Comparison of Various Methods of Estrus Detection in Synchronized Virgin Beef Heifers

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Summary

Methods of heat detection were compared in the Mid-Crest Area Cattle Evaluation Program (MACEP) heifer development program in the 1998-breeding season. A total of 189 heifers from thirteen consignors entered the program on November 10, 1997. These heifers were condition scored, hip height measured, weighed, disposition scored, booster vaccinated, and treated for parasites at the time of arrival. Determination of the heifer's mature weight was made and a target of 65% of their mature weight at breeding was established. The ration was designed to meet this goal. The heifers were kept in a dry lot until all heifers were AI bred once. The heifers were periodically weighed and condition scored to monitor their gains and the ration was adjusted as needed. The estrus synchronization program consisted of an oral progesterone analog for 14 days; 17 days after completion of the progesterone analog treatment a single injection of prostaglandin was given and the heifers were then estrus detected. Two concurrent methods of estrus detection were utilized: 1) Ovatec ® electronic breeding probe (probe), 2) HeatWatch® estrus detection system (HW), and 3) a combination of probe and HW. Probe readings were obtained each 12 hours and the heifers were continuously monitored for estrus activity using the HW system. The probe was used as the primary estrus detection method and the HW system was used as a back-up system. Those heifers that did not demonstrate any estrus signs prior to 96 hours post prostaglandin treatment were mass inseminated at 96 hours. Post AI breeding, 151 of the heifers were placed on pasture and ran with clean-up bulls for 60 days. The remaining heifers left the program after the AI breeding was completed. Pregnancy to the AI breeding was determined by ultrasound on June 29, 1998. Results from using both probe and HW were 60% pregnant by AI, probe alone was 32% pregnant by AI, and HW alone was 27% pregnant by AI. The result of mass insemination was 20% pregnant by AI.

Introduction

Correctly timing artificial insemination of heifers would increase the percentage bred by AI and reduce the cost per AI pregnancy of heifers. The time that heifers are bred in Iowa is during planting season, and the need to reduce the days devoted to visual estrus detection is important. This study was designed to compare methods that would facilitate the reduction of time required to visually detect estrus in heifers for the purpose of artificial insemination of the heifers and maximize the number of heifers pregnant by AI.

Materials and Methods

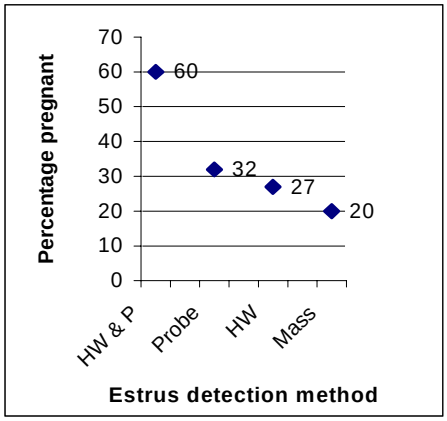
In the summer of 1998, 189 MACEP heifers were studied. These heifers were from 13 different consignors but had been feed together since November of 1997. These heifers were condition scored, hip height measured, weighed, disposition scored, booster vaccinated, and treated for parasites at the time of arrival. Determination of the heifer's mature weight was made and a target of 65% of their mature weight at breeding was established. The ration was designed to meet this goal. These heifers' estrus cycles were synchronized using oral progesterone analog (MGA ®) for 14 days at .5 mg per heifer per day; seventeen days after progesterone analog feeding ended they were given a single injection of prostaglandin (Lutalyse ®). HW transmitters were glued on the heifers at this time. Time of breeding was determined by one of three methods: the primary method used was Ovatec ® electronic breeding probe (Ovatec Electronic Animal Management, Corfu, NY), the back-up estrus detection method was HeatWatch estrus detection system (DDX Denver, CO), and a mass insemination 96 hours post prostaglandin of all of those heifers that had not exhibited estrus. All heifers were probed with the electronic breeding probe every 12 hours. This probe measured the electro-resistance of the vaginal mucus, and changes in the conductivity were used to establish estrus and time of insemination. The HW system consisted of a unique transmitter that was glued to the tail head of each heifer. When the heifer was mounted, a signal was transmitted to a receiver that relayed the mount information to a computer. The computer recorded the time and number of each mount for each heifer. Time of breeding was primarily determined by the probe readings. Heifers were inseminated based on a protocol to obtain a specific sex of calf based on probe readings. Each heifer was randomly assigned prior to synchronization to be bred for a bull or heifer. If probe readings were not as predicted then the HW system was used as a back up to determine the optimum time to inseminate.

Results and Discussion

The results of this study are summarized in figure1. The highest AI conception rates; 60% (12 of 20 heifers) conception for a single AI breeding, were when both the Ovatec® electronic breeding probe and the HeatWatch® system indicated the breeding time. Those heifers bred using information only from the Ovatec® electronic breeding probe had a 32% (21 of 65 heifers) conception rate for a single AI breeding. Heifers that were bred using the only information from the HeatWatch® system had a 27%(3 of 11 heifers) conception rate for a single AI breeding. Heifers that showed no indication of estrus during the study were mass inseminated at 96 hours and had a 20% (11 of 66 heifers) conception rate for a single AI breeding. The average single AI conception rate for the entire group was 31% (see Figure 1).

The previous 5-year average for the MACEP heifers was 57% pregnant on a single AI breeding. The lower than normal conception rates may have been related to the condition of the lots and the continuous wet hair coats of the heifers during the winter of 1997-1998. The wet hair coats and continued rain resulted in poor adhesion of the glue to hold the HeatWatch® patches on, and we had a loss rate of 20% of the transmitters. Indicative of the weather and mud stress that these heifers were experiencing prior to breeding, there was a group of steers being fed in an adjacent pen that had a feed conversion rate of 11 pounds of feed per pound of gain during this period. The labor involved in probing the heifers twice daily was not appropriate for a commercial beef cattle operation. One hundred sixty man-hours were required to probe these cattle for this project.

Figure 1. Percentage pregnant by estrus detection method.



Implications

The purpose of using these technologies (HeatWatch® system and Ovatec® electronic breeding probe) was to increase the percentage of heifers pregnant by AI and/or to reduce labor at breeding time. Given the circumstances of our study, neither of these objectives was met. During drier weather conditions perhaps the HeatWatch® transmitter retention would have been improved. The labor required to probe each heifer may be more appropriate for a dairy but only if conception rates are superior to the results obtained in this study.