Estrus Synchronization Using MGA or Altrenogest in Crossbred Beef Heifers

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Findings

- No detrimental effects were detected using orally administered altrenogest to synchronize estrus in young crossbred beef heifers.
- In this preliminary study, pregnancy rates among beef heifers following MGA and altrenogest estrus synchronization were not significantly different.
- Altrenogest can be a safe and effective alternative to MGA in synchronizing estrus in beef heifers.

Introduction

Estrus synchronization had its humble beginnings in the 1940s when progesterone and pregnant mare serum gonadotropin were administered to cattle at varying stages of the estrous cycle to alter cyclicity. Today a multitude of synchronization regimens (for example, prostaglandins and progestins) exists, but use of estrus synchronization in beef cattle is still low. It has been reported recently that less than 12% of the beef producers in the nation use some form of estrus synchronization with subsequent artificial insemination (AI).

The development of a reproductive management protocol that requires minimal labor would likely improve use of estrus synchronization and subsequently AI among U.S. beef producers. Currently, orally active progestins are one of the least labor-intensive methods of estrus synchronization (on farms with limited facilities), but the hormone agent may require additional cost to be mixed into feed ration. In addition, some products (such as molasses) need to be top-dressed to increase ration palatability, so cattle will consume the minimum daily hormone needed to produce effective estrus synchronization.

Altrenogest is an orally active progestin that has been used for a number of years in estrus synchronization in mares. To our knowledge, the use of altrenogest to synchronize estrus in beef cattle has not been reported in the scientific literature. The objective of this study was to evaluate the effectiveness of altrenogest for estrus synchronization of crossbred beef heifers.

Experimental Approach

Crossbred beef heifers (n = 100) ranging in age from 11 to 14 months (mean = 12.7 months) and weighing 700 to 875 lbs (mean = 769 lbs), all having body condition scores ranging from 5 to 7 (mean = 6), were randomly assigned to one of two treatment groups (two replicates of 25 females in each treatment).

Females in Treatment group A (n = 50) were fed melengestrol acetate (MGA, Pfizer, New York) mixed in the ration for 14 days. The females were removed from the MGA-treated feed the next 17 days and then administered 25 mg of PGF_2 (Lutalyse, The Upjohn Co.) on treatment day 31 (Figure 1). Females in Treatment B (n = 50) received altrenogest (Regumate, Hoechst, New York), top-dressed for 7 days and then received a 25-mg injection of PGF_2 on treatment day 7 (Figure 2.). From the time to PGF_2 treatment (for subsequent AI), females were fed a ration of 3 lbs of ground corn per head per day in bunk feeders for 2 months in both Treatments A and B. To aid with logistical concerns relating to AI, replicate I of each treatment was started 1 week before replicate II of each treatment. Thus, all heifers were fed for the same number of days (total of 61 days) before insemination. Estrual activity was observed in the herd before the start of estrus synchronization treatments.

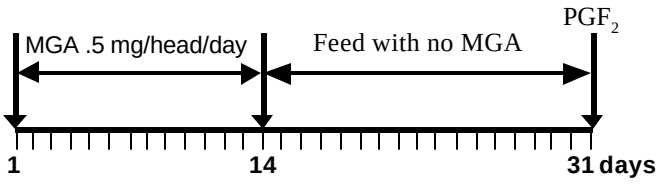

Figure 1. MGA estrus synchronization protocol (Treatment A)

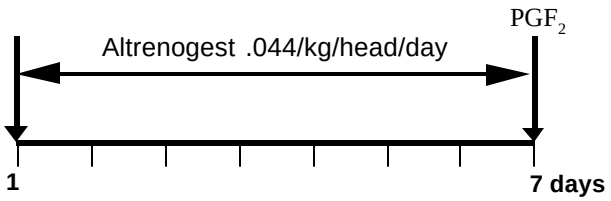

Figure 2. Altrenogest estrus synchronization protocol (Treatment B)

To aid in detection of estrus, each heifer was outfitted with a HeatWatch (computer-based electronic estrus detection device) transponder in addition to visual observations twice daily for a period not less than 45 minutes at dawn and dusk. Duration of estrus was defined as the period from the onset of standing estrus (first mount) continuing until the last mount was recorded by the HeatWatch system. A mount was defined as one heifer standing to be mounted by another heifer for a period not less than 3 seconds and no longer than 30 seconds.

Semen used for AI was from a proven, fertile Red Angus bull from the same lot. Experienced AI technicians performed all inseminations, and each insemination occurred about 10 hours after the onset of standing estrus, as determined by the electronic estrus detection system. At time of insemination, each heifer was assigned an AI score, which was based on the ease or difficulty of the insemination procedure (1 = difficult, 2 = moderately difficult and 3 = relative ease). Additionally, heifers within replicates were inseminated within a 4-day period. Pregnancy rates were determined 30 to 40 days post-AI by rectal ultrasound.

Results and Discussion

The estrus response between MGA-treated and altrenogest-treated heifers did not differ significantly at 42% and 44%, respectively. For females that exhibited estrus and inseminated, the pregnancy rates were not different between MGA and altrenogest at 52.8% and 74.5%, respectively (Table 1). Also, there were no significant differences in duration of estrus and number of mounts occurring during estrus between treatment groups (Table 2).

The mean number of mounts occurring between MGA- and altrenogest-treated females was 39 and 27 mounts, respectively. In an attempt to establish parameters that would be an indicator of pregnancy rates, data were subdivided into the following categories: duration of estrus $\leq$4, 4-8, 9-12, 13-16, 17-20 and >20 hours and number of mounts per females per estrus 10, 11-20, 21-30, 31-40, 41-50 and 51-60. No significant differences were found among categories for duration of estrus or number of mounts per female (Table 3).

In another effort to identify parameters that could serve as an indicator for successful pregnancy, all inseminated heifers were assigned an AI score of 1 to 3 based on ease or difficulty of passing insemination pipet through the cervix. Pregnancy rates from inseminated females receiving AI scores 1 and 2, (40%) and (55%), were significantly lower than females receiving an AI score 3 (88%) (Table 4).

With the estrual response and pregnancy rates not being different between treatment groups, altrenogest can be an effective alternative to MGA for synchronization of estrus in crossbred beef heifers.

In summary, no noticeable detrimental effects were detected in heifers fed altrenogest. The administration of altrenogest was convenient and resulted in pregnancy rates similar to those of MGA-treated heifers. The ease of delivery of the product and the number of days needed to synchronize estrus were less for the altrenogest protocol.

Acknowledgment

The authors wish to thank Pat DeRouen and the ranch crew of St. Gabriel Research Station for all their assistance and use of animals in completing this study.

Table 1. The effect of treatment on pregnancy rates in crossbred heifers

Treatment group	Total no.	Estrual response no. (%)	Pregnant from insemination no. (%)	Overall pregnancy no. (%)
MGA	50	21/50 (42)	11/21 (52.8)	11/50 (22)
Altrenogest	50	22/50 (44)	16/22 (74.5)	16/50 (32)

Table 2. The effect of treatment on duration of estrus and number of mounts per female

Item	Treatment groups: MGA Mean ± SE	Treatment groups: Altrenogest Mean ± SE
Duration of estrus (hour)	9.0 ± 1.01	9.4 ± 1.18
Number of mounts/female	39.8 ± 7.91	27.5 ± 5.23

Table 3. The effect of duration of estrus on pregnancy rates in crossbred heifers

Duration of estrus (hours)	Pregnancy rate (%)	Number of mounts/female	Pregnancy rate (%)
≤4	40	≤10	44
5 – 8	50	11 – 20	55
9 – 12	75	21 – 30	86
13 – 16	67	31 – 40	75
17 – 20	75	41 – 50**	0
> 20*	-	51 – 60	78

* No females had estrus longer than 20 hours.

** Only 2 females in this group.

Table 4. The effect of AI score on pregnancy rates on crossbred heifers

Artificial insemination score	Pregnancy rate (%)
1 = Difficult	40[a]
2 = Relative difficulty	55[a]
3 = Relative ease	88[b]

[a,b] Means in column with different superscript are different (P<.05).