# PRESYNCHRONIZATION OF ESTROUS CYCLES IN DAIRY COWS BEFORE OVSYNCH + CIDR AND RESYNCHRONIZATION OF REPEAT ESTRUS USING THE CIDR[1]

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## Summary

Postpartum anestrus is one of the major limitations to achieving acceptable pregnancy rates. The Ovsynch protocol is an excellent tool to improve reproductive efficiency of dairy cows because it can induce estrous cycles in anestrous cows. In the first experiment, administering two $PGF_{2\alpha}$ injections to lactating dairy cows 14 days apart with the second injection given 12 days before the Ovsynch protocol increased ($P<0.05$) pregnancy rate by 10 percentage points in cycling and noncycling cows. Inserting a progesterone-releasing insert (CIDR) for 7 days during the Ovsynch protocol did not further increase pregnancy rates. In a second experiment, a resynchronization treatment consisting of a used CIDR inserted for 7 days from days 13 to 20 after insemination increased ($P<0.05$) embryo survival from day 30 to 58 by 11 percentage points but failed to increase overall rate of return to estrus and conception rate at the second AI (first eligible estrus after first AI).

(Key Words: Ovsynch, Presynch, Pregnancy Rates.)

## Introduction

Previous studies indicated that conception rates were increased when dairy cows began the Ovsynch protocol between days 5 and 12 of the estrous cycle. We showed that a single injection of $PGF_{2\alpha}$ given 12 days before the Ovsynch protocol improved pregnancy rates in multiple-lactation dairy cows but not in first-lactation cows. This also was confirmed by research in Florida herds where two $PGF_{2\alpha}$ injections given 14 days apart with the second injection given 12 days before the Ovsynch protocol increased pregnancy rate by 12 percentage points. The objectives of the first experiment were to determine if two Presynch injections of $PGF_{2\alpha}$ would increase pregnancy rates in cows treated with the Ovsynch protocol and whether inserting a CIDR during the Ovsynch protocol would likewise improve fertility.

Several studies indicated that luteal inadequacy during the luteal phase predisposes a greater risk for lower conception rates at the subsequent estrus. We also found that progesterone supplementation by intravaginal progesterone insert (CIDR; EAZI-breed CIDR-B insert, InterAg, Hamilton, NZ) for 7 days during the ovulation synchronization (Ovsynch) protocol increased pregnancy rates at first service and embryo survival from day 30 to day 58 of pregnancy. The objective of the second experiment was to resynchronize the first eligible estrus in previously inseminated cows of unknown pregnancy status and determine whether the used CIDR would influence AI resubmission rates, conception rate at the repeat estrus, prior established pregnancy rates, and embryo survival of previously established pregnancies.

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## Procedures

In the first experiment, 630 lactating dairy cows from two cooperating herds were used. Cows were less than 40 days in milk at the start of treatments and were milked 3× daily. Cows were then assigned randomly to four treatments based on days in milk and lactation number. Estrous cycles in Groups 1 and 2 were presynchronized with two injections (25 mg) of $PGF_{2\alpha}$ 14 days apart (Presynch) with the second injection given 12 days before the start of the Ovsynch protocol. Estrous cycles in Groups 3 and 4 were not presynchronized (No Presynch). All groups of cows were treated with the Ovsynch protocol consisting of two injections of the gonadotropin-releasing hormone (GnRH; 100 μg) with a $PGF_{2\alpha}$ injection given 7 days after the first GnRH injection and 48 hr before the second GnRH injection. Cows were inseminated 16-20 hr after the second GnRH injection (timed TAI; TAI). During the Ovsynch protocol, Groups 1 and 3 were fitted with an intravaginal progesterone insert (CIDR; EAZI-breed CIDR-B insert, InterAg, Hamilton, NZ) at the time of first GnRH injection and removed 7 days later. Groups 2 and 4 received no further treatment (No CIDR).

In the second experiment, all cows of unknown pregnancy status in the first experiment were assigned randomly to two treatments. A used CIDR was inserted in the first group on day 13 after TAI for 7 days (Resynch). The second group received no further treatment (control). Cows were observed for signs of estrus for 5 days upon used CIDR removal (day 20).

Blood samples were collected prior to each hormone treatment for later determination of progesterone concentrations. Pregnancy was diagnosed by ultrasonography of uterine contents (viable embryo) at day 30 and 58 after the first insemination (TAI). Pregnancy also was confirmed by the herd veterinary practictioner.

## Results and Discussion

Based on concentrations of progesterone measured in three blood samples collected prior the onset of the Ovsynch protocol, over 85% of the cows were cycling. In the first experiment, the proportion of cows with elevated progesterone concentrations (≥1 ng/mL) in their blood at the time of PGF2α injection, indicative of a functional corpus luteum, was high (91%) in the Presynch groups despite the CIDR treatment. Presynchronization with two injections of $PGF_{2\alpha}$ 14 days apart and 12 days before the Ovsynch protocol increased ($P<0.05$) pregnancy rates at day 30 after TAI by 10 percentage points in both cyclic and anestrous cows compared to the no Presynch cows (Table 1). Thus, a high percentage of the Presynch cows were likely in an early stage of the estrous cycle at the time of initiating the Ovsynch protocol. Treatment with CIDR for 7 days during the Ovsynch protocol decreased pregnancy rates by 5 percentage points in anestrous cows and by 9 percentage points in cyclic cows (Table 1).

In the second experiment, the Resynch treatment failed to increase both overall rate of return to estrus and conception rate at second AI (Table 2). In fact, conception rates of cows inseminated between 20 and 25 days after the TAI (0 and 5 days after removal of the used CIDR) were reduced ($P<0.05$) compared to controls. The used CIDR treatment did not have a detrimental effect on the pregnancies established after the TAI because pregnancy rates at day 30 after TAI were not different. In contrast, the Resynch treatment (used CIDR in place from day 13 to 20 after TAI) increased ($P<0.05$) embryo survival to day 58 in pregnant cows by 11 percentage points (Table 2). The increase in embryo survival to day 58 resulting from progesterone supplementation provided on days 13 to 20 might have had positive effects on the developing embryo or the uterus.

In conclusion, using two injections of $PGF_{2\alpha}$ 14 days apart and 12 days before the Ovsynch protocol improved pregnancy rates of both cyclic and anestrous cows. This protocol provides dairy producers with an excellent alternative to increase reproduction performance over what can be achieved with the traditional Ovsynch protocol alone. The CIDR treatment is not warranted under these

experimental conditions. The Resynch protocol with a used CIDR for 7 days inserted on day 13 after TAI improved embryo survival in pregnant cows but did not improve AI-resubmission rate at first eligible estrus following TAI for nonpregnant cows and had a detrimental effect on conception rates of cows inseminated within 5 days after removal of the CIDR.

**Table 1. Pregnancy Rates at Day 30 After Timed AI**

| | Treatments | | | |
|---|---|---|---|---|
| Cycling status | Presynch | No Presynch | CIDR | No CIDR |
| | ---------- % (no.) ---------- | | | |
| Cycling | 48[a] (257) | 38 (244) | 39 (255) | 48 (246) |
| Anestrus | 41[a] ( 56) | 31 ( 67) | 33 ( 55) | 38 ( 68) |

[a]Different ($P$<0.05) from no Presynch within cycling status.

**Table 2. Fertility Traits After Resynchronization of Repeat Estrus**

| | Treatments | |
|---|---|---|
| Cycling status | Control | Used CIDR |
| | ---------- % (no.) ---------- | |
| Return rate | 29 (189) | 32 (169) |
| Conception rate at the repeat estrus | 27[a] ( 55) | 15 ( 54) |
| Pregnancy rate at day 30 | 41 (327) | 43 (297) |
| Embryo survival from day 30 to 58 | 51[a] (134) | 63 (127) |

[a]Different ($P$<0.05) from controls.