Effective use of Breeding Soundness Examination to Maximize Stallion Fertility and Progeny Quality

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ABSTRACT

The breeding soundness examination (BSE) is crucial for the fertility of the stallion and quality of the progeny. This article covers the detailed sequence of the breeding exam. It starts with the study of the breeding records and any reproductive concerns related to the breeding. Optimal stallion fertility and high-quality progeny depend on the breeding soundness assessment (BSE). This article highlights BSE's holistic approach, which includes several important aspects. Starting with a thorough stallion reproductive history and precise identification is the analysis's foundation. This includes breeding records, reproductive issues, and pedigree evaluation. BSE entails a complete general physical examination of the stallion to determine its health and conformation. Genitalia and reproductive organs are then examined. Libido and mating behavior are important because a stallion's sexual drive affects breeding success. Sperm analysis requires semen collection and assessment. Sperm quantity, quality, and motility are assessed using advanced methods.

1. Introduction:
The goal of the Breeding Soundness Exam for Stallions is to evaluate the stallion's health and temperament to ensure that it can generate an adequate quantity of healthy sperm for artificial insemination or natural mating without transmitting infectious diseases [1]. There are four stages of testing that determine whether or not a stallion will be used for breeding:

- Reproductive history and identification of the stallion
- General physical exam
- External and internal reproductive examination
- Observation of libido and mating behaviour
- Semen collection and evaluation

2. History and identification of the stallion:
Before conducting an examination, it is imperative to ensure that each stallion is accurately and affirmatively recognized. This entails recording essential information such as the stallion's registration identity and number, age, and breed. It is important to document various distinguishing characteristics of a stallion, such as coat color and markings, lip tattoos, microchip details (if applicable), body branding, hair whorls, permanent scars, and any other distinctive traits. The addition of a digital image into the permanent medical record has potential value. The objective is to establish a reliable association between the outcomes of a breeding soundness examination (BSE) and a particular stallion, enabling future identification if required [2]. It is important to have a comprehensive breeding history in order to assess a stallion's prior fertility level, since past breeding outcomes, including conception and foaling rates, serve as the most reliable indications. The data collected includes the quantity and categorization of mares bred throughout each reproductive cycle, including maiden mares, barren mares, and foaling mares. Additionally, the breeding technique used is documented, which encompasses hand breeding, pasture breeding, as well as artificial insemination using fresh, chilled, or frozen semen [3]. The findings from prior to reproductive assessments, medical ailments, immunization records (particularly for horse arteritis virus), and other pertinent details are documented. Additionally, it is crucial to document the planned future use of the stallion and the estimated number of mares for the next season, as this information has significance in providing breeding management advice [2].

3. General physical exam:
It is recommended that a comprehensive physical checkup be conducted on every stallion. The recording of the general body condition score of stallions is equally crucial as it is for mares. The recommended body score for stallions typically falls within the range of 5 to 6, however this may vary depending on the specific breed, such as quarter horses or draft horses [8]. Fertility requires the successful engagement of the stallion in copulation with estrus mare [4]. This involves mounting the mare, inserting his penis into her vagina, executing suitable thrusting movements, and ultimately achieving total ejaculation [5]. It is important to identify musculoskeletal abnormalities, such as concerns with the back, hock, or lameness, as well as neurologic disorders that may hinder the capacity to engage in mating [6]. Along with mating ability of the stallion, other medical conditions are also assessed such as any congenital or heritable disorder, serum evaluation of equine arteritis virus, coggins test, and cultures for contagious equine metritis [7].

4. External and internal reproductive examination:

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5. Observation of libido and mating behaviour:
The sexual drive of stallion, when stimulated by a female horse in estrus, and its capacity to achieve and sustain an erect state, are recorded [2]. Following this, the capacity to mount a mare or utilize a breeding apparatus, insert the penis into the mare or an artificial vagina, engage in thrusting movements, and successfully achieve ejaculation are all thoroughly observed [Figure 2]. The concept of libido can typically be classified into good or bad categories. Furthermore, it is possible to categorize it within a numerical scale ranging from 0-4, contingent upon several parameters such as the stallion’s age, overall health, exercise level, and environmental conditions [11]. A score of zero indicates a significantly diminished level of libido, while a score of four indicates the highest level of libido. [Table 1]. An ideal stallion with desirable mating behavior should have a good libido, demonstrate efficient mounting ability within a timeframe of 10 seconds, achieve ejaculation upon the initial mount, and complete the full breeding process within a duration of approximately 5 minutes [Figure 3].

![Figure 2. Mounting of a stallion on mare in natural breeding.](https://biologicaltimes.com/)

**Table 1. Categorization of libido of stallions.**

<table>
<thead>
<tr>
<th>Score</th>
<th>Libido</th>
<th>Interpretations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absent or extremely low</td>
<td>The stallion has minimal desire for mating and displays indications of disinterest or potential impotence.</td>
</tr>
<tr>
<td>1</td>
<td>Very low</td>
<td>Stallion may exhibit intermittent indications of interest in engaging in mating, although demonstrates a lack of zeal or regularity in its sexual actions.</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>The stallion exhibits a moderate degree of interest in mating and engages in sexual behaviors, but without excessive intensity or frequency.</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>Stallion continuously exhibits a high level of interest in reproductive activities, frequently taking the initiative to engage in sexual behaviors and demonstrating notable enthusiasm.</td>
</tr>
<tr>
<td>4</td>
<td>Maximum</td>
<td>The stallion exhibits a notable desire for mating, characterized by a strong and unwavering nature, accompanied by intense enthusiasm and frequent engagement in sexual behaviors.</td>
</tr>
</tbody>
</table>

6. Semen collection and evaluation:
The evaluation of semen encompasses several parameters such as volume, color, sperm concentration, and motility.

**Volume:** Pre-collection teasing has been observed to potentially enhance the overall volume of ejaculate, however, it has no discernible impact on sperm count. The overall volume of ejaculate is reduced during the winter season compared to the summer season. The estimation of sperm concentration requires consideration of the gel-free volume, which ideally falls within the range of around 15-150ml in concentration which is highly variable compared to the summer season. The estimation of sperm concentration count. The overall volume of ejaculate is reduced during the winter season, however, it has no discernible impact on sperm functionality and viability.

**Sperm concentration:** The determination of sperm concentration can be achieved through two methods: the Hemacytometer and the Densimeter. The Hemacytometer is a direct and cost-effective technique that, despite being time-consuming, does not encounter issues related to discoloration. On the other hand, the Densimeter is capable of accurately measuring concentrations within the range of greater than 100 or less than 300 million sperm. However, this method is susceptible to challenges posed by discoloration or debris. The normal range for stallions is 4-12 billion sperm per ejaculate [7].

**Sperm motility:** The evaluation of sperm motility is conducted using a percentile scale, which takes into account both the percentage of motile sperm and their velocity, ranging from 0 to 4 [Table 2]. This scale classifies sperm movement from no movement to rapid movement. The ideal level of motility necessary for a high-quality semen sample is a minimum of 10% motile sperm out of the total concentration. This applies to both raw semen preserved for up to 6 hours and prolonged semen stored for up to 24 hours. In addition, the evaluation of motility involves the preparation of a slide through semen dilution, followed by microscopic examination [7].

![Figure 3. Ideal mating behaviour characteristics of stallion.](https://biologicaltimes.com/)

**Table 2. Motility velocity of stallion sperm.**

<table>
<thead>
<tr>
<th>Score</th>
<th>Sperm movement</th>
<th>Interpretations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No movement</td>
<td>Spermatozoa exhibit a lack of movement, rendering them entirely stationary.</td>
</tr>
<tr>
<td>1</td>
<td>Very slow movement</td>
<td>Sperms demonstrate limited or irregular motility, which falls significantly below the accepted standard.</td>
</tr>
<tr>
<td>2</td>
<td>Slow movement</td>
<td>Spermatozoa exhibit movement, but their motility is significantly diminished and characterized by suboptimal efficiency.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate movement</td>
<td>Sperms demonstrate a moderate level of motility characterized by motions that are neither sluggish nor rapid, aligning with the typical range.</td>
</tr>
<tr>
<td>4</td>
<td>Rapid movement</td>
<td>Sperms exhibit vigorous and fast motility, which suggests a heightened degree of sperm functionality and viability.</td>
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7. Conclusion:
An optimal Breeding Soundness Examination (BSE) encompasses a comprehensive evaluation of the stallion’s reproductive history, thorough physical tests, thorough behavioral assessments, and diligent semen evaluation. The implementation of this holistic method has the potential to promote stallion fertility, hence resulting in improved progeny quality. This, in turn, contributes to the sustained success of equine breeding operations.

**References**


