



# Vet Call

► by **Bob Larson**, professor of production medicine, Kansas State University

## Breeding soundness examinations

*In order for cow-calf operations to be successful, a high percentage of cows must become pregnant in a confined breeding season, and almost all of those successful matings must occur within the first 35-40 days of the breeding season. In order to accomplish this goal, the cows must be cycling at the start of the breeding season. The bulls must be able to detect each cow in heat, mount her and deliver fertile semen to her reproductive tract. Failure of bulls to successfully accomplish mating results in very poor reproductive efficiency.*

### Testing fertility

A breeding soundness examination (sometimes referred to as a BSE) of bulls is a thorough examination of the bull to estimate his ability to successfully breed cows.

Although some causes of poor fertility are not detected with a breeding soundness exam, many bull problems can be avoided by doing a thorough prebreeding examination. But, as we evaluate the use of an exam, one should recognize the limitations.

The examination will only be as accurate as the skill and equipment of the examiner; and it should also be remembered that the examination reflects an animal's breeding soundness only on the date tested. A breeding soundness examination does not reflect the bull's soundness in the past; neither does it definitely define the bull's ability to cause conception in the future. The overall effect of the exam is to eliminate many infertile bulls and to improve the genetic base for fertility within the herd and breed.

Research has shown that high-fertility bulls can successfully mate as many as 50-60 cows in range situations. Despite this ability, the typical bull-to-female ratio is much lower, often as low as 1-to-25.

This low bull-to-female ratio and the fact that many producers don't routinely do breeding soundness examinations on their bulls may be related. Bulls with unknown ability to successfully mate cows are more likely to fail during the breeding season, and as producers experience bull failure, they tend to guard against future problems by increasing the number of bulls they use.

Breeding soundness examinations of bulls prior to each breeding season are done to reduce the risk that breeding failure is due to inadequate semen volume, sperm cell fertilizing ability and semen delivery.

Although individual situations vary, national reports indicate that 10%-20% of bulls will fail a comprehensive examination.

### The exam

Breeding soundness examinations consist of a complete physical, a scrotal measurement as an indication of testicular size,

and a semen evaluation.

The physical examination includes observing the bull as he moves, while looking for inadequacies in movement, leg conformation and general body condition. Once the bull is confined, the physical examination continues by observing the eyes and teeth, noting any abnormal conformation.

During the breeding season, bulls will travel many miles per day, and sound feet and legs are essential for mating success. Foot and leg problems that are genetically transmitted, such as post-legged traits or having screw-claws, should be heavily criticized and will cause a bull to fail an exam.

Respiratory disease and other illnesses that limit a bull's sexual athleticism will cause him to fail a breeding soundness exam, as will defects or damage to the penis. While confined in the chute, the bull's scrotum and testicles should be examined. The two testicles should be the same size and should be firm, but not hard. Damage to the testicle may be detected as a softening of all or part of the testicle, one testicle being smaller or

larger than normal, or a testicle feeling hard due to scar tissue.

Measurement of scrotal circumference is done during a breeding soundness exam as an accurate predictor of testicular size and weight, and subsequent sperm output. Normal, sexually mature bulls will all produce about the same number of sperm cells per gram of testicle, but because of differences in testicular size, daily production can vary from 3 billion to more than 8 billion sperm per day in different bulls.

Puberty is defined as the age at which a bull will produce a minimum of 50 million total sperm per ejaculation. Although bulls will reach puberty at a variety of weights and ages, scrotal circumference at puberty is fairly constant [about 28 centimeters (cm)]. Bulls that have a large scrotal circumference at a young age (yearling) will reach puberty earlier than similar bulls that have smaller testicular size. Larger scrotal circumference is also associated with early puberty in a bull's daughters.

If a bull is determined to be free of noticeable problems detecting heat, finding and following females that are in heat, and mounting and delivering semen to the female reproductive tract, the next step in a breeding soundness examination is to evaluate the semen produced. In the United States, semen samples are most often collected with the aid of an electroejaculator, although other methods are also available. To keep the semen sample warm, veterinarians who are skilled at breeding soundness exams will have equipment that keeps his/her collection apparatus, slides, stain and other utensils warm.

Semen samples are examined under a microscope to determine the amount of motility and the structural correctness of the sperm cells. Motility determination serves as an indication of both the percentage of sperm that are alive and the percentage that are correctly made. If sperm cells are alive, but malformed, motility is often negatively affected.

By killing all the sperm cells in a sample (so they hold still) and then carefully examining the cells under high magnification, a skilled veterinarian can determine if a sperm cell has normal structure and, many times, if a bull with abnormal sperm is likely to improve.

**The examination will only be as accurate as the skill and equipment of the examiner; and it reflects an animal's breeding soundness only on the date tested.**

## Limitations

The limitations of a breeding soundness examination fall into three categories:

1. limitations of the procedure itself;
2. limitations due to the skill of the examining veterinarian; and
3. limitations because of the expectation and use of breeding soundness exams by cow-calf producers.

The exam procedure and scoring system is most valuable to identify those bulls that have low fertility, but it is not as good at telling the difference between average- and superior-fertility bulls. The scoring system used by most veterinarians who do examinations was developed by the Society for Theriogenology and was designed to be a minimum standard for acceptable fertility. If a producer and his/her veterinarian want to place more selection pressure on fertility, the

standards for use in the herd must be raised.

Breeding soundness examinations require good facilities and equipment to allow for thorough examination of bulls and their semen. Appropriate chutes, semen collection equipment, slide warmers, microscopes and stains are required.

A veterinarian can fail to provide a good exam if he/she is unable to adequately examine the bull to detect structural or health problems that would limit his ability to detect heat or deliver semen properly, or if he/she incorrectly interprets a semen sample when assigning a bull to either the satisfactory or unsatisfactory classifications. Misclassification of bulls is most often due to an incomplete examination.

Cow-calf producers can limit the usefulness of breeding soundness examinations by pressuring a veterinarian to

pass a bull or by purposefully selecting examiners who rarely fail bulls. It is not uncommon to find purebred bull producers who want an exam done on bulls that they merchandise, but who do not want any of their bulls to fail.

Despite their limitations, breeding soundness examinations are a proven tool to remove a high percentage of problem bulls prior to the start of the breeding season and to improve herd and breed fertility by placing selection pressure on fertility. High bull fertility is an important component of high pregnancy percentages and herd productivity.



**E-MAIL:** [rlarson@vet.ksu.edu](mailto:rlarson@vet.ksu.edu)