



Repro Tracks

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

Behavior, semen quality of bulls

Managing bulls after weaning, conducting an appropriate feed test and testing bulls for breeding soundness are more difficult than most bull buyers realize. Understanding the behavior and reproductive capability of young bulls can reduce (but not eliminate) the challenge of getting a bull from weaning to the salering.

The following represent common questions posed by breeders regarding bull behavior and reproductive capability.

Question No. 1

What can be done about bulls that have been singled out by other bulls and ridden constantly? We have had this happen to two bulls. We sorted the first one, let him rest up for a week and tried putting him back in when we weighed. It didn't work. We ended up castrating him. Now, a second one has started. I would appreciate any suggestions.

Response: This problem is experienced by nearly everyone who feeds bulls. Your strategy for reintroducing the bull being ridden (let's call him the "victim") after weighing all the bulls was on the right track. The breeders and feedlot operators I asked about this all indicated reintroduction of the victim bull, without having him picked out again, was most successful when the routine of the other bulls in the pen had been changed. The change in routine provides things to occupy the group's attention other than finding a bull to ride.

One breeder noted that when bulls were clipped and had vegetable oil applied to facilitate ultrasound scanning was a good time to reintroduce a victimized bull. He explained that moving the bulls out of the pen and through the chute and applying oil changed their smell. When the victimized bull was slipped back in as the bulls reentered their pen, he smelled like all the others and was less likely to be noticed.

A feedlot operator who feeds bulls for several breeders indicated another good strategy was to work the group of bulls in an alley and move the whole group to a new pen when reintroducing the victimized bull.

There seems to be several consistent recommendations to solve this problem. Most experts indicate that the victimized bull should be left in the pen if he is just being annoyed and not physically injured. This avoids the risk of injury if he is removed and

reintroduced. All agree that if a bull is being injured by being ridden, he should be removed and allowed to recover. He should be reintroduced using the tactics described above as soon as he is sound.

None of the producers I talked to claimed 100% success at reintroducing victimized bulls. Most indicated that if they were unsuccessful after one or two tries, they simply created a separate pen for the victims and fed them separate from their contemporaries.

Question No. 2

I appreciate your articles in the Angus Journal. The article in the October 2005 issue I found especially beneficial to educate our bull customers about breeding soundness exams without providing them with too much technical data. However, in that article you did not address Class I (primary) and Class II (secondary) sperm defects. Can you describe these defects and explain the effect they have on fertility?



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Response: The sperm defects you refer to are more commonly called sperm abnormalities. Specifically, abnormal sperm are those sperm cells that appear to have an abnormal shape (morphology).

Abnormalities of the shape of the sperm cell head are referred to as primary abnormalities. They have long been considered more detrimental to fertility and less likely to disappear. Primary abnormalities are caused by irregular spermatogenesis, the process in which the DNA is packaged into the head of the sperm cell.

Secondary abnormalities involve abnormal shape of the tail, which is remodeled and acquires the ability to become motile in the epididymis, a sperm storage organ outside of the testis. Abnormal function of the epididymis can be caused by environmental factors; hence, the appearance of secondary abnormalities is usually considered more likely to be a transient event that may improve with time.

There is no clear experimental evidence to show how much of a reduction in fertility is caused by specific types of abnormal sperm. However, a high frequency of abnormal sperm in the ejaculate has been associated with reduced fertility. Most abnormal sperm never reach the egg and are incapable of achieving fertilization. However, if the rate of abnormal sperm inseminated is low, but the total number of sperm inseminated is high, the normal sperm can compensate for the small number of abnormal sperm, and bull fertility can be normal. This is why many sperm abnormalities are classified as "compensable factors."

Unfortunately, some abnormalities cannot be compensated for by increasing the number of sperm that are inseminated. This results when the disruption in the shape of the head or tail is so subtle that an abnormal sperm completes fertilization, but the embryo formed does not have the ability to maintain a pregnancy. Having a high proportion of such abnormal sperm in the ejaculate of a bull is referred to as an "uncompensable factor." Microscopic evaluation does not necessarily allow the identification of these uncompensable abnormalities. However, the higher the rate of total abnormal sperm in the ejaculate, the

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more likely the presence of abnormal sperm that will reduce fertility. These sperm cannot be compensated for by increasing the number of sperm inseminated.

The Society for Theriogenology publishes guidelines for bull breeding soundness exams (sometimes referred to as BSEs). The cutoff for acceptable semen collected from a bull is 30% abnormal sperm, or put another way, the ejaculate must have at least 70% normal sperm. This level was chosen after reviewing

research results that indicated having a greater number of abnormal cells would significantly increase the risk of incurring the detrimental effects on fertility associated with the uncompensable sperm abnormalities described above. Bulls that produce ejaculates with more than 30% abnormal sperm cells are poor risks as potential breeders and should not be sold. However, remember that the production and maturation of sperm is a dynamic process and can change. Bulls that fail a semen evaluation should be re-evaluated after two to four weeks to confirm their status.



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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 Dr. Beal at wbeal@vt.edu or mail them to him at the Dept. of Animal & Poultry Sciences, Virginia Tech, Blacksburg, VA 24061-0306.