

Management Factors Affecting Fertility

SDSU's George Perry gives insight into the management factors affecting fertility in synchronized and natural-breeding programs.

Story and photo by **Troy Smith**

The cow-calf business is really all about reproduction. The goal of any serious cow-calf producer is to maximize the number of cows and heifers that become pregnant. So fertility is pretty important. During the Applied Reproductive Strategies in Beef Cattle (ARSBC) workshop hosted in conjunction with the 2010 Cattle Industry Annual Convention, South Dakota State University (SDSU) reproductive physiologist George Perry talked about factors influencing fertility. He also offered up a number of managerial considerations for maximizing pregnancy rates for breeding programs utilizing natural service or artificial insemination (AI).



► SDSU Reproductive Physiologist George Perry warned against allowing straw-to-straw contact during thawing as some re-freezing and re-thawing of semen may occur and compromise semen quality.

Perry advised producers to consider the “equation of reproduction,” which includes four factors:

1. the percentage of females detected in estrus (standing heat) and inseminated;
2. inseminator efficiency;
3. the fertility level of the breeding herd; and
4. the fertility of the semen.

According to Perry, overall reproductive performance of the breeding herd will never be better than the lowest level of performance in any one of these areas (see Table 1).

With natural service, Perry said, detection of estrus ought to be easy. It's the bull's job. However, Perry reminded producers that libido, or the bull's desire to mate, varies among bulls. And the factors evaluated

during a breeding soundness evaluation are not related to libido. It can only be evaluated through close observation of a bull, after introducing him to a cow herd, and witnessing a demonstration of his desire to detect females in estrus.

When using AI, the herd manager assumes the job of detecting estrus. It is accomplished through observation and with the various commercially available detection aids or “Gomer” bulls. But even when estrus detection aids are used, Perry recommends frequent visual observation to identify the greatest number of animals ready to be inseminated and the most appropriate time for insemination.

“Timing makes a big difference,” Perry stated, “for inseminating too early or too late decreases the likelihood of achieving pregnancy.”

When semen is placed in the right place at the right time conception occurs about 95% of the time. With AI, inseminator efficiency is influenced by semen handling and technical skill. However, according to Perry, even AI professionals fail to deposit semen in the right place (within the uterine body) about 20% of the time.

To enhance conception rates, Perry advised adherence to recommendations for thawing semen and care to maintain thermal protection of straws during transport to the cow. He warned against allowing straw-to-straw contact during thawing as some re-freezing and re-thawing of semen

may occur and compromise semen quality. He recommended that insemination be performed within 15 minutes after thawing semen.

“Even bulls err when it comes to insemination efficiency,” Perry said, citing reasons that included low libido, low serving capacity, physical deformity and competition among multiple sires.

“Fertility level of the herd may be the hardest factor to evaluate,” Perry stated.

“Herd fertility includes cycling status, compliance with synchronization protocols, embryonic mortality, body condition (nutrition) and disease.”

Stress, particularly heat or shipping stress, can be detrimental to survival of newly formed embryos. Perry explained that stress induces the release of hormones that cause detrimental changes to the uterine environment in which the new embryo is developing. The time when shipping stress is most hazardous to establishing successful pregnancy is between days 5 and 42 after insemination. Shipping during this time may cause up to 10% decrease in pregnancy rates.

Stress as a result of nutritional management can interrupt cyclic activity among breeding heifers and may have a detrimental effect on embryonic mortality in heifers already bred. Perry said this is most apt to occur when heifers are developed in confinement and fed prepared rations, then sent to pasture where they must shift to a diet of grazed forages only.

The final factor in the “Reproduction Equation” is fertility level of semen. This factor, Perry said, is managed by always buying quality semen for use in AI, and always subjecting natural-service bulls to a semen test before turnout.



Editor's Note: The ARSBC program was developed by the Beef Cattle Reproduction Task Force to improve understanding and application of reproductive technologies, including AI, estrus synchronization and factors affecting male fertility. For additional coverage — including summaries, proceedings and audio for each presentation — visit the newsroom at www.appliedreprostrategies.com. For API coverage of the Cattle Industry Convention, visit the newsroom at www.4cattlemen.com.

Table 2: Time of day when cows exhibit standing estrus

Time of day	Cows exhibiting standing estrus
6 a.m. to noon	26.0%
noon to 6 p.m.	18.1%
6 p.m. to midnight	26.9%
midnight to 6 a.m.	29.0%

Source: Table 2 (page 149) from the conference proceedings. Data adapted from Hurnik and King, 1987; Xu et al., 1998; G.A. Perry unpublished data.

Table 1: Effect of estrus detection rate on increasing pregnancy rate

Estrus detection rate	55%	60%	65%	70%	75%	80%	85%	90%	95%
Estrus detection rate	70%	70%	70%	70%	70%	70%	70%	70%	70%
Estrus detection rate	39%	42%	46%	49%	53%	56%	60%	63%	67%

Source: Table 1 (page 148) from the conference proceedings.