Texas Dairy Matters

Higher Education Supporting the Industry

INCREASE FERTILITY AND NUMBER OF HEIFER PREGNANCIES DURING HEAT STRESS

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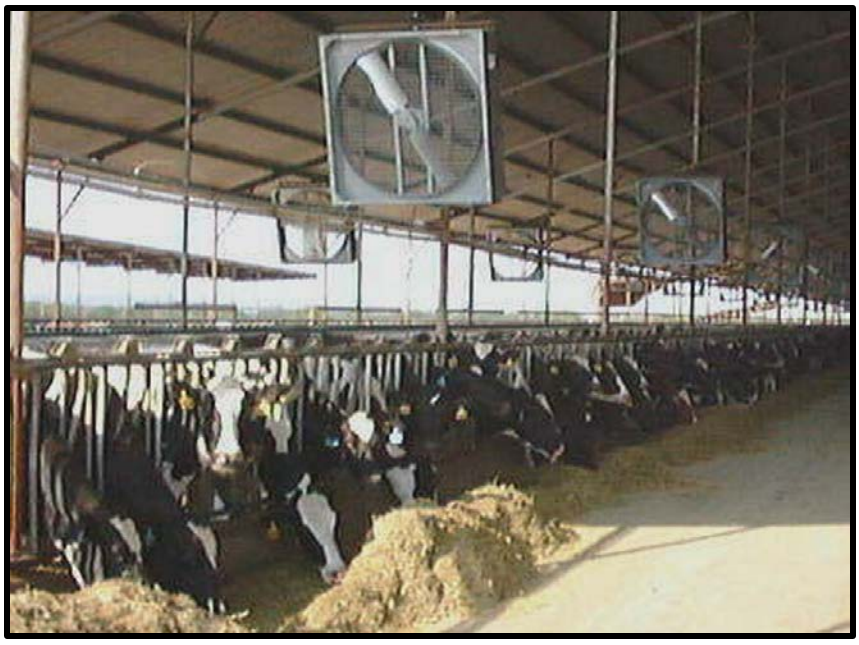
Reproductive failure is the number one reason for involuntary culling, which contributes to the economic importance of getting cows pregnant in a timely manner. Fertility results from a combination of many factors, for example: an increase in milk production per cow, management practices, and environmental factors such as heat stress.

Heat stress not only reduces milk production but further reduces fertility. The total annual economic impact of heat stress on the American dairy industry has been estimated at $1.5 billion, with an estimated economic loss of $132 million to the Texas dairy industry alone.



One reason for the drastic decline in fertility during summer is the early growing embryo's (2-3 days of life) susceptiblity to the negative effects of heat stress. However, the use of embryo transfer of a 7-day-old embryo potentially could by-pass those negative effects.

Recently, our group conducted a study to determine whether transfer of fresh or frozen embryos could improve fertility during summer in lactating

dairy cows compared to artificial insemination (AI). All embryos were produced *in vitro* using sex-sorted semen and cultured for 7 days until transferred.

A total of 722 lactating dairy cows were enrolled last summer at two commercial dairies in Central Texas. Cows were randomly assigned to one of three treatments. Conventional AI (n = 227) was used as the control compared to embryo transfer of either frozen (n = 279) or fresh (n = 216) embryos 7 days after a synchronized estrus. All cows were submitted to the farms' estrous synchronization protocol. The control group was bred either at timed-AI or AI following detected estrus. The other two groups had embryos transferred 7 days after the synchronization protocol was completed.

At initial pregnancy diagnosis (40 ± 7 d), the percent of cows pregnant was greater for fresh embryos (42.1%) versus both frozen embryos (29.3 %) and AI (18.3 %). Also, the percent of cows pregnant was greater for frozen embryos (29.3 %) than AI (18.3 %). At second pregnancy diagnosis (97 ± 7 d), the percent of cows pregnant remained greater for fresh (36.4 %) and frozen (25.7 %) compared to AI (17.0 %). Again, the percent pregnant was greater in the fresh (36.4 %) than frozen (25.7 %) treatment group. The amount of embryo loss did not differ between treatments. Transfer of both frozen and fresh embryos, produced *in vitro* using sex-sorted semen, improved fertility and number of heifer pregnancies in lactating dairy cows during summer. In addition, fresh embryos restored fertility to levels normally seen during cool months.

In conclusion, the use of *in vitro* produced embryos with sex-sorted semen can by-pass the deleterious effects of heat stress on fertility while increasing the number of heifer pregnancies. This could be a viable option for producers to adopt to maintain fertility during summer months.