

Handle with Care

Consider these management and insemination factors affecting fertilization.

Story & photo by **Troy Smith**, field editor

Generally speaking, beef cattle breeders using artificial insemination (AI) can have confidence in the semen they purchase, provided the semen was purchased from reputable sources. According to University of Idaho reproductive physiologist Joe Dalton, reputable AI studs and custom semen collection businesses collect, process and handle semen in accordance with procedures that maintain fertility. However, once semen is purchased and transferred to a buyer's storage tank, maintenance of fertility is in the hands of that producer and his or her employees.

In a presentation delivered during the Applied Reproductive Strategies in Beef Cattle Symposium (ARSBC) in Davis, Calif., Dalton emphasized that anyone involved with the storage and handling of semen, or the insemination process, should be aware of management and insemination-related factors that can and do affect fertilization.

Dalton advised the use of best management practices when storing and handling frozen semen. This includes careful handling to preserve the integrity of semen storage tanks and monitoring liquid nitrogen levels within tanks. When retrieving semen from tanks, Dalton emphasized the importance of preventing exposure to ambient temperature. He advised handlers to keep canisters, canes and unused semen straws below the frost line in the neck of the tank.

"Sperm injury can occur at about minus 110° F," warned Dalton, "and it can't be fixed by putting a straw back in the tank as fast as possible."

Regarding the question of how many straws of semen may be safely thawed at one time, Dalton said the answer is not the same for everyone. He advised inseminators to stop thinking about maximizing the number of straws they can get ready at one time.

"Think time, temperature, hygiene and skill. Know your comfort zone. Know your skill set," said Dalton, advising inseminators to thaw no more straws than can be used within 10-15 minutes.

Timing of insemination also affects fertilization success. Dalton explained that, following insemination, six to 12 hours are required for sperm transport to the fertilization site and for sperm to gain the capacity to fertilize the ovum. However, an ovum that waits too long and becomes "aged" may ultimately yield a low-quality embryo. Therefore, insemination following heat detection should occur near enough to the time of ovulation to maximize sperm access to the ovum, but not so late that an aging ovum waits in the oviduct.

Explaining that differences in semen quality traits exist among bulls, including AI sires, Dalton said differences can be due to compensable semen traits affecting the viability or morphology of sperm cells



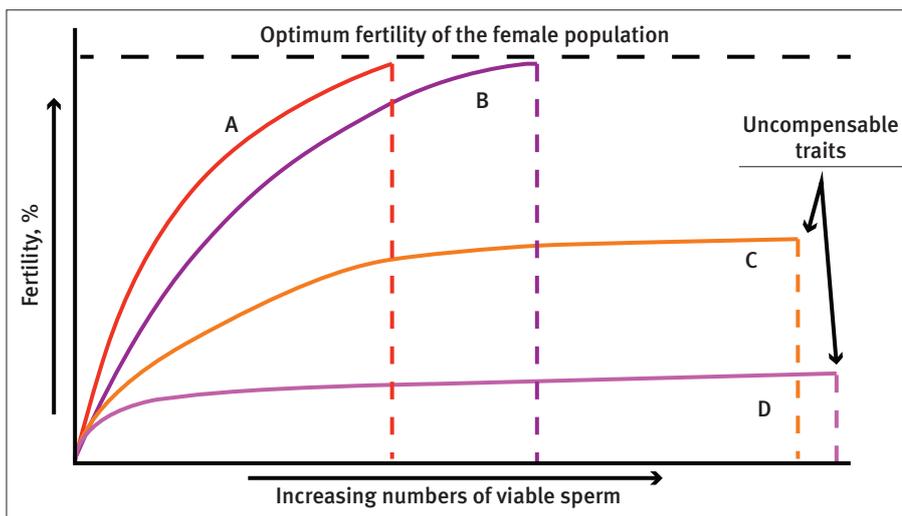
► Once semen is purchased and transferred to a buyer's storage tank, maintenance of fertility is in the hands of that producer and his or her employees, says University of Idaho reproductive physiologist Joe Dalton.

and making them unable to compete for fertilization of the ovum (egg). Compensable traits may be overcome or minimized by increasing the number of sperm delivered during insemination. According to Dalton, reputable semen sources routinely adjust the AI dose when compensable deficiencies are known.

However, Dalton said, low fertility also may be the result of uncompensable traits, usually related to damaged DNA. In this case, a bull's semen contains unacceptable levels of abnormal sperm cells, which may be capable of starting the fertilization process, but are unable to complete it. Dalton warned that uncompensable traits cannot be overcome by increasing sperm dosage, and bulls whose sperm is known to exhibit uncompensable sperm traits should not be collected and used for AI (see Fig. 1). It's another reason that semen should be sourced only from reputable firms.

Dalton spoke during Monday's ARSBC session focused on the bulls. Visit the Newsroom at www.appliedreprostrategies.com to view his PowerPoint, read the proceedings or listen to his presentation.

Fig. 1: Relationship of semen quality and quantity to fertility



Source: Adapted from Salisbury and VanDemark, 1961; Saacke et al., 1994.

Editor's Note: Troy Smith is a freelance writer and cattleman from Sargent, Neb. Comprehensive coverage of the symposium is available online at www.appliedreprostrategies.com. Compiled by the Angus Journal editorial team, the site is made possible through sponsorship by the Beef Reproduction Task Force.