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Abstract

A multi-location study was conducted using suckled beef cows in Minnesota and Kansas to test the benefit of adding a source of progestin to the Cosynch ovulation synchronization protocol (injections of GnRH, 7 days before and 48 hr after an injection of PGF2", with a fixed-time artificial insemination (AI) administered at the same time as the second GnRH injection). Feeding melengestrol acetate (MGA) for 14 days followed in 12 days by the Cosynch protocol was compared to the Cosynch protocol with the addition of a progesterone-impregnated insert (CIDR) placed in the vagina for 7 days concurrent with the first GnRH injection. Pregnancy rates after the first AI (timed AI) were 22% greater with the CIDR insert, whereas conception rates for those cows returning to estrus were greater for cows previously fed MGA. Total pregnant cows after two inseminations were 64% for CIDR cows and 59% for MGA cows.

Keywords

Cattlemen's Day, 2001; Kansas Agricultural Experiment Station contribution; no. 01-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 873; Beef; Ovulation synchronization; Cows; Embryo survival; MGA; CIDR

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OVULATION SYNCHRONIZATION WITH PROGESTINS PRIOR TO A COSYNCH PROTOCOL IN BEEF COWS

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Summary

A multi-location study was conducted using suckled beef cows in Minnesota and Kansas to test the benefit of adding a source of progestin to the Cosynch ovulation synchronization protocol (injections of GnRH, 7 days before and 48 hr after an injection of $PGF_{2\alpha}$, with a fixed-time artificial insemination (AI) administered at the same time as the second GnRH injection). Feeding melengestrol acetate (MGA) for 14 days followed in 12 days by the Cosynch protocol was compared to the Cosynch protocol with the addition of a progesterone-impregnated insert (CIDR) placed in the vagina for 7 days concurrent with the first GnRH injection. Pregnancy rates after the first AI (timed AI) were 22% greater with the CIDR insert, whereas conception rates for those cows returning to estrus were greater for cows previously fed MGA. Total pregnant cows after two inseminations were 64% for CIDR cows and 59% for MGA cows.

(Key Words: Ovulation Synchronization, Cows, Embryo Survival, MGA, CIDR.)

Introduction

During the past 6 years we have experimented with various hormonal protocols to synchronize estrus and ovulation in suckled beef cows without calf removal. Using an injection of GnRH 7 days before an injection of $PGF_{2\alpha}$, has successfully increased the percentage of cows showing heat during the first week of the breeding season, the percentage of cows cycling, and the percentage of cows conceiving to a fixed-time insemination.

Further improvement in these results has occurred when a progestin treatment was included during the 7 days before $PGF_{2\alpha}$. Norgestomet ear implants and the intravaginal progesterone-impregnated CIDR insert have served this purpose. In combination with GnRH, the progestin exposure reduces the short estrous cycles that sometimes follow GnRH-induced ovulation in suckled cows.

The objective of the present experiment was to determine whether or not feeding melengestrol acetate (MGA; orally active progestin) would serve a similar purpose as the CIDR insert. Neither the norgestomet implant nor the CIDR are market-available. However, it is anticipated that the CIDR insert (Pharmacia & Upjohn, Kalamazoo, MI) may be available later this year. It is not known whether the norgestomet implant (part of the Syncro-Mate B estrus-synchronization system) will return to the market.

Experimental Procedures

We used 609 suckled beef cows in two treatments at four locations (Kansas State University Purebred Beef Unit, Manhattan, KS; Thielen Ranch, Dorrance, KS; North Central Research and Outreach Center, Grand Rapids, MN; and DarLynn Ranch, Pierz, MN). The two treatments are illustrated in Figure 1. In the first treatment, cows

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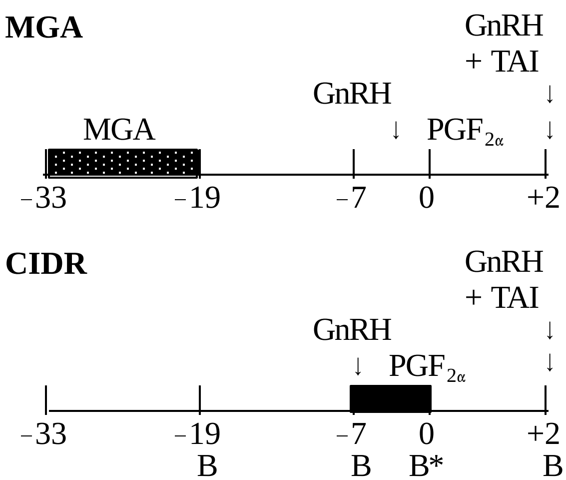
were fed MGA (0.5 mg per cow per day) for 14 days, followed in 12 days by the first injection of GnRH, followed in 7 days by an injection of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$), followed in 48 hr by a second GnRH injection at the same time as timed artificial insemination (TAI). The second treatment consisted of feeding the carrier without MGA for 14 days, with the injections as for the MGA treatment. In addition, cows receiving no MGA received a new intravaginal progester-one-releasing insert (CIDR®-1380 insert, Hamilton, New Zealand) containing 1.38 g of progesterone on day -7 and removed on day 0. The diets of all cows were supplemented with grain mix or a premix containing 4 lb of a pelleted formulation that contains either 0 or 0.5 mg of MGA for a 14-day feeding (days -33 to -19).



Days from $PGF_{2\alpha}$
(beginning of the breeding season)

* = Body condition scores
B = Blood sample to determine concentration of progesterone
= 0.5 mg of melengestrol acetate per day
= New CIDR (1.38 g of progesterone)

Figure 1. Experimental Protocol.

Blood samples were collected at days −19, −7, 0, and +2 for later analysis of serum progesterone. Body scores were assessed on day 0. Cows were observed for returns to estrus beginning 20 days after the TAI and continued until day 23. Cows were inseminated between 8 and 12 hr after first detected return to estrus. Pregnancy diagnoses were made by transrectal ultrasonography on days 29-33 (all locations) and again on days 57-61 (three locations) after TAI. Pregnancy rates were calculated as the number of cows determined pregnant divided by the number of cows treated and inseminated. Embryo loss was calculated for cows in which two pregnancy diagnoses were made.

Results and Discussion

Number of cows, breed composition, body condition scores, and days postpartum at the onset of the breeding season are summarized by location in Table 1.

Results for all locations combined are summarized in Table 2. Pregnancy rates after the first TAI were greater ($P<0.05$) for cows treated with the CIDR insert than after feeding MGA. This difference was consistent at three of four locations, whereas at location D, pregnancy rates were identical between treatments.

Rates of return to the first eligible estrus and average interval to estrus after the first insemination were not different between treatments.

Conception rates of cows that were re-inseminated were 22% greater ($P<0.05$) in those previously fed the MGA than those receiving the CIDR inserts. However, because the reverse was true for pregnancy rates at the TAI, the total proportion pregnant after two inseminations was similar between treatments.

About 11% of the embryos first detected by ultrasonography on days 29-33 did not survive to days 57-61 when the second diagnosis of pregnancy was measured.

Our results from past studies have clearly demonstrated that pregnancy rates achieved after the Cosynch protocol (injections of GnRH 7 days before and 48 hr after an injection of $PGF_{2\alpha}$, with a fixed-time AI administered at the same time as the second GnRH injection) are variable. Pregnancy rates ranged from 30 to 55%. When a progestin (one norgestomet ear implant or a CIDR) is included in the system during the 7 days between the injections of GnRH and $PGF_{2\alpha}$, pregnancy rates ranged from 55 to 66%.

The present study demonstrates again that the addition of a progestin produces pregnancy rates >50% after a TAI (2000 Cattlemen's Day, pp 104-106). Response to the MGA + Cosynch protocol was less at three locations, but at one location it was equal to that of the CIDR insert. Some difficulty arises when attempting to feed MGA to cows once they have been moved to pasture. The carrier for the MGA must be highly palatable and easy to feed in pasture situations. In contrast, the cost of feeding MGA may be less than the cost of the inserting the CIDR.

Table 1. Characteristics of Synchronized Suckled Cows

	Location				
Trait	A	B	C	D	Total
No. of cows	149	161	81	218	609
Breed composition	Crosses of: Angus, South Devon, and Charolais	Purebred Simmental, Hereford, and Angus	Angus	Crosses of: Simmental, Hereford, and Angus	
Body condition score at onset of breeding season	5.4	4.7	5.2	5.1	5.1
Days postpartum at onset of breeding season	69	79	86	70	75

Table 2. Reproductive Traits of Suckled Cows

	Treatment	
Trait	CIDR	MGA
No. of cows	304	305
Pregnancy rates after first AI, %	55	45*
Rates of return to estrus after first AI, %	58	57
Average days to return estrus after first AI	21.3	21.4
Conception rates after second AI, %	50	61*
Total pregnant after two inseminations, %	64	59
Embryo survival after days 29-33 to days 57-61, %	90	88

*Different (P<0.05) from CIDR treatment.