

# Fertile bulls are a ‘must have’ to increase your herd’s profitability

Conducting any beef business means there is a need to focus on the components that most directly influence profitability. There is little value in measuring every trait in sight, or using every new technology being placed on the market, if they do not have a major benefit on the market outcome or the profitability of the enterprise.

Given that your business is essentially driven by the number of animals it can sell, their weight and price, then there is a need to focus on the relative areas that will drive that profit.” Only about 10-15% of the 30,000 plus replacement bulls needed to fill requirements in north Australia each year are currently sold with any fertility measurement describing their function. . A bull with poor fertility and/or genetic traits will not pass on his desirable traits to sufficient progeny.

This has to improve if the industry is going to continue to make significant genetic progress. No matter what trait is involved, producers must know current herd performance, and that their purchases this year and in the future are going to improve the herd’s \$ returns. Many producers gauge their herd fertility performance on a branding percentage. However the percentage of animals calving within a 365 day inter-calving interval is often significantly less than the figure typically calculated from the number of calves branded to total number of breeders. For a producer claiming a 75% branding figure, the reality is often that no more than 50-55% of females are calving within a 365-day period – the same basis as for interest and tax paid.

Australian Association of Cattle Veterinarians have determined that fertility is the ability of a bull to achieve, by natural service, a pregnancy rate of 60% and 90% in 50 normally cycling females, within 3 and 9 weeks of mating, respectively. The beef industry is focused on profitability producing a calf from each breeder within a 365 day interval, and the stud industry must have the same focus if they wish to remain viable and relevant.

Earlier research had shown fertility is often five to ten times more important than price received in terms of enterprise profitability. Growth can be up to double that affected by carcass attributes or price received. This is consistent with recent reports at MLA Beef Up Forums indicating that price received (cents/kg) frequently only accounts for about 11% of profitability in the enterprise. So optimizing fertility performance is obviously a big issue for remote and extensive herds.

## How can fertility be improved?

Objective information in the form of a Bull Breeding Soundness Evaluation (BBSE) in terms of “what we see” (phenotype), is essential and Breedplan EBVs are necessary from a genetic perspective.

The BBSE was developed by veterinarians to standardise bull fertility testing and to provide a consistent descriptor of bull fertility. The evaluation indicates whether a bull has met a set of standards for key fertility components which indicate whether a bull has a high probability of being fertile. The components are:

- Scrotal circumference (cm) and tone or resilience
- Physical examination for faults in the head, legs, joints, feet, sheath and penis
- Semen analysis for motility,
- \* Morphology (or structure of the individual sperm cells), and
- Mating behaviour / mating ability.

Producers may often do a reasonable job in their selection of replacement heifers but undo that good work by selecting bulls on phenotype and not on genetic performance. For example; the majority of bulls are selected on property according to looks, ‘fleshiness’, straight backline, and size that is often a reflection of the animals’ age rather than the true genetic worth of the animal and its fertility.


The reality about genetics is that the genetic make-up of the bull is passed on from the sire to progeny whether we measure those attributes or whether we ignore them. The difference is, if we measure them, we know where we are going for the next 13-16 years! The “mickey” of unknown genetic worth is going to affect your herd function and profitability well into the next decade.

Selection of bulls that meet minimum fertility standards has been a difficulty to many beef producers for a long time. For some time limited reproductive information has been included in sale catalogues — ‘limited’, because many seedstock producers only supply the information that buyers either ask for or are prepared to pay for; or relate an animal to some judges showmanship.

The Australian Association of Cattle Veterinarians (ACV) oversees the BBSE practices with appropriate certification. The certificate provides a standard of assessment for veterinary evaluation of the various reproductive traits important to beef producers. This evaluation is conducted prior to sale and details the identification of the sire, date and location where the evaluation was conducted, the assessments made and relevant disease information (as shown in the example in figure 1). It is purely an evaluation of a range of measures on that date on which it was done and does not provide any guarantee or imply the number of calves that the bull will sire in either single or multiple sire matings.

The BBSE is not a genetic evaluation of reproductive traits, but an indication of the animal’s present reproductive function. However, this certificate is far superior to ‘the lack of’ or ‘distorted’ information that is frequently available to many bull buyers. This evaluation can also be conducted on property as an annual bull test prior to mating to identify any bull that is declining in fertility.

In the sale catalogues, bull sellers are able to provide in association with each bull in the catalogue / or list, a summary of the tests conducted by the examining veterinarian. This BBSE summary (figure 1) will be in the form of:



Scrotum	Physical	Semen	Morphology	Serving
35.5	<input type="checkbox"/>	<input type="checkbox"/>	<b>P</b>	<b>nt</b>

**Key**

**35.5** = Scrotal size or circumference in cm

= Pass

**P** = OK under natural mating

= Fail

**na** = Not applicable

**nt** = Not tested.

The resultant certificate (figure 2) should be sought out by bull buyers when choosing between bulls as they also provide details of aspects of the evaluation that cannot be seen in the live animal e.g. percent normal spermatozoa and mating behavior details (if conducted).

Many of us are very comfortable in discussing the feet, leg and joint structures in animals and are very confident in making a selection decision to purchase or otherwise or use a bull based on what we see. The features of a bull that are clearly visible need little reinforcing in the selection process. However, what we can not see (without a microscope) often needs a little explanation.

**Understanding the morphology myths**

Morphology in a BBSE is basically the ‘structure’ of individual sperm cells. The structural attributes that are not clearly visible (or that require a microscope to view) are frequently just as important, if not more important as far as affecting a bulls fertility.

So let’s go back to the basics of semen production. Unlike the female that has her ‘quota’ of eggs at the start of life, the bull is continuously producing semen within the tubules in the testicles. The testicles are about 2°C cooler than body temperature and between the head, body and tail of the epididymis there is a long tube for storage and maturation of the spermatozoa produced. This production pipeline takes about 6-8 weeks from the start of production to when the semen is ready for ejaculation. As semen is continually produced, unused semen is excreted in the urine of all bulls.

**So can a bulls fertility change?**

How often do we think about what affect various treatments we apply to a bull, have on his fertility? For example, when a bull is bought at a sale after being ‘stuffed full of feed’ (or more nicely put ‘prepared for sale’) and we then ‘let him down’ (reduce his weight considerably); do we affect his fertility? When a new

bull has a fight with the current herd sires and is lame for a few days; does that affect his fertility? In fact any stress that we place on a bull, either as part of our production system or our husbandry programme; can affect the quality or structure of the spermatozoa in the continuous production of semen from within the testicles to each of the storage glands along the reproductive tract.

### **Can we examine and categorise the semen produced by a bull?**

Yes. Many breeders will be aware that upon the collection of semen either by electro-ejaculation or rectal massage, semen is examined crush-side for colour (no blood or urine staining allowed) and density of spermatozoa which is ranked on a 1 (clear to cloudy) to 5 (thick creamy colour) basis. In addition, when using low power magnification, the amount of swirl or vigorous swimming motion of all the spermatozoa is scored on a 1 (no swirl; generalised flickering of individual sperm only) to 5 (fast distinct swirl with continuous dark waves) basis. Once completed, the percentage of individual sperm that are swimming forward freely and independently is recorded. This assessment is a compulsory measure of fertility to meet BBSE standards. Based on extensive research the ACV has determined that a threshold of 30% progressively motile sperm is a pass on a BBSE. In addition, the sample must be free of large numbers of pus cells.

The final evaluation of the semen is the percentage of individual spermatozoa that are structurally normal – the morphology. To record the %Normal sperm, a sample of the semen collection is placed in a small tube with a special diluent and sent off to one of the accredited morphologists. The morphologist will examine 100 individual spermatozoa and record all the abnormalities present.

The morphologist report will detail the % Normal sperm and the percentages of the following abnormalities: %Proximal Cytoplasmic Droplets (PD); %Mid-Piece Abnormalities (MP); %Abnormal Tails and Loose Heads (T&H); %Pyriform Heads (Py); %Knobbed Acrosomes (KA); %Vacuoles & Teratoids (V&T); %Swollen Acrosomes (SA). Maximum thresholds have been set for each of these categories based on their potential impact on the fertility of the bull e.g. PD- 20%, MP- 30%, T&H- 30%, Py- 20%, KA-30%, V&T- 20% and SA- 30%.

### **A frequent concern by producers is – why do subsequent samples from the same bull differ in %Normal sperm?**

As outlined previously, the spermatozoa are continuously produced and are therefore subject to any stressors in the body (including rise in body temperature, disease, etc.) until the time of ejaculation or excretion. Because the stress or rise in body temperature may have been over an extended time, it will have differing effects on the spermatozoa depending on where they were at, in the production process, on the occasion of the stress / temperature. The morphology result is an indication of the quality of the semen at that point in time alone. However, if the %Normal is high, the bull has somewhat more of a buffer and can afford to decrease more in %Normal as a result of stress than a bull that inherently / genetically produces low %Normal semen. If on the first sample, a bull produces a low %Normal sperm, then the bull should be retested between 42 & 56 days after the first test to gain a more representative sample of his true semen quality. That of course is assuming that the bull is not suffering from any longer term adverse effects or ongoing stress.

Therefore, when a BBSE is conducted and the morphology results are presented, there should always be an interpretation of the results in light of the bull's vaccination history, any prior stress imposed on the bull and the bull's age and scrotal size. The semen sample tells us something about the bull's fertility when the sample was taken. When associated with subsequent or previous samples, we can gain a better understanding of the potential fertility of the bull.

### **Are all the details in a BBSE always available?**

Unfortunately NO. Veterinarians often only do the components of the BBSE that the stud breeder requests. Furthermore, whilst some breed societies have supported the BBSE process, in principal, they have NOT gone so far as requiring a COMPLETE BBSE as a prerequisite for bulls to be included in a breed society endorsed sale or multi-vendor sale. It is therefore, essential for all bull buyers to seek out and cite the certificate in advance of purchasing your “new investment” as it is too late after the bull has been assigned to you in the auction. Alternatively, buy your bulls from vendors that clearly and openly identify the BBSE standards of their bulls. Interestingly, some studs request this information themselves when buying a bulls/s, but fail to provide this service to their clients in turn. The best feedback you can

give to your bull supplier is to only buy / pay for bulls with the essential information rather than many kilograms of grain from a feeder!

### **Managing the new investment – the new sire!**

Just because a bull has four legs, a head and a set of testicles, it does not necessarily mean he is permanently a functional bull. How he is handled, what stressors he has undergone, the level of nutrition available and other factors can all have a strong effect (either positive or negative) on the ultimate fertility and functionality of that bull, and his fertility is dynamic, meaning it can change due to these and other stressors / circumstances.

Relocation to a new environment, subjecting bull to new viral and bacterial challenges, fighting and other issues associated with establishing new social groups, could all have often unseen impacts on semen quality. These impacts then flowed through to fertility in the herd.

Where possible, incoming bulls should be kept with animals of similar age, and bulls coming from very different geographic and climatic environments, should be relocated much earlier than those animals bought from a similar environment to your herd. Even within genotypes, some bulls adapt to more stressful environments more readily than others -these being more likely to have their semen quality affected.

Regardless of whether you have sourced bulls out of the paddock or the sale ring, the need for some objectivity in selection remains the same.

Figure 2. An example of a BBSE certificate that you – the bull buyer- can demand at the time of purchase, could be as follows:

**Bullville Veterinary Clinic**

Address  
 Station Road,  
 PO Box 30, Indooroopilly, Queensland 4068.  
 Phone 07 33787944  
 Fax 07 38783559  
 Mobile 04 2747 8239  
 Email: bullivets@email.com.au

*Veterinarians*  
 Dr Maree Jones  
 Dr Tom Smith  
 Dr Bill Chappel

**Report: Bull Breeding Soundness Evaluation**

This report was compiled exclusively for the use of the person to whom it is addressed. No other person or corporation has any authority to make use of any or all of this report.

This report is valid only when signed by the evaluating veterinarian and the bull's owner or agent

**Summary**

To: Mr Jack Shepherd Handsome Station, Quilpe, Queensland 4000

Place of examination: Handsome Station Date: 03 July 2010

Brand: XXXX on offside

Breed: Santa Gertrudis

Bull: \_\_\_\_\_ Age \_\_\_\_\_  
 Number/name: \_\_\_\_\_ Yr : Month \_\_\_\_\_  
 Charter Stowers 1965 1 : 08

Scrotum, Physical, Semen, Morphology, Serving



39.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	nt
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I hereby certify that information included in this report is in full accordance with the standards for evaluation and reporting bull breeding soundness as published by the Australian Association of Cattle Veterinarians

Veterinarian:  
 Signature: \_\_\_\_\_  
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I hereby certify that there has been no medical or surgical intervention of congenital abnormalities of the listed bull(s), whether genetic or not, to enable the above-mentioned standards to be met

Owner/Agent:  
 Signature: \_\_\_\_\_  
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Data Recorded:

Physical		Serving	
Condition Score	3	Serves	3
Testes Tone	3	Penis	Normal
Penis	Normal	MS function	Normal
Feet	Normal		
Legs	3		
Leg joints	Normal		
Gait	Normal		
Head	Normal		
Semen			
Density	4		
Mass Activity	3		
Motility	80%		
Morphology			
Normal Sperm	79%		
General comment:			

**John Bertram**