Bull selection and management for natural mating of beef herds

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Thank you

Please accept my sincere gratitude for this wonderful opportunity to share Australian beef production research and experience outcomes with you.

Special thanks to NESPRO, Leonardo Camellas, João Batista G. Costa Jr, the Universidade Federal Rio G. do Sul, and other sponsors, plus the University of Londrina where I will visit next week.
Cattle are cattle, not humans
Therefore, do not presume that sexual behaviour of cattle is similar to that of humans

To assess a mating situation, use EVIDENCE, and do not guess what might be correct
Too many opinions about bulls are “religious” = acts of faith without evidence

Unfortunately, extrapolation and religion do not have all the answers in business
Questions?

What is the cost/calf for bulls?

How many bulls do I need?

What is the value of a sub-fertile bull?

How is bull fertility best assessed?
A fertile bull

Minimum: Each 21 days

a fertile bull should achieve conception (confirmed by pregnancy diagnosis)
in 60-70%
of 50 fertile, cycling disease-free beef heifers and cows

grazing rangelands under natural single- or multi-sire mating
Predicting bull fertility

BBSE predicts the ability of a bull to deliver fertile sperm to the point of fertilisation

Sperm morphology is one of the best predictors of mating success or calf-getting ability

Other semen traits, physical attributes and behaviour also impact on fertility
Age x Scrotal circumference

Confidence interval high

Variable patterns

Huge breed differences

Obvious nutrition effects
Weight x Scrotal circumference

Lower confidence interval

Most breeds within 50 mm range

Parallel breed effects except for Waygu

Puberty @ ~75% of prediction at 600 kg

Mature semen in most @ ~85% of prediction at 600 kg
Minimum Scrotal circumference

New Australian standards

5 percentile level

= 1.645 sd below mean
Pre-mating sperm indicators

Single-sire herds: One dot per bull

![Graphs showing fertility index against normal sperm % pre-mating and motile sperm % pre-mating.](image)
Pre-mating sperm morphology

Multiple-sire herds: Each dot is calf output for one bull
Morphology x Motility

Correlation: -0.2 to 0.25

Repeatability of morphology high in mature bulls, but low-moderate for motility
Stress

Stressors reduce oxygenation to cause temporary dysfunctional spermatogenesis.

Stressors: Body condition loss, auction x relocation, weather changes, vaccination, fighting, handling.

Well-managed relocation minimises stress.

BBSE with live weight predictive of fertility up to 6 months.
BBSE in Australia

Risk assessment of fertility against standards

- low – green tick, qualified pass – orange Q, high – red cross, not tested - NT

Scrotal circumference, Physical normality, Crush-side semen, Sperm morphology, Serving assessment

Australian Cattle Vets have accreditation system to support knowledge and skills development to achieve consistent standards

Sperm morphology assessment MUST be standardised – equipment, methods and assessors – to protect the value of this critical parameter

Summary:
To: Stepehn Anderson, Queensland Primary Industries and Fisheries, Swan’s Lagoon; Millaroo, MS 54, Ayr

Place of Examination: Main yards Date: 13/12/11

<table>
<thead>
<tr>
<th>Bull ID Brand</th>
<th>Age Yr:Mn Breed</th>
<th>Scrotum</th>
<th>Physical</th>
<th>Crush-Side</th>
<th>Sperm Morphology</th>
<th>Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>080249 (Brand)</td>
<td>4: 1 Brahman</td>
<td>36.5</td>
<td>✓</td>
<td>Q</td>
<td>NT</td>
<td>NT</td>
</tr>
</tbody>
</table>

Summary Comment: Sperm motility moderate but OK; Mild posty leg
Tropical bull fertility genetics

Heritability: Scrotal circumference high (75%), sperm motility and morphology moderate (15-25%)

Genetic correlations:
• Higher Scrotal circumference is predictive of earlier Female puberty age
• Higher Semen traits is predictive of First lactation cyclicity, especially in *Bos indicus*

Note: Heritability of female age at puberty and First lactation cyclicity are high (~50%) in Brahman
How many bulls needed

Fewer and better bulls: Lower cost/calf, higher genetic progress

If: 4 bulls / 100 cows, 75% cycling start of mating, 95% cycled after 12-weeks & 2/3rds pregnant/cycle,
Then, oestrus females mated: starts at ~1/day, finishes at ~1/week

Bulls produce a fertile ejaculate (10 million normal sperm) in < 5 minutes

2% bulls get most of the calves, but 1% fertile bulls is adequate; distance is no issue

>3.5% bulls causes behavioural problems; lower percentages reduce fighting - better body condition
Bull cost / weaner

Cost/calf of bulls that are sub-fertile or have few calves because there are too many bulls?

Too high and scary to calculate
Recommend

Conduct business analysis to find best way to have fewer and better bulls to reduce cost/calf and maximise rate of genetic improvement

Test bulls before first mating at least

2.5% fertile bulls where limited supervision

1% fertile bulls with high supervision
Thank you