UTILIZING AN ORAL PROGESTOGEN WITH OR WITHOUT PROSTAGLANDIN $F_2\alpha$ TO SYNCHRONIZE ESTRUS IN BEEF HEIFERS WITH NATURAL SERVICE OR ARTIFICIAL INSEMINATION UNDER FIELD CONDITIONS

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THE MGA + PROSTAGLANDIN SYSTEM

The theory behind combined progestogen-prostaglandin treatment was that animals beginning treatments with progestogens early in their estrous cycles had normal luteal development, and estrus occurred after administration of prostaglandin.[3] When treatment with a progestogen began late in the estrous cycle, the corpus luteum regressed spontaneously during treatment, and females were held out of estrus until the source of the progestogen was removed. In these cases, the injection of PGF was not needed, even though it was administered to all animals.

The 14 - 17 day MGA + PGF system is outlined below (Figure 1).[4] Short feeding periods of melengestrol acetate (MGA) combined with prostaglandin (PGF) at the end of treatment received renewed interest after available alternatives for regulation of the estrous cycle seemed too costly or labor intensive for widespread commercial acceptance.[5]

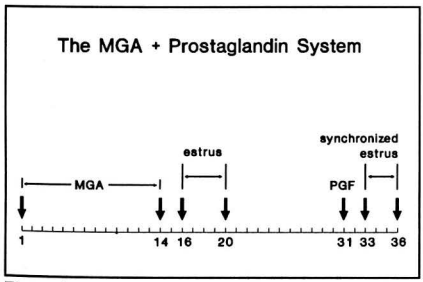

Figure 1.

This treatment places all animals in the late luteal stage of the estrous cycle (days 11 to 14) which reduced the variability in the interval from PGF injection to estrus and maximized conception rate. Melengestrol acetate is fed at a rate of 0.5 mg/hd/day for a 14 day period. The MGA is fed generally in a grain carrier and either top-dressed onto other feed or batch mixed with larger quantities. This aspect of the treatment is critical. Melengestrol acetate will suppress estrus during treatment and animals that fail to consume the required amount will return to estrus during the feeding period, hence reducing the synchronization response. Animals should be observed consequently for signs of behavioral estrus each day of the feeding period. This may be done as animals approach the feeding area and prior to feed distribution. This practice will ensure that all females are receiving adequate intake. Cows or heifers will exhibit estrus beginning within 48 hours after MGA withdrawal, but should not be inseminated or exposed for natural service at this time. Fertility at the first estrus after MGA withdrawal is generally low. Prostaglandin should be administered 17 days after MGA withdrawal, with insemination based on detection of estrus.

There are three prostaglandin products approved by FDA available currently for synchronization of estrus in cattle. Any of these products may be used in combination with MGA. These include: prostaglandin $F_2\alpha$ or Lutalyse[a]; cloprostenol or Estrumate[b]; and fenprostalene or Bovilene[c]. Label approved dosages for each of these products include: Lutalyse, 25 mg; Estrumate, 500 ug; and Fenprostalene, 1 mg.

Field demonstrations in Kentucky with the MGA+PGF system -- Table 1 summarizes the results of field demonstrations with producers in Kentucky that utilized the MGA+PGF system to facilitate the use of AI in their herds over the past two years. A total of 535 heifers at 12 locations were placed on the MGA+PGF treatment. Estrus was observed during the synchronized period in 454 of the 535 heifers (84%). Estrous response ranged from a low of 69% to a high of 100%. These differences are attributable perhaps to: 1) inadequate intake during the treatment period which reduced the synchronization response or 2) decreased

[a]The Upjohn Company, Kalamazoo, MI.
[b]Mobay Corporation, Shawnee, KS.
[c]Syntex Animal Health Inc., West Des Moines, IA.

response because of reduced numbers of heifers that were cycling at the time treatments were imposed. Despite this fact, fertility at the synchronized estrus was acceptable at all locations. The advantages of the MGA+PGF system for synchronization of estrus are ease of administration and cost. These are important considerations for widespread use of any successful estrous synchronization treatment and are essential to expanded application of artificial insemination in the beef cattle industry.

TABLE 1. ESTROUS RESPONSE AND CONCEPTION RATES OF SYNCHRONIZED HEIFERS[a]

Location	No. of heifers	Estrous response[b] (no.)	(%)	Conception rate[c] (no.)	(%)
1	24	23/24	96	18/23	78
2	60	49/60	82	35/49	71
3	31	21/31	68	14/21	67
4	60	51/60	85	40/51	78
5	29	27/29	93	22/27	81
6	19	18/19	95	13/18	72
7	13	9/13	69	8/9	88
8	20	18/20	90	15/18	83
9	107	91/107	85	65/91	71
10	15	15/15	100	12/15	80
11	66	57/66	88	41/57	72
12	91	75/91	82	49/81	60
Total	535	454/535	84	332/454	73

[a]Heifers were inseminated approximately 12 hours after first observed estrus.
[b]Estrous response = proportion of heifers observed in estrus during the synchronized period of those placed on treatment.
[c]Conception rate = proportion of heifers that conceived during the synchronized period of the total responding.

MGA AND NATURAL SERVICE

Pexton et al. (1989) concluded that the use of single-sire matings to breed synchronized groups of females could be advantageous in making a transition from natural service to AI.[6] This practice was an effective management procedure when administered appropriately. Over the past two years we have adapted the MGA system for use in natural service breeding programs with cooperating producers throughout Kentucky. Cows or heifers received the normal 14-day feeding period of MGA; however the administration of progstaglandin after MGA was by-passed. Fertile bulls were exposed to treated groups of females as early as 15 to 18 days after MGA withdrawal (Figure 2).

Field demonstrations were conducted at 12 locations in Kentucky to evaluate the efficacy of this treatment for use in estrous synchronization with natural service. The results are shown in table 2.

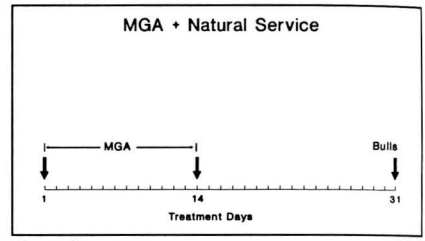

Figure 2.

Heifers received MGA (0.5 mg/hd/day) for 14 days in a grain supplement carrier. Fertile bulls were joined with heifers 15 to 18 days after MGA withdrawal. A ratio of one bull to every 15 to 20 heifers was adhered to. Pregnancy and fetal age were determined by uterine palpation per rectum within 120 days after the synchronized periods. A total of 413 of the 601 heifers (69%) became pregnant during the synchronized periods, and 500 of the 601 (83%) conceived within the first 30 days of the breeding season. An important point that needs to be emphasized is the fact that the average total pregnancy rate at the end of the breeding season in these herds was 89%. This means that of the total number of heifers that became pregnant (535/601), only 10% failed to conceive within the first 25 to 30 days of the breeding season. This also means that nearly 80% (413/535) of the pregnant heifers conceived during the synchronized period.

TABLE 2. PREGNANCY RATES OF HEIFERS EXPOSED FOR NATURAL SERVICE AFTER MGA.

Location	No. of heifers	Synch. preg.[a] (no.)	(%)	30-day preg.[b] (no.)	(%)
1	44	27/44	61	36/44	82
2	77	52/77	68	63/77	82
3	25	21/25	84	24/25	96
4	18	14/18	78	14/18	78
5	28	18/28	64	22/28	79
6	41	25/41	61	31/41	76
7	25	22/25	88	24/25	96
8	120	82/120	68	98/120	82
9	104	61/104	59	82/104	79
10	43	32/43	74	37/43	86
11	60	45/60	75	54/60	90
12	16	14/16	88	15/16	94
Total	601	413/601	69	500/601	83

[a]Proportion of heifers that became pregnant during the synchronized period.
[b]Proportion of heifers that became pregnant within the first 30

days of the breeding season.

This system worked effectively, however careful attention to bull to female ratios needs to be observed. We recommend exposing no more than 15 to 20 synchronized females with a single bull. Age and breeding condition of the bull and results of breeding soundness examinations need to be considered. Farin et al. (1989) reported that classification of bulls by mean libido score can aid in identifying bulls that service more estrous synchronized females, however classification of bulls by results from breeding soundness examinations were more useful in identifying bulls that impregnate more females.[7]

A recent study (Boyd, 1990)[8] failed to show any improvement in the proportion of females that become pregnant early in the breeding season when synchronized heifers that were exposed naturally were compared with nonsynchronized contemporaries. Heifers, in the study, were synchronized with MGA and injected with prostaglandin 17 days after the last feeding day of MGA. Figure 3 illustrates differences in the distribution of estrus comparing the MGA+PGF system to an MGA-only system, similar to that which we have demonstrated in herds in Kentucky.

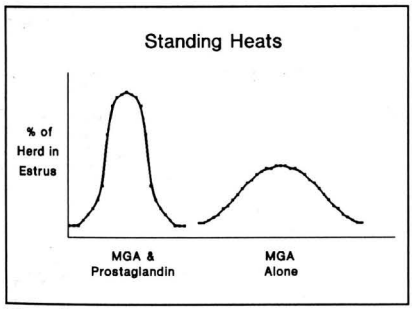

Figure 3.

The combined MGA+PGF system is best suited for use with AI programs because of the high degree of synchrony that can be achieved during the synchronized period. This decreases the amount of time required for detection of estrus. However, under natural mating conditions there may be an advantage in distributing estrus over several additional days for the bulls that are involved. The combined MGA+PGF system for use with natural service presents several distinct management related disadvantages. Aside from concentrating the breeding period over perhaps too short a period of time, this system is more expensive than the MGA-only system and requires that cattle be handled to receive the prostaglandin injection. We find that one of the major advantages of using MGA to control estrous cycles of cattle is the flexibility in matching specific synchronization protocols with the particular management system involved.

References

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