Bull Breeding Soundness Evaluation

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BULL BREEDING SOUNDNESS EVALUATION (B.B.S.E.)

- General Physical Examination
- Reproductive Examination
- Semen Evaluation
- Libido/Serving Capacity
- Specific Diagnostic Tests
- Classification/Report

Prevalence of infertility factors as % total population – (Barth 2005)

- Low serving capacity 15.8%
- Poor semen 14.4%
- Small testicles 6.2%
- Physically unsound 3.8%
The Bull Reporter Package
THE AIM IS TO FOLLOW A SET ROUTINE

- STANDARD ASSESSMENT OF THE BULLS REPRODUCTIVE ABILITY APPROPRIATE TO THE CIRCUMSTANCES
- STANDARD INTERPRETATION OF RESULTS
- STANDARD FINAL CLASSIFICATION
- AVOID INDUSTRY CONFUSION
LIMITATIONS

- IT IS ONLY MEANT TO BE A SCREENING PROCEDURE
- THERE ARE MANY FACTORS BEYOND OUR CONTROL AND UNDERSTANDING
- ACCLIMATISATION REQUIREMENTS OF PURCHASED BULLS
- THE TEST MUST BE PRACTICAL AND ECONOMICALLY VIABLE
- FUTURE TESTS COULD INCLUDE – GENE MARKERS (LIBIDO), GnRH STIM TESTS FOR PREPUBERTAL BULL SELECTION, PROTEOMICS
### Data Reporting

#### Evaluating and reporting bull breeding soundness

**Definitions**
- **Fertile**: Fertile bulls can impregnate (pregnant at day 42 of gestation) by natural service at least 60% and 90% of 50 normal, cycling, disease-free females within 3 and 9 weeks, respectively.
- **Sub-fertile**: Sub-fertile bulls can achieve pregnancies by natural service, but not at the rate achieved by fertile bulls when opportunity exists. Bulls that cannot achieve pregnancies by natural service, but can produce viable semen for artificial breeding, are also sub-fertile.
- **Infertile**: Infertile bulls cannot achieve pregnancies.

#### Components of bull fertility

- **Scrotum**: Scrotal circumference in cm where testes shape is within normal range. Reference standards are available.
- **Physical**: Within the constraints of a standard examination, there is no evidence of any physical condition indicating sub-fertility or infertility.
- **Semen**: Crush-side assessment indicates within normal range for fertile bulls and is suitable for laboratory evaluation.
- **Morphology**: High-magnification microscopy of preserved sperm shows minimum proportions have shape (morphology) indicating normal function.
- **Serving**: The bull is able to serve normally as demonstrated in a standard test and shows no evidence of fertility-limiting defects.

#### Report indicators

Detailed data is reported as either: Actual measurements, Yes/No, Normal/Abnormal, or on a 5-point scale as described in the published standards. Summary reports indicate:

- ✓ For this component, the bull met fertility standards as published by the Australian Association of Cattle Veterinarians
- ✗ The bull did not meet the standards for this fertility component
- P For "Morphology" only: The samples taken do not meet full standards but indicate that the bull is very likely to be fertile under natural mating. The client should seek advice from their cattle vet.
- na Not applicable, eg. Certificate not required to indicate status for this fertility component
- nt This fertility component was not fully tested/evaluated

#### Using a Bull Breeding Soundness Evaluation (BBSE) report

The report indicates likely fertility status at the time of testing the bull and partially helps predict the ideal of whether a bull can seek out oestrus females, mate them repeatedly, impregnate them with good quality semen, and is free of transmissible diseases. The published standards have been selected as the best indicators, but are not a guarantee that the bull is either fertile, sub-fertile, or infertile.

The BBSE report applies to the date of the examination and no responsibility can be taken for any subsequent events that may contribute to the ability of the bull to breed satisfactorily or otherwise. In consultation with a cattle vet, clients consider all aspects of bull fertility when requesting an examination and choose whichever evaluation procedures will best minimise the risk of herd sub-fertility or infertility due to bull failure, or are necessary to meet specific transaction requirements.

The report can only indicate whether bulls meet thresholds for the traits measured based on objective measures and professional judgement of the cattle vet. Overall judgement of a bull as fertile or sound is not appropriate. However, bulls may be deemed sub-fertile or infertile if the BBSE detects indicators of this. A prognosis (predicted future status) based on detailed data collected may be provided where thresholds are not achieved or there are other indicators of sub-fertility or infertility.

#### Limitations of the BBSE report

The report does not indicate future status, especially following relocation or management changes. (Bulls, and especially fat bulls, experiencing these events should be re-examined after acclimatisation). Until suitable technology is available, routine testing for transmissible diseases, especially venereal and congenital diseases, is not conducted. Therefore, unless testing is indicated and reported, the BBSE does not indicate freedom from carrier status for such diseases. (The AACC recommends that bulls should be vaccinated against cAMP/pseudobacteria [Vibrisalis] prior to commencement of mating.) As all possible components of a BBSE will not usually be conducted, there always remains a risk that bulls may not be sound.
FERTILITY

- THE STATE OR QUALITY OF BEING FERTILE.
- FERTILE - BEARING OFFSPRING FREELY; PROLIFIC. ABUNDANTLY PRODUCTIVE.
- FERTILE BULL - 90% OF 50 NORMAL, CYCLING, DISEASE FREE FEMALES PREGNANT WITHIN 9 WEEKS. 60% IN FIRST 3 WEEKS.
GENERAL PHYSICAL EXAMINATION

- IDENTIFY THE BULL
- CONDITION SCORE
- CHECK THE EYES
- SHEATH STRUCTURE
- EXAMINE THE HOOVES
- EXAMINE LEG STRUCTURE AND CONFORMATION
- EXAMINE GAIT
- PELVIC AREA IF APPLICABLE
The General Physical Exam
Osteochondrosis - Joint Lesions
Puffy Hocks

- Commonly cranio-medial
- Often easier to detect from behind
PHYSICAL REPRODUCTIVE EXAMINATION

- RECTAL PALPATION OF INTERNAL REPRODUCTIVE STRUCTURES
- PALPATION OF EXTERNAL REPRODUCTIVE STRUCTURES
- SCROTAL CIRCUMFERENCE MEASUREMENT
INTERNAL REPRODUCTIVE STRUCTURES

- SEMINAL VESICLES
- AMPULLAE & DUCTUS DEFERENS
- PROSTATE GLAND
- INGUINAL RINGS
- PELVIC URETHRA

From Senger 2001
SEMINAL VESICULITIS

- **2.4% PREVALENCE**
- **INCREASED INCIDENCE** with close confinement and high energy diets
- **RETROGRADE INFECTION** possibly most common due to sodomy – Viral infection (perhaps BHV-1) may predispose

Rectal palpation of the internal sex organs
EXTERNAL REPRODUCTIVE STRUCTURES

- THE SCROTUM AND TESTES
- PENIS AND PREPUCE
The Scrotum & Testes

- The scrotal neck - fat, varicocoels
- The scrotal wall & vaginal tunics
- Scrotal skin - lesions, inflammation
- Head, body & tail of the epididymis
- Testicles - presence, tone, size (hypoplasia and freemartins?)
- Scrotal Circumference
Scrotal Contents
Testicular Degeneration

Possible causes:

- Heavy metals
- Varicocoel
- High temperature

Possible association of Freemartin co-twin and testicular hypoplasia
Scrotal Ultrasound

- Photos courtesy Al Barth

- Tunica Albuginea
- T Vaginalis
- Parenchyma
- Rete
Testicular Fibrosis

- Can be classified based on severity 0 to 5
- Fairly common after 10 months (7% to 40%?)
- Minimal effect on semen quality unless severe (grading 4 or 5)
- May be linked to BRSV?
SCROTAL CIRCUMFERENCE

- Reflects daily sperm output
- Can indicate puberty (>27.5 cm)
- Highly heritable, repeatable & reproducable
- Related to age at puberty in heifer calves
New Scrotal Circumference Tape
Penis & Prepuce

- Palpate the penis cranial to the scrotum
- Observe during rectal palpation
- Observe at electroejaculation
- ACP or pudendal nerve blocks can assist
- Persistent frenulum - can be cut
- Papillomas - not usually needing surgery
- Phimosis
- Hypospadias
Preputial Prolapse
Papillomas of the Penis
Penile Haematoma
Semen Collection

- Rectal Massage
- Artificial Vagina
- Electroejaculation

Electroejaculation - A sine wave is used to stimulate nerves responsible for emission and ejaculation
Semen Collection With EEJ
Crush-Side Semen Evaluation

Dilute the sample with saline if necessary.
### Individual Motility Ratings

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<thead>
<tr>
<th>Percent Progressive Motility</th>
<th>Rating</th>
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<tbody>
<tr>
<td>≥70%</td>
<td>Very Good (VG)</td>
</tr>
<tr>
<td>50 - 69%</td>
<td>Good (G)</td>
</tr>
<tr>
<td>30 - 49%</td>
<td>Fair (F)</td>
</tr>
<tr>
<td>≤30%</td>
<td>Poor (P)</td>
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Minimum recommended Individual Motility is 30% for multi-sire groups, or >60% if single sire or semen freezing.
Serving Capacity/Capacity to Serve
Serving Capacity

Identification of back, hip or hind-leg problems
Serving Capacity

- Identification of PSDP