

Beef Cattle Breeding Project Foundation Herd: Effect of Estrus Synchrony on Embryo Transfer Pregnancy Rates

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Introduction

A new beef cattle breeding project has been initiated at Iowa State University. The project has required a complete repopulation of the breeding herd. Part of the foundation cow herd has come from the purchase of virgin heifers in the fall of 1996; the remainder of the herd will come from an embryo transfer program that was conducted in the summer of 1997. The purpose of this report is to summarize some of the results of this program as they relate to recipient cow age and embryo transfer pregnancy rates.

Materials and Methods

Recipients for the embryo transfer program were heifers and cows left over from the previous and recently completed beef cattle breeding project. There were 81 Rhodes Research Farm spring born 1996 heifers taken to the McNay Research Farm and co-mingled with the McNay heifers (89) to prepare them for the embryo transfer program. Mature cow recipients were kept at their respective farm of origin. In total, there were 170 heifers at McNay, 250 two-year-old and older cows at Rhodes and 216 two-year-old and older cows at McNay prepared to serve as recipients. Iowa State University contracted with Trans Ova Genetics, Inc., to help plan, coordinate and perform the embryo transfers. The embryos came from three different Angus breeder sources. The majority of the embryos implanted were frozen, with the balance being fresh. All females implanted with embryos were estrus synchronized according to procedures summarized in another article in this report. In general, virgin heifers were synchronized with MGA and Lutalyse; 60 days and longer postpartum cows were synchronized with 2-shot Lutalyse, and short postpartum cows were synchronized with GNRH and Lutalyse.

The transfers at Rhodes began June 18, 1997, and ran through July 8, 1997. The transfers at McNay began on June 18, 1997, and ran through July 18, 1997. The recipients at Rhodes were checked for pregnancy using ultrasound on July 30, 1997. Recipients at McNay were hand palpated for pregnancy on August 20 and September

10, 1997. Unknown pregnancy results for six embryos were deleted from the analysis in this paper.

At the time of embryo transfer, the difference between when each recipient was detected in heat and optimal transfer time (at day 7) was recorded in hours (-36, -24, -12, 0, 12, 24, and 36). This difference is defined as estrus synchrony in Figures 1-6 of this report.

Results and Discussion

The distribution of estrus-synchrony combined results for both of the two research locations is presented in Figure 1. The majority of the embryo transfers occurred between the -12 and +12 estrus synchrony range. The highest frequency occurred at 0 hours, with 221 embryos transferred. The highest pregnancy rate of 76.47% occurred at -12 hours. Pregnancy rates fall off drastically for embryos that are transferred at -36, -24, 24 and 36 hours. These results are broken out by research location in Figures 2 and 3.

The total number of embryo transfers by type of synchronization is presented in Figure 4. The majority of the recipients (315 cows) were synchronized with the 2-shot Lutalyse system, followed by MGA (128 heifers) and then by GNRH (54 cows). These same results are presented in percentage format in Figure 5. The percentage results indicate a fairly similar distribution of embryo transfers for each of the three synchronization methods.

Three types of embryos were used in the breeding project: Frozen (direct transfer and glycerol) and fresh embryos. Pregnancy percentages for each of the types of embryos as a function of estrus synchrony are presented in Figure 6. It seems that the fresh embryos had a more significant drop off in pregnancy rates at the +24 and +36 estrus synchronies.

Implications

The results of this project would indicate that in order to achieve the highest pregnancy rates with embryos, they should be implanted between the -12 and +12 estrus synchrony hours. This may mean that more recipients have to be available at the time of transfer, especially if one is implanting fresh embryos. Transferring embryos at either -36 or +36 hours is highly discouraged based on the outcome of this project.

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Acknowledgments

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drugs for the 640 recipient females at Rhodes and McNay. The authors also extend this same grateful acknowledgment to Accelerated Genetics for the donation of beef semen for the test herd located at McNay.

Figure 1. Total number of open and pregnant ET recipients as a function of estrus synchrony.

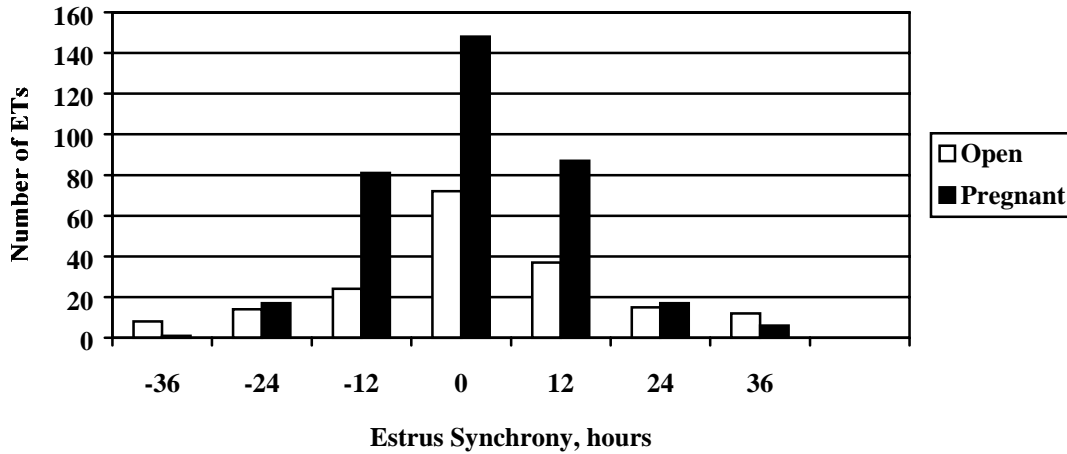
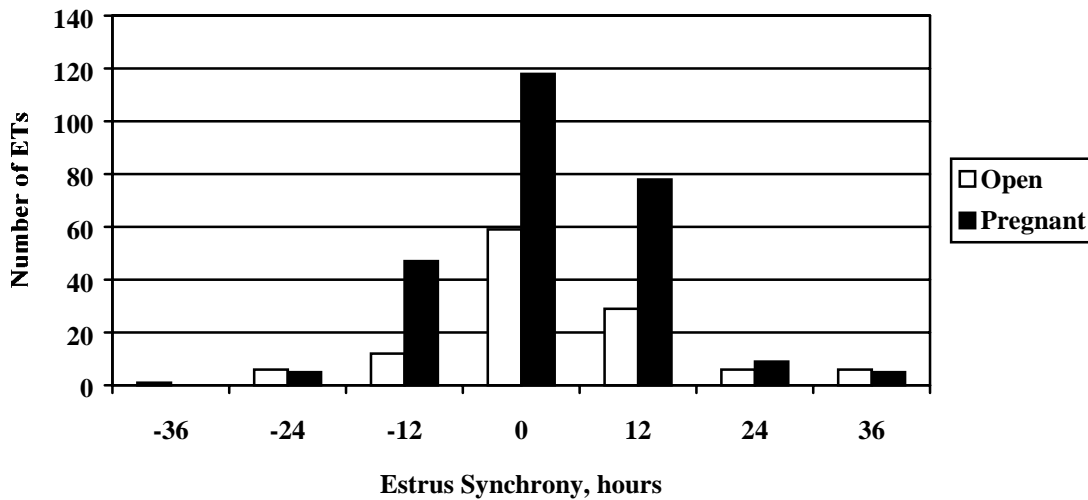


Figure 2. Number of pregnancies as a function of estrus synchrony (McNay).



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Figure 3. Number of pregnancies as a function of estrus synchrony (Rhodes).

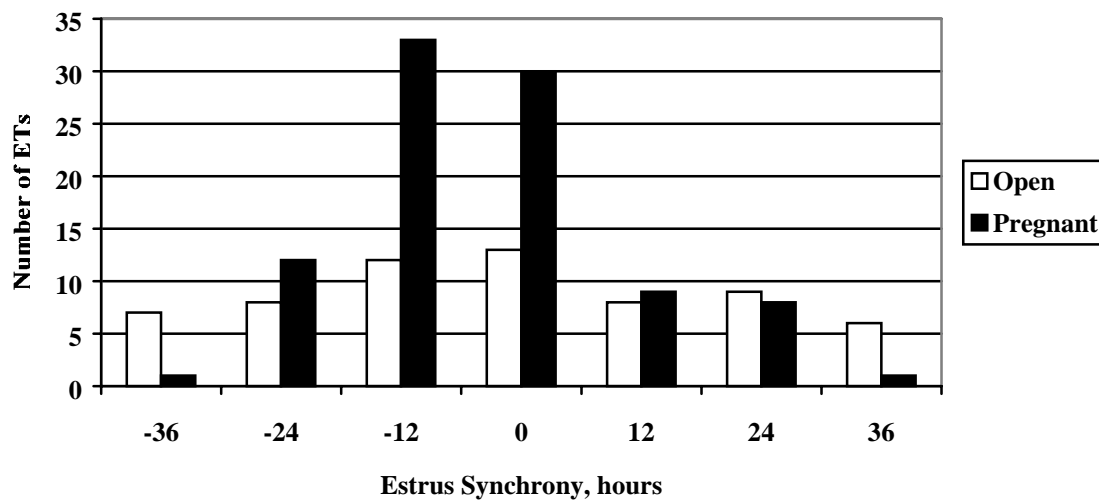
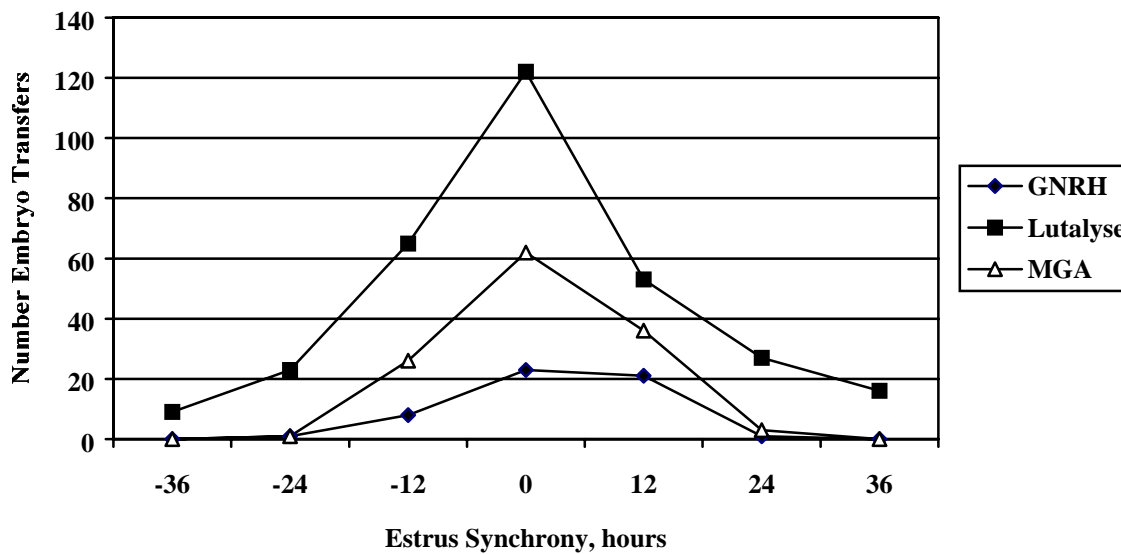


Figure 4. Number of embryo transfers as a function of estrus synchrony and type of synchronization.



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Figure 5. Percentage of embryo transfers within type of synchronization as a function of estrus synchrony for each of three synchronization types.

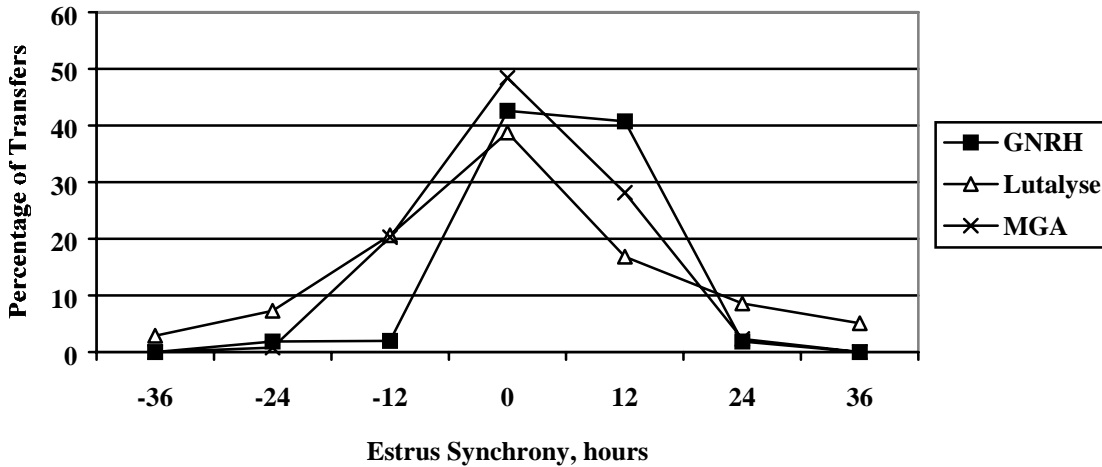


Figure 6. Pregnancy percentages within type of embryo (Direct Transfer, Glycerol or Fresh) as a function of estrus synchrony.

