



Repro Tracks

► by **Bill Beal**, beef cattle reproductive physiologist, Virginia Tech

Increasing the success of artificial insemination

The success of artificial insemination (AI) depends on proper handling of frozen semen and the precise timing and placement of semen in the bovine reproductive tract. Improving the consistency of proper semen handling and increasing the accuracy of semen placement at the optimum time can improve AI pregnancy rates.

Breeder question No. 1

I use the "a.m./p.m. rule" to determine when to breed my cows by AI. I breed cows detected in heat in the morning at 5 p.m. that evening, and I breed cows detected in heat in the afternoon at 7 a.m. in the morning. When should I breed a cow I find in heat at noon?

Response: The a.m./p.m. rule is a time-tested standard that has been used successfully since the 1950s. It "works" because a cow ovulates approximately 30 ± 6 hours after she first exhibits standing heat. The duration of heat in beef cows is usually 12-18 hours. Therefore, if you detect the cow in heat during the early or middle part of her heat (6-12 hours after the beginning of heat) and breed her 12 hours later (18-24 hours after the beginning of heat), the semen is deposited 6-12 hours before ovulation, which is the best time to result in high pregnancy rates.

A cow that was not in heat overnight or when checked first thing in the morning, but that exhibits standing heat at noon, is expected to ovulate the next day at around 6 p.m. To be in the optimum window for maximum pregnancy rates, a cow beginning heat at noon should be bred the following morning.

A word of caution goes with this recommendation. If you are not absolutely sure the cow observed in heat at noon was not in heat earlier that morning, inseminating that cow the same evening would be recommended. Depositing semen 24 hours prior to ovulation is better than being "late" and inseminating the cow after she has ovulated.

Breeder question No. 2

My neighbor is a dairyman who breeds his cows AI. He claims to get a better conception rate if he deposits half of the semen in each uterine horn, rather than all the semen in the

body of the uterus. He calls it "horn breeding." Should I be doing this?

Response: The original study that created a lot of excitement about horn breeding revealed a 20% higher pregnancy rate in horn-bred dairy cows. Subsequent studies have been less encouraging.

Mel DeJarnette of Select Sires recently summarized all the scientific studies on horn breeding. He found that in 15 studies that specifically compared horn breeding with deposition of semen in the body of the uterus, just past the cervix, only seven studies showed a higher pregnancy rate with horn breeding and the average improvement was less than 4%.

Many of those positive studies indicated that horn breeding helped some technicians, but not others. The common interpretation of this result was that horn breeding may have helped less-experienced inseminators because it ensured they deposited semen past the cervix. More-experienced inseminators were less likely to benefit from horn breeding because their site of semen deposition was already consistently beyond the cervix.

Horn breeding doesn't seem to be consistently advantageous. Conversely, it has not resulted in lower pregnancy rates. The take-home message here is to be sure semen is deposited past the cervix. If you are in doubt when inseminating an individual cow or heifer, then gently maneuvering the insemination gun to deposit half the semen an inch or so up into each uterine horn seems to do no harm and may ensure placement beyond the cervix.

Breeder question No. 3

I read about a "pocket thaw" method for thawing semen. The article indicated that pregnancy rates were the same for semen thawed in the air (or in your pocket) as in

warm water (95° F). Which method should I use?

Response: Let me begin this answer with a little history lesson about frozen semen. Bull semen used to be stored in larger volumes and frozen in glass ampules. The freezing process was slower, and the recommendation was to thaw semen in ice water to cause slow thawing.

It was discovered that packaging semen in smaller volumes in straws with greater surface area enabled the freezing rate to be much faster. That faster semen freezing rate was less-damaging to the sperm cells, but only if the straws of semen were thawed quickly in warm water. The industry changed to storing semen in straws and began recommending warm-water thawing.

In the past few years some semen suppliers have changed semen extenders and freezing procedures with the intention to permit more flexible thawing methods. A recent experiment involving 11,215 services was performed to compare pocket thawing and warm-water thawing of semen prepared for flexible thawing. Thaw method was alternated weekly in the same herds. In the end, thaw method had no significant effect on pregnancy rate. Remember, however, this was done with semen specifically prepared for flexible thawing procedures, and not all semen providers freeze semen using this method.

In another study, sperm characteristics were compared after air thawing or warm-water thawing. The number of intact sperm cells was consistently better after thawing in warm water. This study lends credence to the concept that warm-water thawing is always acceptable, but that pocket thaw method must only be used when the semen supplier has specifically prepared frozen semen for flexible thawing methods. How can you tell the difference? If the semen supplier does not recommend pocket thaw, they are telling you they prepared the semen for warm-water thaw only.



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Editor's Note: Bill Beal is a beef cattle reproductive physiologist at Virginia Tech. He conducts research involving estrus synchronization, AI, embryo transfer and the use of ultrasound technology. This column is designed to provide answers to questions about reproductive management commonly posed by commercial and purebred breeders. If you have questions or comments related to the reproductive management of cows or bulls, e-mail them to him at wbeal@vt.edu or mail them to him at the Department of Animal & Poultry Sciences, Virginia Tech, Blacksburg, VA 24061-0306.