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**Synchronization of estrus in beef cows using Select Synch with estrous AI up to 48 h and timed AI at 48 and 72 h post PG injection with or without a second GnRH injection with the incorporation of calf removal at PG**

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**Objective.** To determine if the addition of GnRH, Select Synch, will stimulate a tighter synchrony and increase conception rates with timed-insemination at 48 or 72 h post PG injection with or without an additional GnRH injection. To determine if estrous response after PG is shortened due to calf removal.

**Introduction.** Estrous synchronization has become a powerful tool for scheduling breeding seasons that fit an operator's program and potential markets. Synchronization can become labor intensive through visual heat detection of estrus and may allow for missed heats due to poor observation (Hixon et al., 2001). An alternative method, fixed time-insemination, can eliminate some problems that producers face with estrous detection such as labor management and facilities. Evidence has shown that timed-insemination can produce results comparable to those attained with other conventional estrous synchronization protocols that require detection of estrus. Hixon et al., (2001), utilized a modified 7-11 MGA Select Synch protocol with the addition of GnRH 48 h post PG injection followed by timed-insemination. He reported comparable conception rates (72.7%) versus two other protocols that required heat detection (two-shot PGF<sub>2α</sub> (58.4%); 7-11 MGA Select Synch (61.8%)).

One area in cattle synchronization that warrants further investigation is the control of ovulation in the female estrous cycle. Fixed-time insemination shows a prominent future, however, coordinating follicular growth and luteal regression will aid in controlling a precise ovulation that will mandate control of the estrous cycle. Incorporation of GnRH induces LH release in the estrous cycle that leads to synchronized ovulation of large dominant follicles. Schmitt et al., (1996), reported that fertility after ovulation of a persistent dominant follicle can be reduced, however, an induction of a new dominant follicle results in increased fertility after injection of a GnRH agonist. Incorporating a second GnRH injection after PG will ensure ovulation at a tighter synchrony for timed-insemination. Results from a recent study indicated that incorporation of a second injection of GnRH may be feasible if the estrous response is high at the time of AI (Geary et al., 2001a).

Short-term calf removal has shown to increase GnRH and LH pulse frequencies that are similar to those prior to estrus. Geary et al., (2001b), suggested that calf-removal along with the administration of GnRH may initiate an earlier and larger LH surge. This increased response could have stimulated tighter synchrony of ovulation among both cyclic and non-cyclic cows. With an injection of GnRH on day 0, this will overturn the current dominant follicle, given that the female is not in proestrus or estrus, and allows incorporation of a new persistent dominant follicle for ovulation in response to PG on day 7. With the progression of a younger and new dominant follicle

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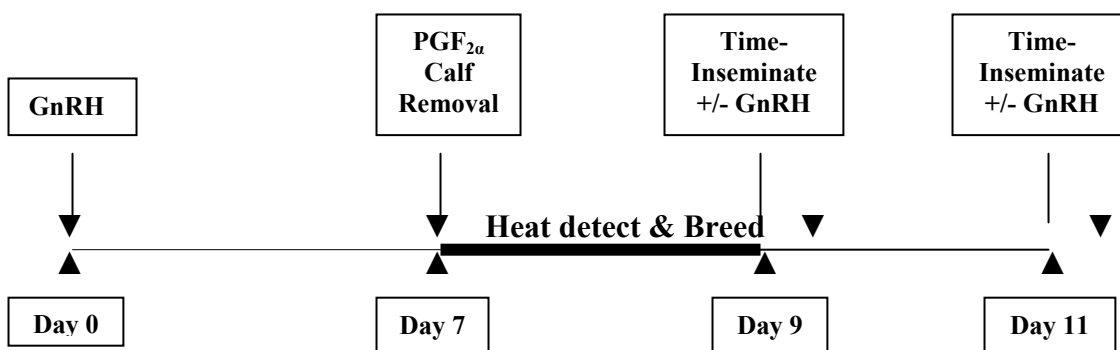
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arising, along with a 48 or 72 hour calf removal, estrous response should be stronger and tighter. A question that will remain is the use of an additional injection of GnRH at various times after PG along with mass-insemination.

**Materials and Methods.** Multiparous, Red Angus based, crossbred cows (n=350) will be grouped into two breeding seasons, two months apart, for other experimental reasons. Cows will be treated the same and analyzed the same in both breeding seasons. The early season cows (n=175) will be synchronized with the Select Synch protocol to induce estrus in cycling and non-cycling cows. An injection of GnRH (100 µg; i.m.) will be given on day 0 followed by an injection of PGF<sub>2α</sub> (25 mg; i.m.) on day 7. Cows will be observed in estrus for 48 h following PG injection and will be artificially inseminated by a certified technician 12 h after standing heat. At 48 h post PG injection, non-responding cows will be divided into two groups randomly. Half of the non-responding cows will be timed-inseminated 48 h post PG injection, with half of those receiving GnRH (100 µg; i.m.) injection and the other half without GnRH injection. The second half of the non-responding cows will be timed-inseminated 72 h post PG, with half of those receiving GnRH (100 µg; i.m.) injection and the other half without GnRH injection. Calf removal will start at PG injection and cows inseminated within 48 h post PG, based on heat detection, will be reunited with their calves at breeding. Cows timed-inseminated at 48 h post PG will be reunited with their calves immediately after breeding and cows inseminated at 72 h post PG will be reunited with their calves immediately after breeding. Calves will be reunited with their dams immediately after breeding to eliminate any stress that the cow may incur after breeding due to separation of her calf.

Blood samples for progesterone analysis will be taken 10 days prior to the first GnRH injection (day -10) and at first GnRH injection (day 0) via jugular venipuncture for determination of cyclicity prior to the start of synchronization. Body condition scores will be assessed on all cows at the start of synchronization to determine nutritional status of each cow. Cows will be diagnosed for pregnancy to AI via rectal ultrasound 35 d after timed-insemination. Cleanup bulls will be turned out 14 d after the 72 h timed-insemination.



<u>1<sup>st</sup> Breeding Season</u>	<u>Treatments</u>	<u>2<sup>nd</sup> Breeding Season</u>
May 15	Blood Sample	July 15
May 25	Blood Sample GnRH Injection (100 µg; im) Body condition score	July 25
June 1	PGF <sub>2α</sub> Injection (25 mg; im) Calf Removal (Return calves upon breeding)	August 1
June 3	Time-inseminate 1 <sup>st</sup> half of non-responders Give half GnRH and other half no GnRH (Return calves upon breeding)	August 3
June 5	Time-inseminate 2 <sup>nd</sup> half of non-responders Give half GnRH and other half no GnRH (Return calves upon breeding)	August 5

### DOSES:

GnRH: 1<sup>st</sup> Breeding Season = approximately 300 doses

2<sup>nd</sup> Breeding Season = approximately 300 doses

**Total of = 600 doses**

### REFERENCES:

Geary, T. W., J. C. Whittier, R. G. Mortimer, J. W. Young, R. R. Salverson. 2001a. Synchronization of estrus in beef cows using GnRH and PGF with estrus AI or timed AI 72 h after PGF with or without a second GnRH injection. Proc. WSAS of Anim Sci. vol:52 p. 369-371.

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