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Testing bulls for breeding soundness

By R. L. Peet, Animal Health Division

New tests are available to ensure that bulls are fertile.

Control of infertility in female cattle has been greatly improved, for example through vaccination against vibriosis and the progressive eradication of brucellosis. Attention has therefore recently been focused on the other vital factor—the bull.

Tests have become available to farmers to ensure that bulls will get 90 to 100 per cent of cows in calf over a controlled mating period.

First, an old myth must be exposed. Convincing field experiments from South Africa and Australia show that older bulls should not be used with your new young bulls in group mating cows to “show them how.”

As many astute cattlemen have observed, the dominant bull, usually older than the other bulls, keeps the cows on heat around him while spending most of his time chasing the keen young bulls away. The young bulls are quick to seize any opportunities, but usually the older bull will sire 70 to 80 per cent or more of calves. The new, often expensive, genes of the young bulls are therefore largely wasted.

If bulls must be mated as a group to large numbers of cows, it is much better to run bulls of the same age group together as dominance is not as great.

This leads to the next question. Has the bull the desire and ability to serve 30 to 40 cows and get them pregnant in, say, a 10 week period?

Dr Mike de Blockey, of the Victorian Department of Agriculture’s pastoral research station at Hamilton, has developed a method of testing this serving capacity of bulls. He discovered that bulls will mate heifers or cows, whether or not they are on heat, if they are properly restrained in a bale or shute.

This removes the problem of an often extensive veterinary inspection (sometimes with an anaesthetic required) to withdraw the penis from the sheath to check for “breaks” (haematomas) or other defects.

It is also essential for the vet or farmer to observe the bull mating to ensure it can gain intromission and actually copulate. Often cows on heat are not available and hormone injections to “bring them on” are not always effective.

Deviated and corkscrew penis is not uncommon in bulls and these bulls can only be detected at test matings. Also, lameness (particularly hip lameness) can prevent copulation although the bull appears normal until he attempts to mount.

Dr Blockey has also shown that some bulls have no interest in copulation. Other bulls have a “medium” desire or libido and others are “super bulls” which can copulate six or more times with restrained females in a 40 minute test.

Libido has been proven to be highly heritable and lack of libido should be detected in bulls and eliminated by stud breeders. The test consists of using three or four crated heifers in a large yard and allowing five bulls (of the same age group) in the yard for a 40 minute period.

However, it is essential to allow bulls under test to watch one or two older bulls serving these restrained heifers for about 10 minutes. The test bulls must be in an adjoining yard for this “voyeuring” where they can observe the mating activity, so that their sex drive is stimulated.

Results in the table show that bulls with low serving capacity finished a 10 week mating period with only 20 to 67 per cent of their 30 to 40 cows in calf. Conversely, bulls with a high serving capacity (six or more services in the 40 minute period) finished with 90 to 100 per cent of their cows in calf and 65 to 75 per cent of pregnancies were conceived at the first oestrus.

Dr Bryon Micke, veterinary practitioner at Moora, was the first to introduce this system into
Dr Micke, of Moora introduced the system of bull testing into Western Australia. He transports the easily assembled crates to properties to test bulls and make the other essential clinical examinations.

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The clinical examination includes measurement of circumference of the testicles. Both tests are held in the scrotum and measured at their widest circumference. The measurement is adjusted for the bull's age, and a score is given. For example a bull aged 12 to 14 months with a 35 cm circumference scores 40/40. A bull should have a minimum testicular circumference of 32 cm if it is to be mated alone to 40 cows.

Measurement of the circumference of the testicles gives the best estimate of the sperm producing ability. If the measurement is adequate the bull should produce enough sperm for each service. This is important if many cows are on heat in a single day. The bull will require good serving capacity and enough healthy testicular tissue to produce a good number of sperm at each service.

Testicular size is also heritable and breeders should obtain worthwhile results by selecting for it. Testicles are also tested by skilled palpation or feeling. They must feel firm and turgid (or swollen) to be healthy. This means all the tubules are packed with sperm, and there are no abnormalities of the connecting and storage tubules (epididymis).

Bulls should then be ejaculated and sperm motility (movement) estimated. Sperm is given a score of 20/20 if it moves in a rapid swirling movement.

However, more emphasis is now placed on examining sperm morphology or shape. Defective sperm may be produced in apparently healthy testicles and microscopic examination is the only way to detect these defective sperm. The photograph shows a normal sperm and two defective sperm incapable of fertilisation.

These types of abnormalities of sperm are called "primary" defects, due to defective sperm formation, and may be heritable. Other abnormalities such as simple bent or recurved tails are "secondary" defects and may be produced by mishandling the semen such as allowing it to get cold. Secondary defects are usually of no significance for fertility.

Interpretation and counting of defects of sperm is a skilled process. A scoring system allocates 40/40 for a bull with less than 10 per cent primary abnormalities in his sperm compared to only 3/40 for a bull with more than 29 per cent primary defects. This service is available at the Animal Health Laboratories of the Department of Agriculture at South Perth, and also at regional offices of the Department at Albany and Bunbury. These scores for testicular circumference, motility and sperm morphology give an estimate of the semen quality. Added to this, serving capacity and a general examination of health give a good guide to the value of the bull for field use.

However, accidents and disease can occur in the paddock, so frequent observation of mating is necessary to detect faults such as a broken penis, acute lamenesses or infections.

Providing basic nutrition is adequate, a 90 to 100 per cent calf drop is possible. Over-fat bulls bought from the sale ring should have a three month "let down" period before being put into service.