Breeding Soundness Examination and Management of Bulls

Dr Sukhwinder Singh Dhillon
Khalsa College of Veterinary & Animal Sciences

The breeding bullexamination is one of the most criticalaspects of cattle herd management.While, a cow influences one calf per year, a single bull can be responsible for siring 25-50, or even more calves in a single season. A bull contributes 50% of the genetics to every calf born. Therefore, a sub-fertile or infertile bull is not just an individual failure; it is an economic disaster waiting to happen, leading to a high number of open cows, a protracted calving season, and a non-uniform calf crop.

Examination of bullsfor breeding soundness, therefore,is a commonly acceptedpractice by breeders offering young bulls for sale and by commercial dairy farm owners as a pre-breeding evaluation of their existing herd sires.

The Breeding Soundness Evaluation (BSE)

A breeding soundness evaluationis a standardized, systematic veterinary examination designed to predict a bull's ability to get a satisfactory percentage of cycling cows pregnant in a defined breeding season.

When should a BSE be performed?

- **Pre-purchase:** Never buy a bull without a satisfactory BSE certificate.
- **Pre-breeding Season:** Ideally 30-60 days before turning the bull out with the cows. This window allows time to replace a failed bull or for a "Deferred" bull to recover.
- **Post-breeding Season:** To assess any potential injuries or health issues that arose during breeding

Components of a BSE

A complete BSE has four main considerations:

1. **Physical Examination:** This is a general health check from nose to tail.
2. We are looking for any condition that could prevent the bull from physically seeking out and mounting a cow.

- **General Health:** Assess Body Condition Score (BCS). The ideal BCS is 6 on a 9-point scale. Bulls should be fit, not fat. Obesity can lead to reduced libido and heat intolerance.
- **Structural Soundness (Feet & Legs):**This is critical for mobility. Check for corkscrew claws, foot rot, arthritis, and any signs of lameness. A bull with painful feet will not travel to find cows in estrus.
- **Eyes & Teeth:** Check for pinkeye, cancer eye, or any vision impairment. A bull needs to see a cow in standing heat. Check teeth for proper grazing ability.

2. Reproductive Tract Examination: This is a detailed assessment of the bull's reproductive organs.

- **Scrotum and Testicles:**
- The testes on palpation should be firm, symmetrical, and move freely within the scrotum. Any softness, lump or significant size difference is a red flag.
- Scrotal Circumference (SC)is one of the most important measurements. A larger SC is highly correlated with higher sperm production volume and earlier age of puberty in his daughters.
- Minimum Recommended Scrotal Circumference varies by breed, but general guidelines are**:**

Age (months)	Minimum SC (cm)
≤ 15	30 cm
> 15 to 21	31 cm
> 21 to 30	32 cm
> 30	34 m

- **Internal Organs (via Rectal Palpation):**
- Vesicular glands (Seminal Vesicles) should be soft and lobulated. Infection (vesiculitis) makes them firm and painful.
- Ampullae, the terminal parts of the vas deferens should be palpated to assess their condition, whether they are enlarged, inflamed, or otherwise abnormal.
- Prostate gland should feel like a firm ring.
- **Penis and Prepuce:**
- The penis is exteriorized during to check for any injuries, scar tissue, warts (fibropapilloma), persistent frenulum, or signs of "corkscrew" or "rainbow" deviation.

3. Semen Evaluation: This step assesses the quality of the "product." Semen is typically collected via artificial vagina by mounting the bull on a dummy or by electroejaculation and is assessed for:

- **Gross Motility:** A drop of neat semen is placed on a warm slide and observed without a coverslip at low power (100x). We are looking for a generalized "swirl" or "wave motion," indicating a high concentration of progressively motile sperm.
- **Individual Motility:** A drop of semen is diluted with a warm extender, a coverslip is added, and it's viewed at high power (400x). We assess the percentage of sperm that are moving in a rapid, straight line (Progressive motile).The environments in which BSE are done are variable, and there is a high chance of temperature shock to sperm before they may be evaluated. Therefore, > 30% individual progressive motility, or fair gross motility, is considered threshold for an acceptable prospective breeder. If the examination is performed **under optimal conditions**, a minimum of 60% motility for a bull to be classified as a satisfactory potential breeder.
- **Sperm Morphology:** A semen smear is stained and examined under oil immersion (1000x). At least 100 sperm cells are counted and categorized as normal or abnormal. A minimum of 70% normal morphology is required to pass. Abnormalities are classified as:
  - **Primary Abnormalities:** Occur during sperm production in the testis (e.g., pear-shaped heads, coiled tails). These are more serious.
  - **Secondary Abnormalities:** Occur during maturation or storage in the epididymis (e.g., detached heads, bent tails).

4. Libido & Mating Ability (Optional but Recommended): A bull can pass the first three criteria and still have no desire to breed (low libido). This is a behavioural test where the bull is observed with restrained, estrus females to see if he has the drive and physical coordination to successfully mount and serve.

Based on the BSE, a bull is classified as:

- **Satisfactory Potential Breeder:** The bull has passed all minimum thresholds for physical soundness, scrotal size, and semen quality.
- **Unsatisfactory Potential Breeder:** The bull fails to meet the minimum requirements and is unlikely to improve. These bulls should be culled.
- **Decision Deferred:** The bull fails to meet a minimum standard, but the condition is likely temporary (e.g., a young bull who will mature, a temporary illness, or recent heat stress). The bull should be re-tested in 30-60 days.

Management of the Breeding Bull

A satisfactory BSE is just a snapshot in time. Proper year-round management is essential to ensure the bull remains a valuable asset.

1. **Nutrition Management:** A bull's nutritional needs change throughout the year. The goal is to maintain a BCS of 5-6.

- **Pre-Breeding (60-90 days prior):** This is the conditioning phase. Provide high-quality forage and supplement with a concentrate feed to ensure he is gaining condition to reach a target BCS of 6. This period is critical as the sperm production cycle (spermatogenesis) takes about 60 days.
- **During Breeding:** A bull can lose up to 100 kg of body weight during a heavy breeding season. Ensure access to excellent green fodder or supplemental feed and a reliable source of minerals.
- **Post-Breeding/Off-Season:** Allow the bull to recover lost condition, but do not let him get fat. A diet based on good quality forage is usually sufficient. Over-fattening (BCS > 7) can impair future fertility.

2. Health & Disease Control:

- **Vaccinations:** Establish a vaccination protocol against key reproductive diseases like IBR, BVD, Leptospirosis, and Vibriosis (Campylobacteriosis). Also include Clostridial diseases (e.g., Blackleg).
- **Parasite Control:** Implement a strategic deworming program for internal parasites. Control external parasites like flies and ticks, which cause stress and can transmit disease.
- **Biosecurity:** Always quarantine new animals for at least 30 days. Test new bullsfor Brucellosis, Trichomoniasis, Vibriosis and others before introducing them to the herd.

3. Environmental Management:

- **Heat Stress:** High ambient temperatures (especially in climates like Punjab) can severely impact fertility for up to 60 days. Always provide access to shade and clean, cool water. Avoid working or transporting bulls during the hottest part of the day.
- **Housing:** Provide a well-drained, dry area. Muddy, wet conditions can lead to foot rot.
- **Safety:** Bulls are dangerous animals. Ensure fences, pens, and handling facilities (chutes, headgates) are strong and in good repair. Always handle bulls with caution and respect.

4. Breeding Season Management:

- **Bull-to-Cow Ratio:** Do not overwork your bulls, especially young ones.

Bull Age	Recommended Number of Cows
12-15 months (Yearling)	10-15 cows
24 months (2-year-old)	20-25 cows
Mature Bull (3+ years)	25-40 cows

- **Monitoring:** Regularly observe the bull for signs of lameness, injury, or significant weight loss. More importantly, watch the cows. If you see a large number of cows returning to heat after 21 days, the bull may have a problem.

The bull is the primary driver of herd fertility and genetic improvement. Investing in a thorough annual BSE is not an expense; it is insurance against a failed breeding season. Combining this evaluation with a comprehensive, year-round management plan focusing on nutrition, health, and environment will ensure that bull can perform his vital role effectively, season after season. A sound bull is the cornerstone of a profitable cattle operation.