Estrous response for progestin-based estrous synchronization protocols and subsequent pregnancy rates when using sorted semen in primiparous and multiparous beef cows

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Introduction

Sorted semen is more costly and often results in lower pregnancy rates than unsorted semen. Therefore, it is important to identify estrous synchronization protocols that maximize expression of estrus and AI pregnancy rates when using sorted semen. Our laboratory has observed good synchrony and AI pregnancy rates for cows synchronized with a 14-day CIDR treatment, followed by GnRH on day 16 and prostaglandin F_2 (PG) on day 23. In the absence of luteal progesterone, a 14-day CIDR treatment should result in the development of a persistent follicle. Thus, our protocol might be improved by the addition of PG on day 7 of the CIDR treatment, to ensure endogenous progesterone concentration is low and that a persistent follicle will develop and respond to GnRH given on day 16. This study evaluated the estrous response and subsequent AI pregnancy rate after synchronization of beef cows with a 14-day CIDR protocol, with an additional PG treatment given on day 7 of the CIDR treatment. A secondary objective was to evaluate the effect of time of insemination after onset of estrus on pregnancy rate when sorted semen was used.

Materials and Methods

Angus-cross primiparous (n = 35) and multiparous (n = 72) beef cows at one location were randomly and equally distributed into two treatments groups on the basis of cyclicity, parity, body weight, body condition score, and days postpartum. Treatment 1 (TRT1) cows received a CIDR insert (Eazi-Breed CIDR) on day 0. The CIDR was removed on day 14, followed by treatment with 100 mcg of GnRH (Factrel) on day 16, and a 25 mg of PG (Lutalyse) on day 23. Treatment 2 (TRT2) cows received the same synchronization treatment, except an additional 25 mg of PG was given on day 7 of the CIDR treatment. A mount detection patch (Estrotect) was placed on all cows at the time of PG administration on day 23. Cows were observed for estrus for 96 hours after PG administration, and cows exhibiting estrus were inseminated with X-chromosome sorted semen 10 to 24 hours after onset of estrus. A week after the end of the estrus detection period, all cows were exposed to fertile bulls for 56 days. Transrectal ultrasonography (Aloka 500V, 5 MHz transducer) was used to determine pregnancy status of cows 31 days after the removal of bulls. Fetal crown-to-rump length was used to determine whether pregnancies resulted from artificial insemination or subsequent natural service. Data were analyzed using statistical software (SAS, Version 9.1). Nonparametric data were evaluated with Chi-Square analyses, and all other data were evaluated with analysis of variance.

Results

The percentage of cows exhibiting estrus did not differ ($P = 0.78$) between TRT1 (62.9%) and TRT2 (60.4%). At the start of synchronization, 50% of primiparous cows and 37% of multiparous cows were in anestrus. This may explain the approximately 60% estrous response to the synchronization protocol. The interval from PG treatment to detected estrus was similar ($P = 0.89$) for TRT1 (55.6 h) and TRT2 (55.9 h), as were the AI pregnancy rates between TRT1 (58.8%) and TRT2 (68.8%; $P = 0.40$). Across treatments, AI pregnancy rate tended to be higher ($P = 0.07$) for cows inseminated 15 to 19 hours after onset of estrus (73.7%) than those inseminated 10 to 14 hours (60%) or 20 to 24 hours (38.5%) after onset of estrus. Seasonal pregnancy rates were also similar ($P = 0.26$) between TRT1 (72.2%) and TRT2 (79.3%).

Significance

In beef cows, the addition of a PG injection of day 7 of a synchronization protocol that consisted of a CIDR for 14 days, GnRH on day 16, and PG on day 23 did not improve estrous response or subsequent AI pregnancy rate. When sorted semen is used for insemination of beef cows, the time of insemination in relation to onset of estrus may influence subsequent pregnancy rate, and merits further study.