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# Synchronizing estrus in replacement beef heifers using select synch, MGA, AND PGF2

## Abstract

The Select Synch protocol (GnRH at day - 7, PGF2 at day 0, AI at detected heat) was compared to protocols using either MGA + prostaglandin (Colorado system) or two injections of prostaglandin to synchronize estrus in replacement heifers at three locations. Percentage of heifers detected in heat before, during, or after the target breeding week was not different among treatments but varied in percentages among locations. Overall conception rates ranged from 64 to 69%. Pregnancy rates varied from 46 to 56% and tended to be greatest in the MGA + PGF2" treatment. Costs of these treatments ranged from \$3.50 to \$8 and were lowest for the MGA + PGF2 protocol.

## Keywords

Cattlemen's Day, 1999; Kansas Agricultural Experiment Station contribution; no. 99-339-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 831; Beef; Heifers; Estrus-synchronization; GnRH; PGF2; AI

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## SYNCHRONIZING ESTRUS IN REPLACEMENT BEEF HEIFERS USING SELECT SYNCH, MGA, AND PGF<sub>2</sub><sup>1</sup>

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### Summary

The Select Synch protocol (GnRH at day - 7, PGF<sub>2</sub> at day 0, AI at detected heat) was compared to protocols using either MGA + prostaglandin (Colorado system) or two injections of prostaglandin to synchronize estrus in replacement heifers at three locations. Percentage of heifers detected in heat before, during, or after the target breeding week was not different among treatments but varied in percentages among locations. Overall conception rates ranged from 64 to 69%. Pregnancy rates varied from 46 to 56% and tended to be greatest in the MGA + PGF<sub>2</sub> treatment. Costs of these treatments ranged from \$3.50 to \$8 and were lowest for the MGA + PGF<sub>2</sub> protocol.

(Key Words: Heifers, Estrus-Synchronization, GnRH, PGF<sub>2</sub>, AI.)

### Introduction

Replacement heifers are often fed in dry lots, making them more easily accessible for feeding, handling, and AI breeding. Unfortunately, only 8 to 10% of all replacement heifers are inseminated artificially. Use of Select Synch (a PGF<sub>2</sub> injection is preceded 7 days earlier by an injection of GnRH) has increased in cow herds because of its relative ease of administration and short duration of treatment (7 days).

The traditional MGA + PGF<sub>2</sub> system for heifers starts 31 days before the beginning of

the breeding season. Even the two-injection PGF<sub>2</sub> protocol (given 11 to 14 days apart) is shorter than the MGA + PGF<sub>2</sub> protocol. Our objective was to determine if the Select Synch protocol would equal MGA + PGF<sub>2</sub> or two PGF<sub>2</sub> injections for inducing a fertile estrus during the first week of the breeding season (target breeding week).

### Experimental Procedures

Replacement beef heifers at three locations (Hereford × Angus Cow-Calf Unit heifers, Manhattan; Hereford, Angus, and Simmental Purebred Unit heifers, Manhattan; and Hereford × Angus heifers, Agra) were assigned to each of three treatments illustrated in Figure 1: 1) two PGF<sub>2</sub> injections (25 mg of Lutalyse<sup>®</sup>) given 14 days apart (2×PGF<sub>2</sub>); 2) MGA (0.5 mg per head per day for 14 days) + PGF<sub>2</sub> 17 days later (MGA+PGF<sub>2</sub>); or 3) 100 µg of GnRH (Fertagyl<sup>®</sup>) followed in 7 days by 25 mg of Lutalyse<sup>®</sup> (GnRH+PGF<sub>2</sub> or Select Synch). Heifers were observed for estrus beginning 5 days before the second or only PGF<sub>2</sub> injection and continuing for various durations thereafter.

Blood samples were collected from all Manhattan heifers on days -41, -31 -7, and 0 for determination of progesterone by radioimmunoassay. Heifers were observed for estrus at least twice daily and were inseminated 10 to 14 hours after first detected estrus according to the AM-PM rule. Pregnancy was diagnosed by transrectal ultrasonography

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<sup>1</sup>We acknowledge the cooperation and participation of the Losey Bros., Agra, KS, in this study. We also thank Gary Ritter, Wayne Adolph, and students workers at the Cow-Calf and Purebred Units for their assistance.

between 33 and 37 days after insemination.

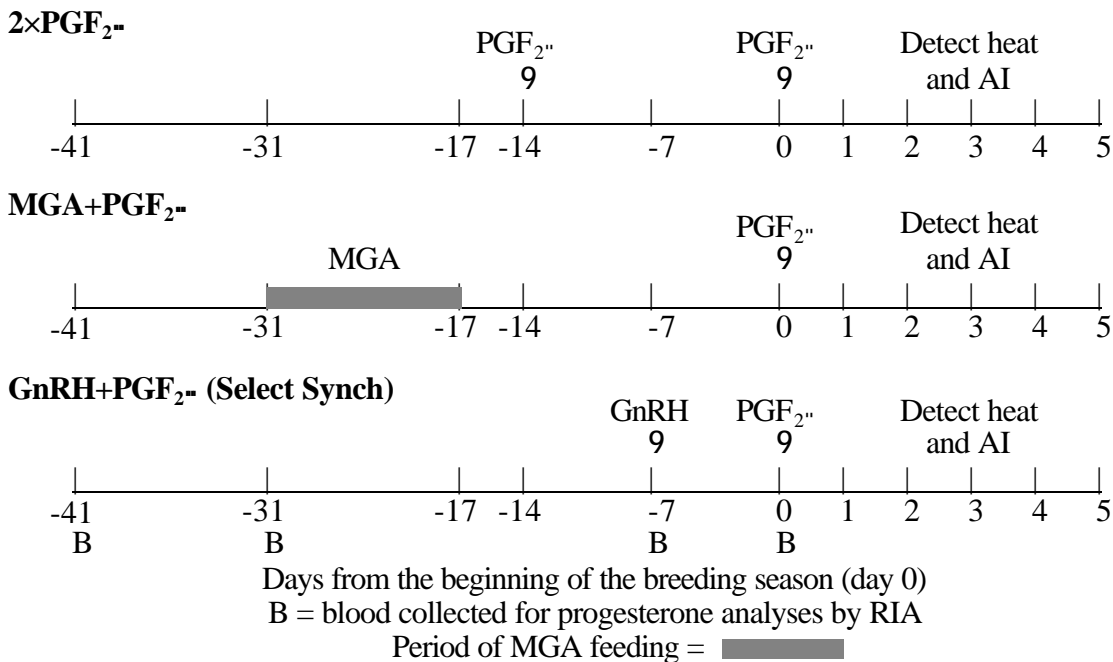
## Results and Discussion

Occurrence of estrus before, during, and after the target breeding week is summarized in Table 1. In the Agra herd, the MGA + PGF<sub>2</sub> treatment had the smallest percentage of heifers in heat during 5 days before the beginning of the breeding season (day 0), whereas in the Manhattan heifers, the smallest percentage of heats during that period was in the Select Synch treatment followed in order by the 2×PGF<sub>2</sub> and MGA+PGF<sub>2</sub>.

Irrespective of treatment, over 72% of the heifers were detected in heat during the target breeding week (days 0 to 7), with the MGA+PGF<sub>2</sub> treatment having the greatest percentage of heifers in heat. This also was true in the Agra herd, but in the two groups of Manhattan heifers, either 2×PGF<sub>2</sub> or Select Synch induced the greatest percentage of heifers in heat. A similar percentage (about 8%) of heifers in any treatment was first detected in heat at more than 7 days or not at all (4 to 8%).

Conception rates (number of heifers pregnant/number of heifers inseminated) were similar among treatments, varying from 64 to 69%. In one location, conception rates were highest after the Select Synch protocol, whereas at the other two locations, conception rates were highest after the 2×PGF<sub>2</sub> protocol. Likewise, pregnancy rates (number of heifers pregnant/number of heifers treated) were not different but tended to be greater in the MGA+PGF<sub>2</sub> treatment. In the two Manhattan locations, pregnancy rates were lowest in the MGA+PGF<sub>2</sub> treatment, whereas the reverse was true at Agra.

The advantage of Select Synch is its shorter duration of administration (7 days) compared to the 2×PGF<sub>2</sub> (14 days) or MGA+PGF<sub>2</sub> (31 days). Neither conception nor pregnancy rates were significantly reduced by the two shorter duration treatments, although the best overall performance occurred with MGA+PGF<sub>2</sub>. Treatment costs per head [Select Synch (\$6-8); 2×PGF<sub>2</sub> (\$6) or MGA+PGF<sub>2</sub> (\$3.50)] were not too different. Work in dairy cattle has shown that 50 µg GnRH (as Cystorelin) works as well as the full (100 µg) dose. If that holds true in beef cattle, the cost of Select Synch could be reduced by using only half as much GnRH (we used Fertagyl).



**Figure 1. Experimental Protocol Used to Synchronize Estrus in Replacement Heifers.**

**Table 1. Occurrence of Estrus before, during, and after the Target Breeding Week (days 0 to 7; day 0 = PGF<sub>2α</sub>)**

Item	Treatment <sup>1</sup>		
	2×PGF <sub>2α</sub>	MGA+PGF <sub>2α</sub>	Select Synch
No. of heifers	139	289	160
	----- % (no.) -----		
Before: days -5 to -1	8.6 ( 12)	5.9 ( 17)	12.5 ( 20)
During: days 0 to 7 (Average days to estrus)	74.8 (104) (3.0 ± .1)	82.0 (237) (3.2 ± .1)	72.5 (116) (2.3 ± .1 <sup>x</sup> )
After: >day 7	8.6 ( 12)	8.3 ( 24)	8.7 ( 14)
No estrus	7.9 ( 11)	3.8 ( 11)	6.2 ( 10)

<sup>1</sup>Treatment (P<.001) and treatment × location interactions (P<.001).

<sup>x</sup>Different ( P<.001) from other treatments.

**Table 2. Rates of Estrus, Conception, and Pregnancy for Heifers Detected during the Target Breeding Week (days 0 to 7; day 0 = PGF<sub>2α</sub>)**

Item	Treatment <sup>1</sup>		
	2×PGF <sub>2α</sub>	MGA+PGF <sub>2α</sub>	Select Synch
No. of heifers	139	289	160
Estrus detection <sup>2</sup> , %	74.8	82.0	72.5
Conception rate <sup>3</sup> , %	69.2	68.2	63.8
Pregnancy rate <sup>4</sup> , %	51.8	56.0	46.2

<sup>1</sup>Models included treatment, location, and all two-way interactions.

<sup>2</sup>Treatment × location (P<.01).

<sup>3</sup>Treatment × location (P<.05).

<sup>4</sup>Treatment × location (P=.07).