

BREEDING BY APPOINTMENT AND TRANSPORTATION EFFECTS ON PREGNANCY AMONG MGA/PROSTAGLANDIN SYNCHRONIZED HEIFERS

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SUMMARY

A synchronization program using a combination of MGA and Lutalyse was used to synchronize estrus in yearling crossbred heifers. Conception rate following insemination at 72 hours post Lutalyse injection was not different than insemination at 12-14 hours following detection of standing heat. Transportation of heifers at 5 or 9 days following insemination did not adversely affect conception rates.

INTRODUCTION:

The Dickinson Research Center conducted a breeding management investigation with yearling crossbred beef heifers to evaluate the following objectives:

1. To compare insemination by appointment with estrus detection and insemination among heifers synchronized with a combination of MGA and Lutalyse.
2. To evaluate the effect of transportation, following breeding, on embryo survival among heifers carrying free floating 5 to 9 day old embryos.

Breeding synchronized groups of beef females by appointment is a goal of many progressive cattlemen. Three approaches to estrous synchronization are currently available. The first approach uses prostaglandin products such as Lutalyse, Estrumate, or Bovilene. The second approach is to use Syncro-Mate B (SMB). A third approach uses a

sequential combination of a feed grade progesterone compound melengesterol acetate (MGA) along with a prostaglandin.

Methodologies developed over the last several years that generate a synchrony compact enough for appointment breeding have focused on the use of progesterone as the principle ingredient. Syncro-Mate B combines a progesterone like Norgestomet ear implant with an intramuscular injection containing 3 mg. of Norgestomet and 5 mg. of estradiol valerate. To obtain maximum synchrony with the product, administration must effectively control corpus luteum (CL) formation and function at all stages of the estrous cycle. Syncro-Mate B has been shown to yield variable response depending upon the stage of the estrous cycle females are in at the time of administration. Syncro-Mate B efficacy is decreased when administered any time during the first 5 days of the estrous cycle (Lauderdale, 1972; Peters, 1984; McVey Williams 1989; Pratt et al., 1991), but administration on day 9 of the estrous cycle yields satisfactory CL control and subsequent reproductive response (Peters, 1984; McVey and Williams, 1989; Pratt et al., 1991). Using SMB requires more labor and handling than other available techniques.

Combining a sequential feeding of feed grade MGA for 14 days with administration of a prostaglandin 17 days later has been shown to be an effective method for estrous synchronization in cows and heifers (Brown et al., 1988; Patterson et al., 1986). Moreover, the method also appears to yield a synchrony compact enough for timed appointment breeding, while also being less labor intensive (Brown et al., 1988; Patterson et al., 1986; Beal et al., 1988). The purpose of the first objective is to compare breeding by appointment with insemination according to estrus among heifers synchronized in a MGA/prostaglandin program.

Our second objective focused on the potential detrimental effect that transportation may have on embryo survival in heifers carrying free floating 5 to 9 day old embryos. Some local cattlemen have reported lowered conception rates following insemination and subsequent transportation when compared to non-transported females.

MATERIALS AND METHODS:

Objective 1:

To evaluate breeding by appointment, seventy-six yearling Angus X Hereford heifers averaging 862 lbs. were

synchronized using the MGA/Prostaglandin program shown in [Figure 1](#). The heifers were fed a supplement containing MGA (.5 mg/hd/da) for 14 days and then 17 days after the last MGA feeding the heifers were injected with 20 mg (Landblom and Nelson, 1986) of prostaglandin (PGF). Half of the heifers (n=37) were

Figure 1

MGA PROSTAGLANDIN PROGRAM



inseminated 72 hours after administration of the PGF without regard to standing heat. The remaining heifers (n=39) were detected for standing heat and inseminated 12 - 14 hours after detection. Epididectomized detector bulls wearing chin ball markers were used to aid heat detection. Pregnancy status was determined using real-time ultrasound (33 days post insemination) and by actual calving date.

Objective 2:

To evaluate the effect of transportation on 5 to 9 day embryos, the same seventy-six virgin Angus X Hereford heifers used in objective one were divided by insemination method and transported a distance of 112 miles to summer pastures south of Bowman, North Dakota. Pickup drawn livestock trailers measuring 7'x 24', 7'x 18', and 5'x 16'

were used to transport the heifers. Each group of heifers, carrying embryos of either 5 (n =38) or 9 (n = 38) days of age, were delivered to the pastures south of Bowman at approximately 11:30 am. each morning of the two delivery days.

RESULTS & DISCUSSION:

Objective 1:

Seventy-two hour insemination by appointment among virgin Angus x Hereford heifers was as reproductively effective as inseminating according estrus. Estrous response did not differ between treatments (78.4% vs 84.6%), and a compact distribution was observed ([Table 1](#)). In the 48 hour period between 29 and 77 hours after PGF₂ was administered, 78.2 % of the heifers in the appointment breeding treatment, and 74.3% of the heifers in the estrous detected treatment were in standing heat.

Also, as shown in [Table 2](#), no difference was measured for synchronized conception rate (69.0% vs 72.7%), synchronized pregnancy rate (54.1% vs 61.5%) or 25 day pregnancy rate (78.4% vs 79.5%).

Based on these data, breeding synchronized heifers by appointment in an MGA/prostaglandin synchronization program would save considerable heat detection labor while being reproductively efficient.

Objective 2:

The effect of transportation on freshly inseminated females was evaluated. No measurable impact on embryo survival was observed for either of the two treatments ([Table 3](#)). Hauling either 5 or 9 days after breeding did not effect synchronized conception rate, or 25 day pregnancy rate. Based on these data, no detrimental effects on embryo survival would be expected when freshly bred females are hauled distances similar to the ones used in this study.

Table 1. Hours and Percentage of Estrous Response Following Prostaglandin Administration	
Bred By	Bred After

Appointment (72 Hr. Post Inj.)	Estrous Detection (12-14 Hr.)
39 Hrs. 7.8%	29 Hrs. 2.5%
43 Hrs. 21.0%	43 Hrs. 25.6%
48 Hrs. 18.3%	48 Hrs. 15.4%
53 Hrs. 18.3%	52 Hrs. 10.3%
65 Hrs. 7.8%	53 Hrs. 5.1%
77 Hrs. 5.2%	65 Hrs. 7.7%
No Response 21.6%	74 Hrs. 7.7%
	87 Hrs. 7.7%
	98 Hrs. 2.6%
	No Response 15.4%

Table 2. Seventy-Two Hour Breeding by Appointment vs Estrous Detection and Insemination		
	Bred by Appointment	Detection/Insemination
No. Heifers	37	39
Estrous Response ¹	29/37 (78.4%) ^a	33/39 (84.6%) ^a
No. Open	4/37 (10.8%) ^a	6/39 (15.4%) ^a
Synchron. Conception Rate ²	20/29 (69.0%) ^a	24/33 (72.7%) ^a
Synchron. Pregnancy Rate ³	20/37 (54.1%) ^a	24/39 (61.5%) ^a

25 Day Pregnancy Rate ⁴	29/37 (78.4%) ^a	31/39 (79.5%) ^a
1. Estrous Response = proportion of heifers observed in estrus during the synchronized period of the treatment total.		
2. Conception Rate = proportion of heifers that conceived during the synchronized period of the total responding.		
3. Pregnancy Rate = proportion of heifers that conceived during the synchronized period of the treatment total.		
4. 25 Day Pregnancy Rate = proportion of heifers that conceived during the synchronized estrus plus those conceiving during the additional cycle initiated by the synchronization treatment.		

Table 3. Transportation Effect on Embryo Survival		
	Embryo Age 5 Day	Embryo Age 9 Day
No. Heifers	38	38
Estrous Response	32/38 (84.2%) ^a	31/38 (81.6%) ^a
No. Open	5/38 (13.2%) ^a	5/38 (13.2%)
Synchron. Conception Rate	22/32 (68.8%) ^a	22/31 (71.0%) ^a
Synchron. Pregnancy Rate	22/38 (57.9%) ^a	22/38 (57.9%) ^a
25 Day Pregnancy Rate	32/38 (84.2%) ^a	28/38 (73.7%) ^a

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