Comparison of the Timing of the Second Dose of Prostaglandin F2 Alpha in a Five-Day Progesterone-based Timed AI Synchronization Protocol in Angus Cross Beef Cows

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Introduction

Artificial insemination (AI) is a highly effective reproductive technology for promoting genetic improvement in beef cattle. The most commonly used timed-AI program in beef cattle is the CO-Synch program. Pregnancy rates achieved through this program have ranged from 31 to 66% across a series of published reports, a rate that is acceptable to many beef producers. It has been shown that reducing the interval from the initial GnRH treatment to PGF2α (and withdrawal of a progestin) improves the outcome of timed-AI. With this protocol, termed the 5-day Co-Synch + CIDR protocol, cows are given GnRH and have a CIDR device placed intravaginally, have the device removed after five days, and are given PGF2α, and then are time inseminated at 72 hours. However, this protocol requires the injection of two doses of PGF2α with an inconvenient 12-hour wait between the two doses. Reducing the interval between the two doses of PGF2α will allow cows to be handled twice with only a single penning and sorting to remove calves. The objective of this study was to compare reproductive performance of Angus cross beef cows synchronized with 5-day Co-Synch + CIDR protocol and two doses of dinoprost tromethamine (PGF) given at CIDR removal and either at 2 h or 8 h following CIDR withdrawal.

Materials and Methods

Angus cross beef cows (n = 830) at six locations received 100 micrograms of GnRH and a CIDR on day 0. Within farm, cows were randomly allocated to receive the second of two 25 mg doses of PGF at either 2 h later (2hPGF; n = 391) or 8 h later (8hPGF; n = 410). Cows were given a body condition score (BCS) at the initiation of synchronization. All cows were administered 100 micrograms of GnRH on day 8 (72 h after CIDR removal) and were inseminated at that time. Cows were fitted with a pressure sensitive heat detection device (Kamar) at the time of CIDR withdrawal. The pregnancy status of each cow was determined 70 d after fixed time AI either by per-rectal palpation or by trans-rectal ultrasonography (Sonosite 180Plus, Sonosite Inc., Bothell, WA, USA). The data were analyzed using a statistical software program (SAS Version 9.1 for Windows, SAS Institute, Cary, NC, USA). The Glimmix model was used to evaluate differences in estrus expression rates and AI pregnancy rates among the body condition scores. Locations were offered as random in the model. The model for estrus expression included BCS, days postpartum, and age groups. The model for AI pregnancy included BCS, age groups (2 years, 3-6 years, ≥ 7 years), days post partum groups (30-60 d, 61-80 d, > 80 d), and all possible two way interactions.

Results

The overall AI pregnancy rate in this study was 58.4%. Cows with activated Kamars had higher pregnancy than cows with intact Kamar devices (63.5 [283/446] vs 51.7% [183/354]; $P < 0.01$). The timed AI pregnancy rates among locations ranged from 51.4% to 67.9%. Accounting for other significant variables such as AI sire ($P < 0.05$) and cows exhibiting estrus at or prior to the time of AI ($P < 0.01$), timed AI pregnancy rates were similar ($P > 0.07$) between the 2hPGF and the 8hPGF treatments. The AI pregnancy rate was different among the six locations ($P < 0.05$) but there was no difference between treatments for the various farms except in one location.

Significance

Cows that received 2 doses of PGF on the day of CIDR removal in a 5-d Co-Synch + CIDR synchronization protocol had excellent timed AI pregnancy rates independent of whether the second dose of PGF was given at 2h or 8h following the withdrawal of the CIDR device and the first injection of PGF. Reducing the interval between the two doses of PGF2α to two hours will allow cows to be handled twice with only a single penning and sorting to remove calves. The increased convenience will encourage producers to utilize this technology for achieving excellent AI results without the need for heat detection.