

## RESYNCHRONIZATION OF ESTRUS WITH PROGESTERONE AND ESTROGEN IN PREVIOUSLY INSEMINATED BEEF COWS

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### Summary

A study was conducted in 609 beef cows to determine whether or not estrus might be resynchronized in previously inseminated beef cows to accommodate a second artificial insemination (AI) early in the breeding season. Previously inseminated cows were treated for 7 days with progesterone (via a previously used intravaginal progesterone-releasing insert [CIDR]) beginning 13 days after AI. In addition, injections of estrogen (estradiol benzoate [EB] or estradiol cypionate [ECP]) were given at insertion and removal of the CIDR insert. Rates of return to estrus and total pregnancy rates were increased after treatments with progesterone and estrogen compared with controls. No harm to pregnancies occurred in pregnant cows and a second AI period was facilitated by the end of the first 23 days of the breeding season.

(Key Words: Cows, Resynchronization of Estrus, Estrogen, Progesterone, Pregnancy Rates.)

### Introduction

Unfortunately, the pregnancy outcome after first inseminations is unknown until cows have a repeat estrus (20 to 22 days after first service), are diagnosed pregnant at about 28 days via transrectal ultrasonography, or are diagnosed by palpation after 35 to 40 days. In all such cases, the full advantage gained from synchronizing follicular maturation and luteolysis is not fully realized.

Because all cows are closely synchronized after first insemination, all open cows can easily be resynchronized for their second (and even subsequent) services.

At least two approaches have been attempted to set up a resynchronization of second services. The first attempt included reinsertion of a progesterone-releasing intravaginal device or the feeding of a progestin after previous inseminations. Results were variable.

A second approach included administration of supplemental progestin plus estrogen (to control follicular growth) at the time of insertion of a progesterone-releasing device, and estrogen administration (to induce estrus and the preovulatory LH surge) 0 or 24 hr after the progesterone insert is removed. In those studies, estradiol benzoate (EB) was used. The only estrogen product available in the U.S. is estradiol cypionate (ECP<sup>®</sup>, Pharmacia & Upjohn Co., Kalamazoo, MI). Using a combination of estrogen and progesterone to reset follicular dynamics and synchronize the next eligible estrus has met with success in dairy cattle. Inseminated cows were exposed to progesterone (a used CIDR) for 7 days between days 13 and 20 after insemination. These treatments did not reduce pregnancy rates of dairy cows that had conceived at first service but increased the probability that all nonpregnant cows exhibited estrus within 3 days after progesterone withdrawal, or within 2 days if a second estrogen (EB) injection was given 0 to 24 hr after progesterone withdrawal. Only rarely

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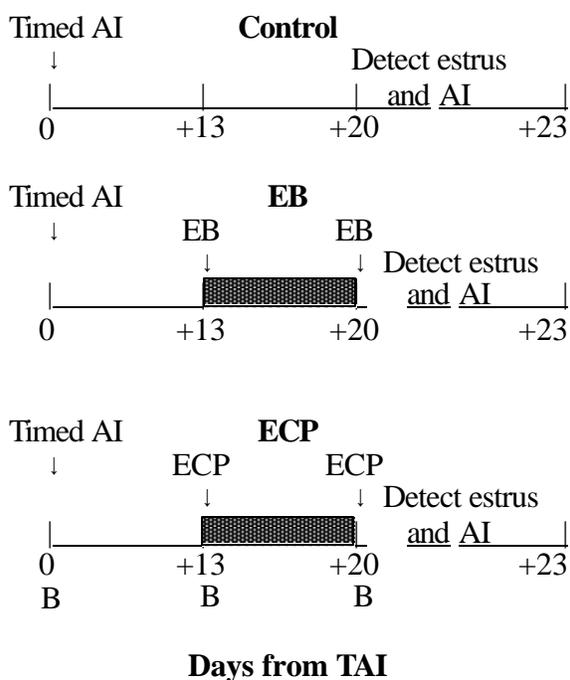
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do pregnant cows show estrus in response to this treatment.

The purpose of our study was to determine if resynchronization of estrus with progesterone and estrogen was feasible in pregnant and nonpregnant suckled beef cows without harm to the ongoing pregnancy of pregnant cows.

### Experimental Procedures

We used three resynchronization treatments on the 609 suckled beef cows described in the previous report (see pages 9 to 11). The three treatments are illustrated in Figure 1.



- B = Blood sample to determine concentration of progesterone
- ▒ = Used CIDR (1.38 g of progesterone)
- EB = Estradiol benzoate (1 mg)
- ECP = Estradiol cypionate (0.5 mg)

**Figure 1. Experimental Protocol.**

Thirteen days after AI, 50% of the cows received no further treatment (controls); 25%

received 1 mg of estradiol benzoate (EB) plus a used CIDR (progesterone-releasing intravaginal insert originally containing 1.38 g of progesterone; CIDR<sup>®</sup>-1380 insert, Hamilton, New Zealand); and 25% received 0.5 mg of estradiol cypionate (ECP) plus a used CIDR. Seven days later, the controls received no further treatment. The used CIDR was removed from EB cows and they received an additional 1 mg of EB. The used CIDR was removed from ECP cows and they received an additional 0.5 mg of ECP.

Cows were observed for estrus twice daily between 20 and 23 days after the timed AI. Any cow detected in estrus after the second EB or ECP injection was re-inseminated between 8 and 12 hr later. Blood samples were collected prior to each injection of estrogen (EB or ECP) for later analysis of serum progesterone. Pregnancy diagnoses were made by transrectal ultrasonography on days 29-33 (all locations) after timed AI (6 to 10 days after the second estrogen injection) and again 31 to 34 days later.

### Results and Discussion

Results of this experiment are summarized in Table 1. The resynchronization protocols were not detrimental to already pregnant cows because pregnancy rates after the first timed AI were similar for two estrogen treatments compared to the controls.

Rates of return to estrus were increased by more than twofold (EB = 2.7×; ECP = 2.3×) with the use of the used CIDR and estrogen treatments. Average days to returned estrus after the timed AI were greater (P<0.01) for the longer-acting estrogen (ECP) than for the shorter-acting estrogen (EB). Conception rates of cows after treatment with progesterone and estrogen tended (P=0.11) to be less than those of controls, primarily because of the EB source of estrogen. Most importantly, total pregnant cows after two synchronizations and inseminations was increased by 11-23%. Embryo survival was unaffected by estrogen treatments. These results demonstrate that repeat estrus can be successfully resynchronized after a timed AI program by using a combination of a CIDR and either of

two estrogen products. Estradiol benzoate has been used successfully in similar protocols for seasonal-calving dairy cows in New Zealand and Australia. Unfortunately, EB is not available in our market, but ECP is available to “correct anestrus (absence of heat period) in the absence of follicular cysts in some cases” (labeled indication for ECP®; Pharmacia & Upjohn, Kalamazoo, MI).

Even though the treatment is given to all cows regardless of pregnancy status, no harm occurred to the ongoing pregnancy in our study or in other studies. In fact, the total number of pregnancies was increased after using our protocol so that more than 60% of the cows were pregnant to AI sires after 23 days of the breeding season.

**Table 1. Reproductive Traits of Suckled Cows after Resynchronization with the CIDR (Progesterone) and Estrogen**

Trait	Treatment		
	Control	EB	ECP
No. of cows	189	96	94
Pregnancy rates after first AI, %	52	44	51
Rates of return to estrus after first AI, %	27 <sup>X</sup>	73	63
Average days to return estrus after first AI	21.3	21.2 <sup>Y</sup>	21.7
Conception rates after second AI, %	62 <sup>Z</sup>	48	63
Total pregnant after two inseminations, %	56 <sup>X</sup>	62	69
Embryo survival after days 29-33 to days 57-61, %	84	92	96

<sup>X</sup>Control vs. estrogen (EB+ECP) (P<0.01).

<sup>Y</sup>EB vs. ECP (P<0.01).

<sup>Z</sup>Control vs. estrogen (EB+ECP) (P=0.11).