

# Bull Breeding Soundness Examinations

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In natural service breeding systems, making sure that bulls have the ability to identify, mount and deposit semen in an estrus female successfully, and that the semen is capable of travelling through the reproductive tract of the female and fertilizing the waiting oocyte, is imperative. Unfortunately, not all bulls are capable of performing these tasks. If a bull can't fertilize cows and you turn him out to breed, you likely will have a lot of open cows at the end of the year.

Breeding soundness exams can reveal many potential problems with young bulls, as well as with older bulls that already have sired calf crops. These exams are a sound investment for a cow-calf producer, yet less than 20 percent of U.S. producers perform breeding soundness exams on their bulls prior to spring turnout.

The Society for Theriogenology, a veterinarian group focused on animal reproduction, has established standards that bulls must meet or exceed to pass during a breeding soundness exam (BSE). These standards including criteria for physical structure, reproductive organs and semen.



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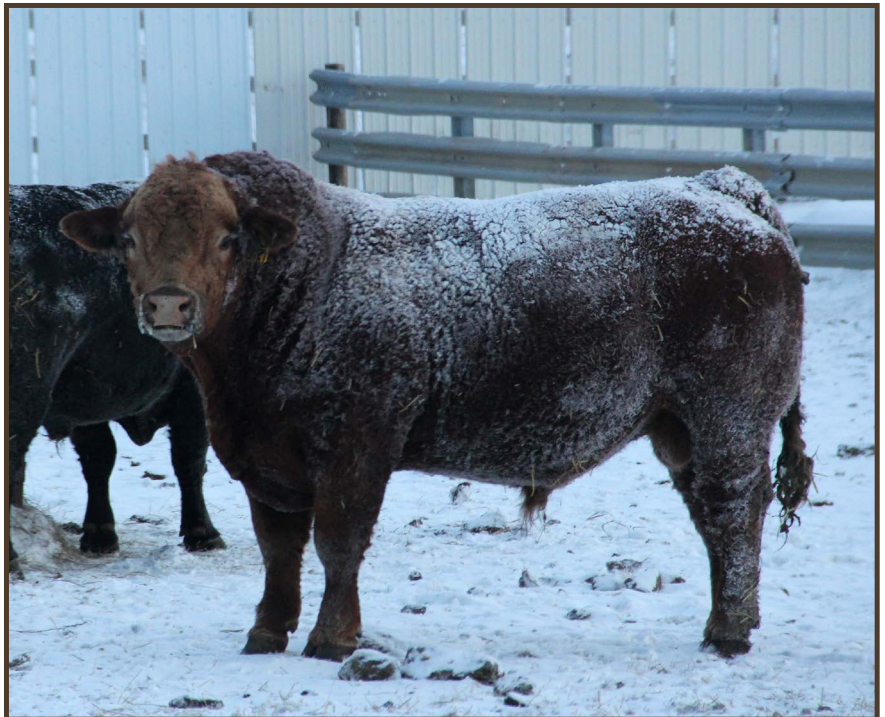
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## Physical Structure

The physical examination is important because bulls with proper structure are more likely to hold up under the rigors of the breeding season than bulls with structural problems. Structural problems of the feet and legs or movement in general are a big issue because bulls in many regions are required to cover large areas with varying terrain and, thus, need to be free of physical problems to breed cows successfully.

Bulls will lose body condition during a breeding season, so they must enter the season with adequate condition.

Viewing the mounting behavior of cows in heat from a distance helps the bull identify which females are ready to breed, so bulls must have good vision.



## Reproductive Organs

During a BSE, some of the reproductive organs are viewed from outside of the bull, whereas others are examined via rectal palpation. The penis, testicles, seminal vesicles and other parts of the bull's reproductive tract are evaluated to make sure they are free of injuries or defects that would prohibit a bull from successfully breeding and/or impregnating cows.

Scrotal circumference is heavily scrutinized in young bulls because it is an indicator of semen volume. As young bulls mature, the standards for adequate scrotal circumference also increase. For example, a bull that is less than 15 months old should have a circumference of at least 30 centimeters (cm), whereas a bull more than 24 months old should have a scrotal circumference of at least 34 cm.





# Semen

A sample of semen often is collected on the farm or in veterinary clinics using an electroejaculator. Semen then is evaluated under a microscope for motility, morphology and concentration.

Motility is the movement of sperm and, ideally, a sample will have a rapid swirling movement. If sperm are not moving in a synchronized manner they may not be able to swim successfully through the female reproductive tract to the site of fertilization. The minimum requirement for sperm motility is 30 percent.

Morphology is an evaluation of the structure of the sperm. Ideally, the sperm will have heads and tails of proper shape. Sperm that has incorrect structure likely will not result in successful fertilization (Figure 2). The minimum requirement of sperm morphology is 70 percent normal sperm.

Results from the bulls' physical structure, reproductive organs and semen are taken together to classify each bull into "satisfactory," "deferred" or "unsatisfactory" categories. The deferred classification most often is used in cases of young bulls that may not be physically mature at the time of examination.

Young bulls that fail a BSE because of inadequate scrotal circumference, or issues with motility or morphology, should be retested and sold only after they have passed a subsequent BSE.

Bulls in the deferred category may be classified later as satisfactory breeders if they achieve appropriate standards in a subsequent examination.

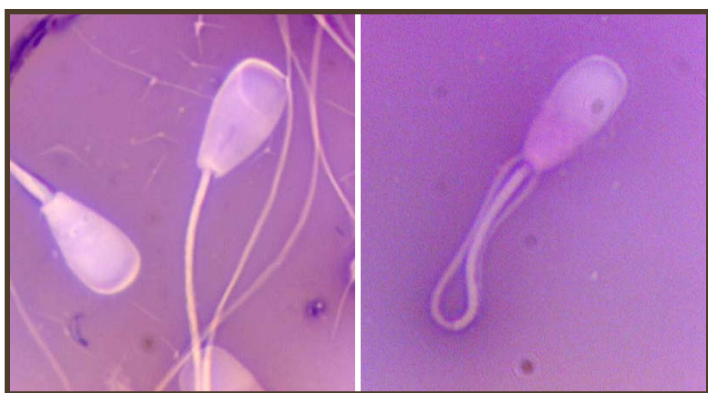
A summary of retesting revealed that 45 percent of yearling bulls and 36 percent of mature bulls that failed an initial BSE also failed a retest at a later date.

Just because a bull sired calves last year does not mean he can do it again this year. Injuries during the nonbreeding months, as well as effects of extreme cold weather and frostbite, can render previously satisfactory bulls infertile. Spermatogenesis, or the process of making sperm, takes 60 days, so frostbite or other reproductive injuries that occur in March still may be affecting semen quality in May.

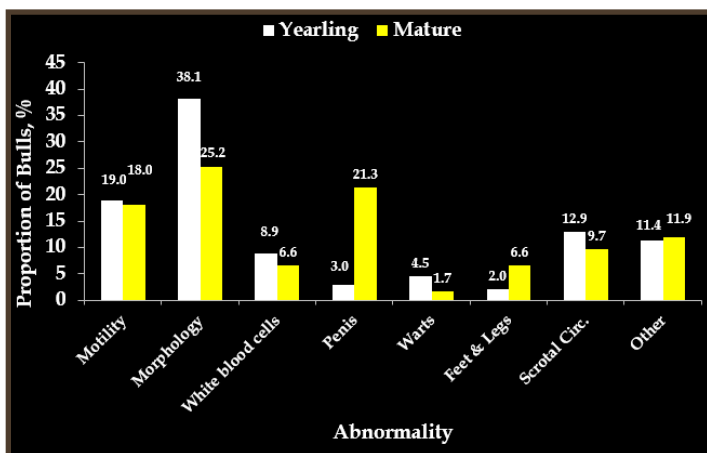
Perform breeding soundness exams close to the time of breeding to ensure recovery from winter injuries, but enough time in advance of turnout to find new bulls if problems are identified.

A summary of breeding soundness exams conducted on 5,800 bulls by North Dakota veterinarians in 2014 revealed that the examination failure rate of mature bulls was 9 percent and the failure rate of yearling bulls was 17 percent.

Morphology issues were the most frequently identified reason for yearling bull failure, followed by motility and scrotal circumference issues (Figure 2). In mature bulls, the most frequently identified reason for failure also was morphology, which was followed closely by penis issues (broken penis, etc.) and motility issues.



**Figure 1. Examples of normal semen morphology (left) and semen with morphological defects (right).** (NDSU photos)



**Figure 2. Reasons for breeding soundness examination failure in yearling and mature beef bulls.** (NDSU illustration)

## Considerations Beyond a Breeding Soundness Exam

**Stocking rate** (number of cows a bull is required to breed): The nationwide average for bull stocking rates is 25 cows per mature bull or 15 cows per yearling bull. Stocking rates of up to 50 cows per bull are used successfully in some systems, but high stocking rates in other systems may lead to cows not becoming pregnant on their first estrous cycle of the breeding season. Cows becoming pregnant later in the breeding season will calve later the following year and, as a result, likely will have lighter calves at weaning.

**Libido** (willingness to breed): Libido can be determined only when bulls are on pastures or in pens with females in heat. Bulls may have all of the qualifications to pass the breeding soundness exam, but if they aren't breeding cows actively, producers must find a different option.



Watch breeding activity closely because catching and correcting problems during the breeding season is much more profitable than waiting for open cows to calve.

While our industry has no chute-side method of identifying bulls that offer fertility far superior than average bulls, a BSE certainly can identify bulls with very low likelihood of successfully breeding cows. Identifying, removing and replacing bulls with reproductive problems can result in significant benefits to the reproductive performance of the cow herd and profitability for the beef producer.

All photos by Carl Dahlen, NDSU.

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