

Bull Breeding Soundness Evaluation and Venereal Disease Testing

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Introduction

The bull has a single primary mission: that is to impregnate all females he is exposed to as soon as possible after introduction to them. He is a sexual athlete and as such must be in top physical shape, have functional reproductive equipment, strong sex drive and fertile spermatozoa of sufficient quantity to deliver on demand.

Reproductive performance of the natural-service-beef-cow herd is dependent on healthy, breeding sound bulls. Failure to properly screen and select herd sires will affect over all herd performance. A standardized bull assessment should include: review of bull production parameters, performance of a breeding soundness evaluation and venereal disease testing.

This paper will focus on the breeding soundness evaluation and venereal disease testing

Breeding Soundness Examination (BSE)

Introduction

In order to establish a method of standardized evaluation, the Society for Theriogenology, 1992, developed guidelines for breeding soundness evaluation. Breeding soundness evaluation is a production tool. In herds where BSE screened bulls are used, increases of 5 to 10% in pregnancy percentages have been observed (Table 1). The breeding soundness evaluation traditionally consists of: a physical examination, a reproductive examination, collection and examination of semen. Specific components are described below.

The Breeding Soundness Examination:

- identification and history
 - identify the bull and provide pertinent descriptive information
 - determine previous breeding and health history.
- structural soundness and physical exam
 - body condition score
 - eyes
 - feet and legs
 - wounds and physical defects
 - generalized signs of disease
- rectal exam of internal genitalia
 - accessory sex organs
 - prostate, seminal vesicles, ampulla, inguinal rings
 - assessment for
 - size, shape, consistency
- external genitalia
 - scrotum, testes
 - spermatic cord, epididymies
 - penis/prepuce (sheath)
- scrotal circumference
 - measurement of circumference

Minimum recommended scrotal circumference

| <i>Age (months)</i> | <i>Circumference (cm)</i> |
|---------------------|---------------------------|
| ≤15 | 30 |
| ≥15 to ≤18 | 31 |
| ≥18 to ≤21 | 32 |
| ≥21 to ≤24 | 33 |
| ≥24 | 34 |

- semen evaluation
 - motility (how rapidly do the sperm move)
 - gross (as a mass or group)
 - individual (as individual sperm)

| Motility thresholds | |
|---|---------------|
| <i>Mass activity (Gross motility)</i> | <i>Rating</i> |
| Rapid swirling | Very good |
| Slower swirling | Good |
| Generalized oscillation | Fair |
| Sporadic oscillation | Poor |
| Minimum recommended threshold- Fair | |
| <i>Progressive motility (%)</i> | <i>Rating</i> |
| ≥70% | Very good |
| 50 - 69% | Good |
| 30 - 49% | Fair |
| ≤30% | Poor |
| Minimum recommended threshold- 30% | |
| ○ morphology (shape and form) | |
| - % normal | |
| - % primary abnormalities | |
| - % secondary abnormalities | |
| - other cells- WBC, RBC, etc | |
| The minimum recommended threshold for sperm morphology is 70% normal spermatozoa. | |

Classification of Breeding Potential

At conclusion of the breeding soundness evaluation, an assessment is made as to the breeding potential of the bull. This classification consists of three categories: satisfactory, unsatisfactory or deferred.

Satisfactory- bulls equal to or surpassing the minimum thresholds for scrotal circumference, sperm motility and sperm morphology, and which do not show genetic, infectious or other problems or faults which could compromise breeding or fertility.

Unsatisfactory — bulls which are below one or more thresholds and which are highly unlikely to ever improve their status. Also, bulls which show

genetic faults or irrevocable physical problems (including infectious disease) which would compromise breeding or fertility.

Deferred — bulls which do not fit into the above categories and which may benefit from a retest. This includes bulls which are substandard but have the capability to improve. (Usually, a reexamination test date is suggested).

Note: It is not uncommon for yearling bulls to exhibit higher levels of certain types of spermatozoal abnormalities which are associated with immaturity. Such bulls will usually require a second examination before being classified as a satisfactory potential breeder.

Note: Pregnancy percentages can be profoundly affected when a dominant bull (or bulls) in a multi sire breeding herd is infertile. Older bulls tend to be more dominant and may have lowered fertility following a number of years of use. Dominance and fertility are not related, neither are dominance and sex-drive.

Preputial Sampling and Culture for Venereal Diseases

Our two greatest reproductive disease concerns are the contagious, venereal, post-breeding diseases trichomonas and campylobacter (or vibriosis).

Tritrichomonas foetus

- Protozoa
 - very sensitive to environmental conditions
 - found only in the genital tract of the bull or cow.
- Transmission
 - almost exclusively venereal

Campylobacter fetus venerealis (vibrio)

Bacteria

- sensitive to heat, light and drying, but may survive in manure or hay for up to 3 weeks.

- found generally, only in the genital tract of the bull or cow.
- Transmission
 - almost exclusively venereal

Sampling Technique

- the bull is restrained to prevent injury (to the bull or personnel)
- the external preputial area is cleaned
- a pipette is introduced into the fornix of the bull's prepuce (10 - 12 inches)
- smegma is collected by a combination of scraping and aspiration using an attached disposable syringe.
- the AI pipette is removed and the smegma immediately placed into culture media.
- the culture media used is specifically prepared for growing either the *T. fetus* or *Campylobacter*.
- the tip of the pipette is inserted into the liquid media and inoculated (~0.5 cc)
- the sample is placed in an insulated container until it reaches the lab.
- at the laboratory the samples are incubated at 37 degrees Centigrade.
- samples are read under a microscope on three occasions after inoculation:
 - 24, 48, and 96 to 120 hours.
- test positive bulls should be culled immediately.
- a test negative bull from a herd with no previous history of disease has a high likelihood of being negative. Further testing may be necessary to confirm a negative state.

Conclusion

It is recommended that producers consider the following as routine management procedures for herd bulls:

- perform a breeding soundness evaluation on all bulls each year;
- immunize all bulls pre breeding against campylobacter (vibrio), leptospira, as well as, all other agents for which the mature cow herd is immunized;
- test bulls, especially older bulls, for trichomonas and vibriosis prebreeding;
- employee homogenous groups of younger bulls in mult sire groups;
- cull older bulls (e.g. >8 years of age), unless of particular value genetically. In such cases, single sire breeding groups or hand mating should be used.

Implementing these management procedures and practices will provide you the best assurance that your natural service sires are able to perform as the sexual athletes they are.

References

- Chenoweth PJ, Bailey T, Bull breeding soundness- new criteria, Proc Annual Meeting Society for Theriogenology, Aug 1992.
- Chenoweth PJ. Reproductive management of bulls, unpublished class notes, 1994.
- Wiltbank JN. Challenges for improving calf crop. In: Fields MJ, Sand RS (eds), Factors Affecting Calf Crop, Boca Raton, FL, CRC Press, Inc., 1994;7.

Table 1. Differences in fertility in bulls selected for semen quality.

| | <i>Random bull group</i> | <i>Selected bull group</i> | <i>Difference</i> |
|-----------------------|--------------------------|----------------------------|-------------------|
| Cow breeding group | | | |
| Number of cows | 655 | 675 | |
| Bull to cow ratio | 1:25 | 1:25 | |
| Pregnancy | 87 | 93 | 6 |
| Heifer breeding group | | | |
| Number of heifers | 1282 | 1372 | |
| Bull to heifer ratio | 1:25 | 1:25 | |
| Pregnancy percentage | 85 | 90 | 5 |

Wiltbank and Parish (1986), Table 1-11, Factors Affecting Calf Crop, 1994. Selected bull group had 70% or more normal sperm. Differences are significantly different at $P < 0.001$.

NOTES: