Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 208

2004

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CHANGES IN BREEDING SOUNDNESS EVALUATION DURING A BREEDING SEASON

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Summary

Breeding-soundness evaluations are a common tool in the beef industry to test a bull's potential fertility. These evaluations place a bull into one of three categories: satisfactory, unsatisfactory, or deferred. These categories only refer to the bull at a specific time, and his status can and will change over time. The purpose of this report is to explain and demonstrate the changes in a bull's breeding-soundness evaluations during a breeding season.

Introduction

Reproductive management of a cattle herd has many different components. Most of the emphasis is placed on female reproduction. Non-pregnant cows are typically culled from herds. If artificial insemination is not used, then the "bull power" of the herd is responsible for ensuring that cows are bred. Because 95% of the beef cows in the United States are bred by bulls, bull fertility is a substantial area for reproductive management.

The most common tool of reproductive management of bulls is a breeding-soundness evaluation just before the beginning of the breeding season. The components of a breeding-soundness evaluation provide a picture of potential fertility at that time. The most common components of a breeding-soundness evaluation include a general physical exam, an examination of the male reproductive tract, assessment of semen, and a measurement of size of the testes. The breeding-soundness evaluation should be performed by a qualified veterinarian. The Society for Theriogenology, a veterinary society that specializes in animal reproduction, has set guidelines to standardize the results of breeding-soundness evaluations. These guidelines are research-based, minimum standards that give producers fertility criteria for selection of bulls.

The examination of the reproductive tract typically includes a trans-rectal examination of internal organs to ensure that there are no problems that will affect the bull's performance. The exam also looks at the external genitalia because, if a bull cannot extend and obtain an erection, he will not be able to breed any cows. Palpation of the testes is also performed to ensure that there are no problems or injuries.

A sample of semen is obtained from the bull. The sample is evaluated for individual motility (the percentage of sperm that are moving forward). A recommended minimum threshold for motility is 30%, which is termed "fair" (Table 1). Morphology (structural correctness of the sperm) is also evaluated. The minimum threshold for structural correctness is 70%. Neither non-motile sperm nor sperm with incorrect morphology are likely to fertilize an egg.

An evaluation of scrotal circumference is used to predict the bull's sperm production. In yearling bulls, scrotal circumference is associated with the age that the sire's heifer progeny will attain puberty. These factors have led to standards of acceptability (Table 2).

The combination of evaluations will result in a category rating of Satisfactory, Deferred, or Unsatisfactory. A satisfactory rating means that a bull has passed all of the minimum requirements just stated. An unsatisfactory rating indicates the bull did not pass at least one of the minimum requirements and is not likely to recover normal fertility. Deferred ratings are used to describe bulls that do not fit into either of the other two categories, and for which subsequent testing will be required before the bull can be classified as satisfactory or unsatisfactory.

As previously stated, the breeding-soundness evaluation provides a picture of potential fertility at a point in time. It does not mean that, once a bull has been deemed acceptable, he remains acceptable throughout the breeding season. To illustrate this point, bulls used in the commercial cow herd were subjected to a breeding-soundness evaluation before, during, and at the end of the breeding season.

Experimental Procedures

At the beginning of the 2003 breeding season, 12 bulls exposed to cows were subjected to a breeding-soundness evaluation. Four bulls were purchased at the beginning of the breeding season and had previously undergone a breeding-soundness evaluation. The bulls were rechecked during the breeding season, and were checked again at the conclusion of the breeding season (Figure 1).

Results and Discussion

Two bulls received an unsatisfactory rating at the start of the breeding season and were sold. One bull received a deferred rating and passed when rechecked two weeks later. This illustrates the need for every bull to be tested before the breeding season.

The testing in the middle of the breeding season yielded three bulls with a deferred rating. One of these bulls (No. 364) had a dilute semen sample that could not be evaluated. This is not uncommon for bulls "in work" because of frequent breeding. Bulls that received a deferred rating were not rechecked until the end of the breeding season.

At the conclusion of the breeding season, three bulls again produced deferred ratings. Interestingly, one bull that was deferred in the middle of the breeding season was deferred at the end of the breeding season. These results demonstrate how the fertility of the bull can change in a relatively short time (Figure 2).

Such variations between breeding soundness evaluations can be attributed to a number of factors. The environment can potentially play a key role in fertility. A bull's fertility can be affected by both hot and cold temperatures. Although the bull has many mechanisms to regulate the temperature of the testes, extremes on either end of the spectrum can cause problems. This breeding season occurred during the summer months, and hot temperatures may have affected the bulls' fertility results. Heat and cold stress, unless severe, usually do not cause permanent sub-fertility.

Another factor that could possibly play a role in variations between exams is injury or sickness. Injuries to the scrotum, testes, or internal reproductive organs will affect fertility. Sickness can also play a role in fertility. A fever will change the bull's temperature, and can cause damage to sperm. These conditions are not typically permanent, but may render a bull sub-fertile for a period of time. If a bull sustains an injury to his penis or testes, however, unsatisfactory fertility may be permanent.

A bull's fertility is a constantly changing condition. A breeding-soundness evaluation

is an extremely useful tool for determining the breeding potential of a bull, but it is important to realize that these evaluations are just a picture in time of the workings of the bull's reproductive tract.

Table 1. Guidelines for Sperm Motility and Rating from a Breeding-Soundness Evaluation[a]

Mass Activity	Rating	Individual
Rapid Swirling	Very Good	70%
Slower Swirling	Good	50-69%
Generalized Oscillation	Fair	30-49%*
Sporadic Oscillation	Poor	<30%

Adapted from BIF Guidelines.
*A minimum recommended motility is 30% or Fair.

Table 2. Minimum Recommended Scrotal Circumference

Age	Scrotal Circumference, cm
15 months	30
>15 <18 months	31
>18 <21 months	32
>21 <24 months	33
>24 months	34

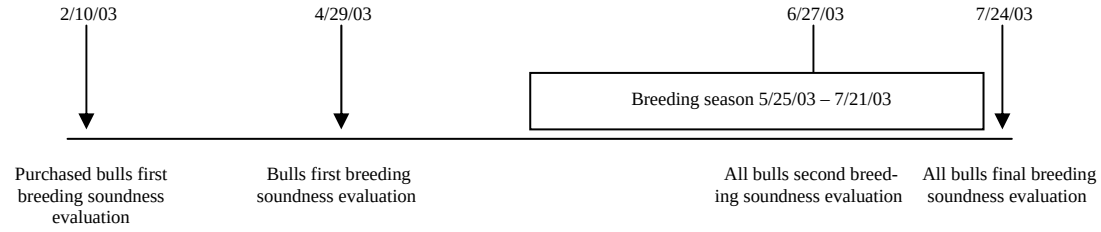

Figure 1. Timeline of Breeding-Soundness Examinations in Relation to the Breeding Season.

Bull ID	Rating at the Beginning of the Breeding Season	Rating in the Middle of the Breeding Season	Rating at the End of the Breeding Season
202	Satisfactory	Deferred	Satisfactory
10M	Satisfactory	Satisfactory	Satisfactory
15	Satisfactory	Satisfactory	Satisfactory
102	Satisfactory	Satisfactory	Deferred
418	Satisfactory	Satisfactory	Satisfactory
205	Satisfactory	Deferred	Deferred
599	Satisfactory	Satisfactory	Satisfactory
0030	Satisfactory	Satisfactory	Deferred
0041	Satisfactory	Satisfactory	Satisfactory
391	Deferred*	Satisfactory	Satisfactory
364	Satisfactory	Deferred	Satisfactory
204	Satisfactory	Satisfactory	Satisfactory

*Rechecked and passed breeding-soundness evaluation.

Figure 2. Breeding-Soundness Evaluation Ratings Across the Breeding Season.