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## ESTROUS SYNCHRONIZATION OF HEIFERS USING MGA AND PROSTAGLANDIN: RANCH RESULTS

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### CATTLE 89-13

#### Summary

A total of 315 yearling heifers were exposed to an estrous synchronization program which consisted of feeding MGA for 14 consecutive days (.5 mg per head per day), followed by a prostaglandin injection 17 days after the last day of MGA feeding. Two hundred forty-seven (78%) of the heifers were detected in heat and artificially inseminated within 5 days after the prostaglandin injection. Response rate ranged from 75 to 84% between ranches and years.

(Key Words: Estrous Synchronization, Heifers, MGA, Prostaglandins.)

#### Introduction

Calving difficulty in first-calf heifers continues to decrease production output and increase production costs. Expected Progeny Difference (EPD) makes for more accurate identification of bulls that will help reduce calving difficulty without sacrificing a great deal of growth. However, bulls which possess a highly desirable set of EPD with high accuracy are usually only available to most cattlemen through artificial insemination (AI).

Artificial insemination is only practical for most cattlemen when combined with an estrous synchronization program. The management practice of synchronizing and inseminating heifers can increase returns through:

- 1) Use of predictable genetics
- 2) Earlier conception, with a shorter breeding season
  - a) leading to heavier (older) calves at weaning
  - b) cows have more time to cycle back and rebreed
- 3) Shorter calving season, concentrates labor
- 4) Allows improved nutritional management

Researchers at Colorado State University have developed a highly effective estrous synchronization program using the feed additive melengesterol acetate (MGA) and a prostaglandin injection.

MGA is a synthetic progesterone that is delivered orally as a relatively inexpensive feed additive. MGA is added to diets of feedlot heifers to suppress heat and improve growth and feed efficiency. Cattle will come into heat within 2 to 5 days after MGA is removed from the diet. Reproductive data show that the longer MGA is fed the tighter the degree of synchrony following removal, but fertility at first heat is reduced as well. Fertility is not reduced beyond the first heat.

Prostaglandins are a class of naturally occurring hormones. One function of naturally occurring prostaglandins is to regress the corpus luteum on the ovary, which sets the stage for the next estrous cycle. Commercially available prostaglandins, such as Lutalyse, Estrumate and Bovilene, also regress the corpus luteum when given by injection. Prostaglandin injection is effective for heat synchronization only if a corpus luteum is present on the ovary, which would be days 6 to 17 of the estrous cycle. Research has shown that a prostaglandin injection late (days 10 to 15) in the estrous cycle gives a higher percentage response and better fertility than if given early (days 5 to 9) in the estrous cycle.

This report describes a method of heat synchronization using MGA and prostaglandin and documents experiences of South Dakota producers who have used this program.

#### Materials and Methods

Results were made available by Blair Ranches, Sturgis, (1989 breeding season) and Quinn Cow Company, Shannon County (1988, 1989 breeding season). Both ranches used the same procedure as outlined below.

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Beginning 33 days prior to the start of breeding heifers are fed .5 mg per head per day of MGA for 14 consecutive days. Seventeen (17) days after the last day of MGA feeding, heifers are injected with prostaglandin.

In this program the MGA and prostaglandin are utilized in a manner capitalizing on the strength of each compound while minimizing the weaknesses. The 14 days of MGA feeding synchronizes the heifers; but, since the first heat is subfertile, it is passed over. By waiting 17 days to give the prostaglandin, then the corpus luteum from the previous ovulation is at the

stage where it will be most beneficial to give the injection.

### Results and Discussion

The number of heifers treated, percentage responding within 5 days of injection and number of heifers in heat each day for each ranch are presented in Table 1.

The percentage of heifers in heat within a 5-day period ranged from 75 to 84%, with the peak number of heifers coming in 2 to 3 days after injection of prostaglandin.

TABLE 1. DEMONSTRATION OF MGA-PROSTAGLANDIN EFFECTIVENESS FOR ESTROUS SYNCHRONIZATION OF HEIFERS

	Blair		Quinn Cow Co.	
	Ranches			
No. heifers	109	95	(1988)	111 (1989)
Percent in heat <sup>a</sup>	75	76		84
No. heifers in heat on day <sup>b</sup>				
0	-	-		-
1	-	2		1
2	29	22		6
3	38	35		72
4	13	11		12
5	2	2		2

<sup>a</sup> Percent in heat within 5 days of prostaglandin injection.

<sup>b</sup> Heifers were injected on day 0.

The estrus response observed on the two ranches is consistent with research results and experiences of producers in other states (Table 2). When the individual results from the three states are combined, a total of 1393 heifers were exposed to MGA-prostaglandin treatment with 968 (69%) coming into heat over a 5- to 7-day period. The response ranged from 33 to 95%.

The low response observed at Kansas locations B and D was considered a function of a high percentage of prepuberal heifers (associated with young heifers), improper heifer development and breed effects. If these two locations are not included in a summary of Tables 1 and 2, then the average response was 80% (1105/1380) with a range of 58 to 95%.

TABLE 2. ESTRUS RESPONSE TO MGA-  
PROSTAGLANDIN TREATMENT

Location	Estrus response
Kansas Ranch Demonstrations <sup>a</sup>	
Location: A	36/50 = 72
B	39/117 = 33
C	15/22 = 68
D	71/211 = 34
E	89/117 = 76
F	26/45 = 58
G	265/330 = 80
H	21/22 = 95
I	71/81 = 88
J	32/36 = 89
K	71/81 = 88
Nebraska <sup>b</sup> - 1 trial	52/60 = 87
Colorado <sup>c</sup> - 5 trial summary	131/157 = 83
- 1 trial	49/64 = 77

<sup>a</sup> Houghton, 1988. Kansas Beef Report, p. 10. Five day estrus response to 14 days MGA, injection 17 days later.

<sup>b</sup> Deutscher, 1988. Nebraska Beef Report, p. 3. Seven day estrus response to 14 days MGA, injection 16 days later.

<sup>c</sup> Odde, 1987. Proceedings, Range Beef Cow Symposium, p. 32. Five to 7 day estrus response to 14-16 days MGA, injection 16-17 days later.

Collectively, these results suggest that feeding .5 mg per head per day of MGA for 14 days followed by a prostaglandin injection 17 days later is effective for synchronizing heifers, provided they have received adequate nutrition and are of proper breeding age. Producers could realistically expect to synchronize about 75 to 85% within a 5-day period.

*Calving Data.* Calving records for 87 heifers were made available from the Quinn Ranch for the heifers synchronized in 1988. Fifty-five head of the 72 inseminated conceived for a 76% first-service conception rate. This compares quite favorably to the 65 to 70% conception rate reported in the Nebraska and Colorado studies. The fertility of heifers synchronized with this procedure appears to be quite good. Producers could realistically expect conception rates to run 60% or higher.

Some producers have the misconception that cattle inseminated over a 2- to 5-day period will calve out in that tight of period. This is simply not true, as there will be more variation than that in gestation length. At the Quinn ranch, the AI-sired calves were dropped over a 16-day period. Dispersion over a somewhat longer period, up to 20 days, could be expected.

During the peak 7 days of the calving season, 41% (36/87) of the calves were dropped. With this concentrated of a calving season, concerns for calf losses during a bad storm become quite valid. Large groups of heifers should probably be synchronized in two groups to help prevent disastrous storm losses.

Cumulative calving distribution by 21-day periods was as follows:

1st 21 days of calving: 57/87 = 65%  
By 42 days: 78/87 = 90%  
By 63 days: 87/87 = 100%

The short calving season combined with calving the heifers ahead of the cows should maximize the chance of conceiving early in the subsequent breeding season.