



NATURAL SERVICE— JUST A BUNCH OF BULL?

Artificial insemination offers many advantages

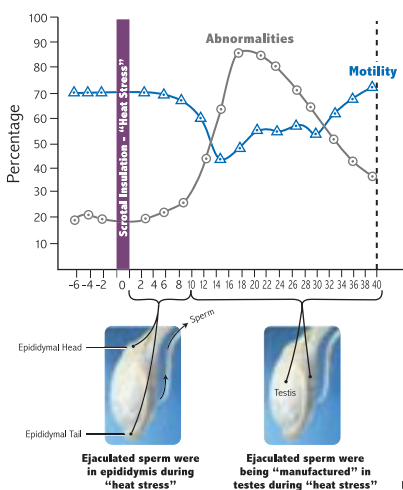
By P.L. Senger, PhD

Frustrated with the time, expense and labor required to run efficient artificial insemination (AI) programs, dairy managers may be tempted to turn to natural service as a perceived hassle-free method of breeding cows. The reality, however, is that bulls often bring greater liability to a reproductive program because of the many factors that can impair their performance and fertility.

Heat stress

Bulls are easily affected by heat, which can reduce their fertility in two ways. First, when the body temperature rises, the animal's blood temperature also becomes higher than normal. This increased blood temperature reaches the testes and prevents them from cooling. Second, the testes typically cool by sweating. If the ambient temperature approaches body temperature and humidity is high, the bull cannot cool the testes or the scrotum. The temperature of the scrotum increases, as does the temperature of the testes, and compromises sperm viability (motility) and causes significantly elevated numbers of abnormal sperm. (See Figure 1)

Figure 1. Effects on abnormalities and motility of sperm produced and stored during heat stress



What does this mean?

- If scrotal cooling is compromised, abnormal sperm increase dramatically, **BUT...** there is a 10-12 day lag before they appear in the ejaculation.
- Abnormalities remain high for about 25-60 days. **Fertility is at risk!!!**
- Sperm viability decreases about 10 days after the insult and remains depressed for 25-30 days. **Fertility is at risk!!!**
- The severity of heat stress is nearly impossible to determine in natural service bulls. This coupled with the lag in sperm damage makes for a nearly impossible management situation.

In a study on the effects of heat stress, researchers placed insulators around the scrotum of bulls to mimic elevated temperatures and prevent the testes from cooling. The results showed that sperm motility decreased about 10 days after the insult and remained low for 25 to 30 days. When scrotal cooling was not permitted, the amount of abnormal sperm in the ejaculate also increased dramatically.¹

In geographic regions where heat stress is constant during the summer months, bulls may be subfertile the majority of the summer with lasting effects into the fall. Weather fluctuations make reproductive management increasingly difficult as bulls may be recovering from heat stress, only to be subjected to another heat insult, delaying recovery further. With these constant "attacks" on the bull's reproductive system, it is easy for the management team to lose track of where the bull is in his sperm production cycle.

Health concerns

Bulls are also prime disease carriers. The bull's accessory sex glands and the penis deliver diseases to the cow that can affect fertility. For example, leptospirosis can cause early embryonic deaths, abortions, stillbirths and births of premature, weak calves.² Abortions caused by Infectious Bovine Rhinotracheitis (IBR) most often occur from 4 weeks to term, but can also happen weeks later after the disease has passed through the herd.³

Vibriosis and trichomoniasis are two common venereal diseases in cattle that can be spread rapidly from cow-to-cow by the herd bull. Although young bulls usually clear the diseases quickly, they are often re-infected in future breedings. These diseases, as well as infections caused by *A. pyogenes* and *H. somnus*, can cause early embryonic deaths and abortions.⁴

In addition to health concerns because of diseases, bulls can experience problems due to nutrition. Bulls running with lactating cows usually eat the same ration. However, this type of diet can cause bulls to gain too much weight. Overweight bulls may have faulty testicular cooling (because of fat accumulation in the neck of the scrotum) or low libido and can become lame due to laminitis or injury.

Behavioral issues

Sometimes bulls are not the most eager breeders. Favoritism and boredom can lead to reduced reproductive performance.

The bull's epididymis houses about six to seven days of sperm production, which is about 50 billion sperm or eight to 10 ejaculations. However, bulls can have favorite cows to breed within a herd and deplete sperm reserves because of repeated ejaculations with these cows. Although the bull may breed other cows, he may be ineffective because not enough sperm is present. Bulls also like novelty. Reproductive behavior declines significantly when they remain with the same group of cows for an extended period of time.

Proof in numbers

As herds expand, it becomes increasingly difficult to manage individual cows. Reliance on clean-up bulls becomes greater even when AI is used. Management teams can easily become lulled into the mentality that bulls will successfully service those cows that do not become pregnant following AI. Studies, however, show otherwise. In a trial with 85 herds, AI outperformed natural service in 80 percent of all herds.⁵

All AI companies must certify that sperm cells are from healthy bulls with high semen quality and low abnormalities. They are held to Certified Semen Standards to ensure semen is disease-free and meets guidelines for sperm count and motility. AI bulls are also housed in climate-controlled barns to eliminate exposure to heat stress. The targeted delivery of semen via AI ensures that every eligible animal receives a dose of high-quality, disease-free semen at the appropriate time.

They may seem like the "easy answer" to getting cows bred, but instead of improving the reproductive performance of a herd, bulls reduce fertility. Unless bulls pass a breeding soundness exam and are managed intensely, they are an inferior breeding option compared to AI.

