his role in a herd's reproductive performance. The physical examination by your veterinarian looks at a bull's general appearance and condition. How a bull moves is of particular importance. A bull to be used in a natural mating pasture operation must travel and mount cows in heat. Lameness, however slight, particularly on rear legs may be compounded when a bull mounts and travels during the breeding season.

Reproductive System Examination

The examination of the reproductive system by your veterinarian focuses on three areas:

- 1) The scrotum and its contents – conformation, size and tone of testicles - examination the testicle epididymis and vas deferens
- 2) The internal reproductive organs
- 3) The penis and prepuce

One of the most easily obtained and repeatable procedures is a measurement of the scrotal circumference. **Research has shown a positive relationship between scrotal circumference and male reproductive traits such as the number of normal sperm, sperm concentration, sperm motility, total daily sperm production and number of cows settled in a specific time**. The minimum industry requirement established by the Society for Theriogenology for 12-14 month old bulls across all breeds is 30 cm. Bulls found below this value may produce semen of satisfactory quality but normal breeding pressures may overcome the limited sperm production capacity of these bulls resulting in poor reproductive performance. Ideally, a producer would want selection criteria set well above these values.

Minimum Recommended Scrotal Circumference in Centimeters by Age for Bulls

Age (months)	Scrotal Circumference (cm)
12-15	30
15-18	31
18-21	32
21-24	33
>24	34

Examination of the internal reproductive organs by your veterinarian involves a rectal palpation of the seminal vesicular glands, internal portions of the vas deferens, prostate gland and the internal portion of the penis. The penis should be fully extended and examined thoroughly especially younger bulls. It is difficult to evaluate the penis if electro-ejaculation is not used. In a study of 1,111 ten to fifteen month-old bulls, over 30 percent were found to have abnormalities of the penis and prepuce that impaired the bull's ability to successfully breed cows because of poor extension, pain or physical blockage of the entry of the penis into the cow at breeding.

Semen Evaluation

While many methods are available to obtain semen samples. The most frequently used is with an electro-ejaculator. This allows careful observation of the extended penis. To evaluate semen quality, the collected sample is examined with a microscope to determine overall and individual sperm motility and the percent of normal sperm. **Both motility and morphology are positively correlated to pregnancy rates. To examine morphology you must stain the sample and view it under a high magnification microscope. The minimum industry standards for bull semen are to have over 70 percent normal sperm in a sample with 30 percent of the sperm being progressively motile.**

Take Home points

The bull has been described, as half of the herd and catastrophic losses due to infertility are not uncommon. More common losses occur when a sub-fertile bull is not properly examined and passes a bull BSE. A professionally done, complete bull breeding soundness examination (including scrotal size, motility and morphology), careful

observation during the breeding season, and good health management will prevent most problems of breeding bulls.