EVALUATION OF DAYS POSTPARTUM ON EFFICACY OF ESTRUS SYNCHRONIZATION AND ARTIFICAL INSEMINATION

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INTRODUTION

Artificial insemination (AI) results in genetically superior calves and when coupled with estrus synchronization results in: (1) a compressed calving season, allowing consolidation of labor, (2) early born calves that are older and heavier at weaning, and (3) a longer subsequent postpartum interval to breeding, resulting in an improved opportunity for return to estrus, early conception as well as improved pregnancy rates.

The major obstacle to adoption of AI by the beef cattle industry has been the labor requirement involved. In addition, conception rate to AI following estrus synchronization has often been less than desirable. Estrus synchronization methods are rapidly improving, but late calving cows still frequently fail to respond. This experiment was designed to examine the efficacy of exposing late calving cows to estrus synchronization and AI.

METHODS

Following calving, 130 spring-calving cows in year 1 and 153 spring-calving cows in year 2, were assigned by calving date to 4 treatment groups: (1) early calving (EC), synchronized (SMB) and bred AI (EC-SMB-AI; n=130), (2) late calving (LC-SMB-AI; n=51), (3) LC-SMB and natural mated (LC-SMB-NM; n=50), and (4) LC-NM (n=52). Cows assigned to EC-SMB-AI were a minimum of 60 days (average 70 days) postpartum when estrus synchronized with Syncro-Mate-B (SMB) and were mass mated (time bred) by AI 48 hours after SMB implant removal. All cows assigned to the other 3 treatment groups were late calving and under 60 days (average 48 days) postpartum when estrus synchronization was initiated. LC-SMB-AI cows received the same treatments as EC-SMB-AI. Cows assigned to LC-SMB-NM were synchronized with SMB and exposed to fertile bulls after implant removal. Cows assigned to LC-NM were exposed to fertile bulls on the same day LC-SMB-NM were exposed to a bull. All cows were exposed to four fertile bulls on days 4 through 50 of the breeding season.

First service conception rate (FSCR) to AI was determined by calving date and pregnancy rate was determined by rectal palpation 120 days after the breeding season ended. Number of cows calving in the first 10, 14, 21, and 42 days of the subsequent calving season was examined, as well as calving interval.

RESULTS AND DISCUSSION

There were no differences between years for any of the variables measured and year was removed from the statistical models for final analysis.

First service conception rate to AI was significantly greater ($p<.01$) for EC-SMB-AI compared to LC-SMB-AI (46.1% vs. 24.5%, respectively). Conception rate to AI needs to be higher than was observed for either treatment group to be economically feasible. Less than optimum body condition (average 4.84) likely contributed to the low first service conception rate observed in the current study. Final pregnancy rate was greater ($p<.05$) for EC-SMB-AI compared to all 3 late calving treatment groups (90.6% vs. 80.4%, respectively). Pregnancy rate did not differ between LC-SMB-AI, LC-SMB-NM and LC-NM groups ($p>.10$). This clearly

demonstrates the importance of cows calving early in the calving season, allowing an adequate postpartum interval to reestablish estrual behavior. Estrus synchronization and/or bull exposure at initiation of the breeding season was not capable of improving the pregnancy rate of late calving cows.

The number of cows calving in the first 10 and 14 days of the subsequent calving season was significantly greater for EC-SMB-AI and LC-SMB-AI compared to LC-SMB-NM and LC-NM (Figure 1). All calves resulting from AI should be born within the first 14 days of the calving season and represents a good period to compare late calving cows exposed to AI versus those naturally mated. Although FSCR for LC-SMB-AI was lower than EC-SMB-AI, significantly more late calving cows exposed to estrus synchronization and AI (LC-SMB-AI) had calved by day 14 of the calving season compared to late calving cows exposed to estrus synchronization and bulls or only bulls (LC-SMB-NM and LC-NM). However, this earlier calving date for LC-SMB-AI treated cows was not great enough to result in a shortened calving interval compared to other late calving cows in the LC-SMB-NM and LC-NM groups. It is important to note that fewer LC-SMB-NM cows calved in the first 14 days compared to LC-SMB-AI cows. Although only 22 LC-SMB-NM cows in year 1 and 30 LC-SMB-NM cows in year 2 were exposed to 2 bulls after SMB implant removal, apparently the bulls were not capable of servicing all cows that responded to estrus synchronization. Not surprisingly, by day 21 of the calving season significantly more EC-SMB-AI cows had calved compared to late calving cows regardless of breeding treatment (Figure 1). At 42 days of the subsequent calving season, fewer LC-SMB-NM cows had calved compared to the other three treatment groups (Figure 1). The reason for the reduced number of LC-SMB-NM cows calving by day 42 of the calving season is unknown, but perhaps was a carry over effect because a fewer number of these cows were bred after SMB implant removal. All cows calved within a 60 day period.

Calving interval was significantly shorter for late calving cows compared to early calving cows (averaging 350 days and 369 days, respectively), but was not different between LC-SMB-AI, LC-SMB-NM and LC-NM.

Although more late calving cows calved in the first 14 days of the subsequent calving season, FSCR to AI was significantly reduced. The cost effectiveness of synchronizing and artificially inseminating late calving cows needs to be carefully weighed against the feasibility of sorting out late calving cows within each operation. Sixty days postpartum was chosen as a cut-off for early calving cows in this study to dramatically demonstrate the differences between early and late calving cows. However, the reproductive efficiency of cows a minimum of 45 to 50 days postpartum at initiation of estrus synchronization should be acceptable. Late calving cows within this calving group should conceive to AI, calve earlier the following year, wean heavier calves, and have a longer postpartum interval insuring conception to AI the following year.

Figure 1. Influence of Treatment Groups on the Cummulative Proportion of Calves Born by Calving Period