



# Repro Tracks

► by **Bill Beal**, beef cattle reproductive physiologist, Virginia Tech

## Breeding ability of bulls

*Selling bulls is the business of every purebred breeder. Producing and marketing bulls that have the expected progeny differences (EPDs) needed to satisfy a variety of customers and effectively evaluating bulls for breeding soundness are two of the principal requirements for success in marketing bulls. The following represent common questions posed by breeders regarding bull marketing.*

### Question No. 1

*My understanding is that a bull's fertility and the fertility of his daughters are directly related to the size of the bull's testicles. I can't understand why breeders use bulls with a small scrotal circumference (SC) or bulls that have a negative EPD value for scrotal circumference. Am I missing something, or are these people just crazy?*

**Response:** First, let's establish what scrotal circumference *is* and what it *is not*. Scrotal circumference *is* a measure of the maximum circumference around the testicles of a bull. If the bull is 1 year old or older, SC provides the most easily measured estimate of his daily sperm production. In other words, bulls with larger testicles should be expected to produce more motile, normal sperm cells.

Scrotal circumference *is not* a measurement of how capable a bull's sperm cells are of fertilizing the egg ovulated by a cow. Put another way, SC is not a measure of the bull's fertility per se. Instead, it is a measure of how many sperm cells he is likely to get to the site of fertilization.

Scrotal circumference is included in a bull breeding soundness examination (sometimes referred to as a BSE) in order to eliminate those bulls whose testicles are so small that they are unlikely to produce enough motile sperm cells to be able to successfully service a normal-size group of cows or heifers.

A secondary trait related to SC or the SC EPD of a sire is the correlation between yearling SC of a bull and the age of the bull's daughters when they reach puberty (start cycling). Simply put, bulls with larger testicles tend to sire daughters that reach puberty earlier.

However, the magnitude of this effect is rather small. A difference in actual SC of 1 centimeter (cm) between two bulls

corresponds to less than one day's difference in the average age at puberty of their daughters (0.8 to 0.9 days per cm). In other words, daughters of a bull with a 40-cm scrotum would be expected to reach puberty only seven days earlier than daughters of a bull with a 32-cm scrotum.

No doubt, reaching puberty earlier is a desirable trait. Unfortunately, big differences in the SC or SC EPDs of bulls don't translate into big differences in the age at puberty of their daughters, and SC of the sire is not related to his daughter's likelihood of becoming pregnant once she starts cycling.

Scrotal measurements and SC EPDs are most useful for breeders who wish to increase testicular size of bulls in their herd and thereby reduce the number of bulls that fail breeding soundness exams because they have small testicles. There is no evidence that a bull with larger testicles is more fertile among a group of bulls that all have adequate-size testicles to pass breeding soundness exams. However, a beneficial side effect is that selection of the bull with larger testicles hastens the onset of puberty in his daughters — a little bit.

### Question No. 2

*If a yearling bull coming off a performance feed test fails a breeding soundness exam, should he be culled or given a second chance? If you give him a second chance, how long should you wait between the tests he failed and the time he is retested?*

**Response:** The answer to this question depends heavily on *why* the bull failed the first breeding soundness exam. If he had a physical problem with his penis, his testicles were way too small or he failed the exam for soundness problems that were unlikely to improve, he should be culled (do everybody a favor). Conversely, a bull that fails because

of too few sperm in the semen collected by electroejaculation or with too many abnormal sperm in the ejaculate should probably be retested.

Some bulls do not respond well to electroejaculation (imagine that). Those bulls often fail to provide a large ejaculate or an ejaculate with the concentration of sperm cells that would occur when the bull ejaculates naturally. Hence, in that case, the electroejaculate is an underestimate of the bull's sperm-producing potential.

In general, differences in the number of sperm collected from two bulls during electroejaculation is not a good indicator of true differences in the number of sperm the different bulls may ejaculate during natural service. However, the ejaculate collected from each bull must have enough sperm for the veterinarian to feel comfortable that the bull has breeding potential.

Furthermore, there must be enough sperm cells in the sample to reliably evaluate the motility and percentage of normal sperm. It may take more than one attempt at electroejaculation for a bull to provide an adequate semen sample for evaluation.

Compounding the problem of bulls not responding well to electroejaculation is the fact that some young bulls may not have ejaculated (by masturbation) or may have ejaculated very infrequently prior to the breeding soundness exam. This results in what some physiologists call a "rusty load." Sperm that have spent an extended time in the male reproductive tract may be abnormal and may represent a higher proportion of the cells in the ejaculate if the bull has not ejaculated on a regular basis. This may result in a young, inexperienced bull producing semen with a low percentage of motile or normal sperm cells. Retesting that bull and repeating the electroejaculation procedure may result in dramatically improved semen quality.

The question of when to retest is a sensitive one. The owner trying to get a bull passed for an upcoming sale would like to retest him the next day. That is probably fruitless. I called three veterinarians who together examine more than 5,000 bulls a year. Their consensus was that retesting at a 2- to 3-week interval was most effective.

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The three practitioners each offered valuable tips:

- 1) The longer the bull has been off a feed test and the older the bull, the less likely he is to have a problem with poor-quality semen and the more likely he is to pass a second test.
- 2) For the bull that fails to produce a large enough semen sample in response to electroejaculation, manually massaging the repro tract (via the rectum) just

prior to electroejaculation during the retest may improve the volume of the semen in the ejaculate.

- 3) Bulls that have infection of the seminal vesicles or epididymis are *not* good candidates for passing a second or third test administered within two or three weeks. If these conditions are to improve, it will probably take considerably longer.



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**Editor's Note:** *Bill Beal is a beef cattle reproductive physiologist at Virginia Tech. He conducts research involving estrus synchronization, artificial insemination (AI), embryo transfer (ET) and the use of ultrasound technology. This column is designed to provide answers to questions about reproductive management commonly posed by commercial and purebred breeders. If you have questions or comments related to the reproductive management of cows or bulls, e-mail them to Beal at [wbeal@vt.edu](mailto:wbeal@vt.edu) or mail them to him at the Dept. of Animal & Poultry Sciences, Virginia Tech, Blacksburg, VA 24061-0306.*