

(Re) SYNCHRONIZATION PROGRAMS APPLIED TO BEEF AND DAIRY PRODUCTION

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Introduction

The need to inseminate the largest number of animals in a short period of time requires the development of protocols that allow the synchronization of the return to the estrus of the animals that are empty, to the fixed time artificial insemination (FTAI). This is especially important in herds where the value of breeding produced by artificial insemination (AI) is higher than production by natural breeding, as well as in dairy cow herds in lactation (3).

It is possible to find in the literature data on the use of intravaginal devices with progesterone (P4), oestradiol benzoate (OEB), and GnRH or the combination of both during the luteal phase with the objective that the returns to estrus after FTAI occur in a short and determined period of time.

Experiments in New Zealand by Macmillan and Peterson; (1) showed that if a CIDR-B device (new or used) was placed between Day 16 to 21, the animals could be repeated between 22 and 25 days post-AI instead of the natural return of the heat (Day 18 to 25). Other experiments showed that while this treatment is easy to apply and quite effective, not all empty cows return to heat.

Another possibility studied is the use of a low dose of OEB during the luteal phase. The objective is to use a low dose of OEB that fails to trigger the luteolytic mechanism but is sufficient to act synergistically with the progesterone secreted by CL and induce, through the suppression of FSH and LH, regression of the dominant follicle of the second wave and thus transform 3 waves to all animals, with interovulatory intervals of 23-24 days (2).

In research work in New Zealand / Australia, the re-use of CIDR-B was combined with the administration of OEB to synchronize the development of the third follicular wave. In these experiments CIDR-B devices 13 were inserted 15 days after the 1st AI and were withdrawn 18-21 days after AI. This resulted in 95% of the empty cows after the first AI being estrus between 3 days after CIDR-B removal (10% on the 1st day, 82% on the 2nd day, 8% on the 3rd day). Fertility was similar or higher in the treated groups than in the control groups.

Although these treatments proved to be efficient, there is a need to detect heat and we know that there is a lot of variability in the heat detection efficiency. This is true both in beef cow herds under extensive conditions and in dairy cows (4). This is why

the need to develop protocols that allow a second AI in a short period of time and without the need to detect heat (Second FTAI) was generated.

The objective of this article is to show the new protocols implemented to perform a second FTAI in both beef and dairy cows.

Protocols for resynchronization of ovulation without heat detection in dairy cows

The objective of this experiment was to evaluate the pregnancy rates 90 days in milk (DIM) in high production Holstein cows submitted to two reproductive programs. The work was carried out in Torreón, Mexico between the months of June to August (summer). Six hundred and eighty Holstein cows were used with averages of 1.9 lactations and 36.9 liters/day production under a system of 3 daily milkings. All cows received (Table 1) a dose of 500 µg of cloprostenol (Celosil, Intervet) in the 35 DIM as part of the standard management of the farm. When cows were between 40 to 47 DIM (Day 0), 344 of these were selected (FTAI+Resynch Group) to receive a DIB (1g P4, Syntex) and 2 mg of oestradiol benzoate (Gonadiol; Syntex). On Day 8 the DIBs were removed and 500 µg of cloprostenol (Cyclase, Syntex) plus 400 IU of eCG (Novormon, Syntex) were applied. On Day 9 they received 1 mg of OEB and were inseminated at 60 h after withdrawal of the DIB. On Day 26, all cows received a DIB with prior use. On Day 33 the DIBs were removed and 50 µg of Lecirelin (Gonasyn, Syntex) was applied. On Day 40, ultrasound (US, Agrosan ECM) was performed, on the empty, 500 µg of cloprostenol (Cyclase), 24 hours later (Day 41), 1 mg of EB and were re- FTAI at 60 h of applied PGF. The final diagnosis of gestation was performed for US 30 days after the second FTAI. The remaining 336 cows (Control Group) received a dose of 500 µg of cloprostenol (Celosil, Intervet) and a 12 day test of jealousy and AI. In 60 DIM, cows that were not inseminated received 100 µg of gonadorelin (Fertagyl, Intervet), DEL 67, 500 µg of cloprostenol (Celosil), 48 hours later, 100 µg of gonadorelin (Fertagyl) and were IA 16 h later. Continuation of the daily heat detection of and AI up to the DE 89. The diagnosis of gestation was performed 30 days post AI by US. The data were analyzed by Logistic Regression (Infostat). There was no effect of DIM or semen used ($P > 0.1$). Pregnancy rates between groups were different ($P = 0.01$) and presented in Table 2.

Table 1. Treatments groups. For FTAI+Resynch Group: DIB (1 g P4 intravaginal device), eCG (Novormon), GnRH (Gonasyn), EB (OEB, Gonadiol), PGF (Cyclase)

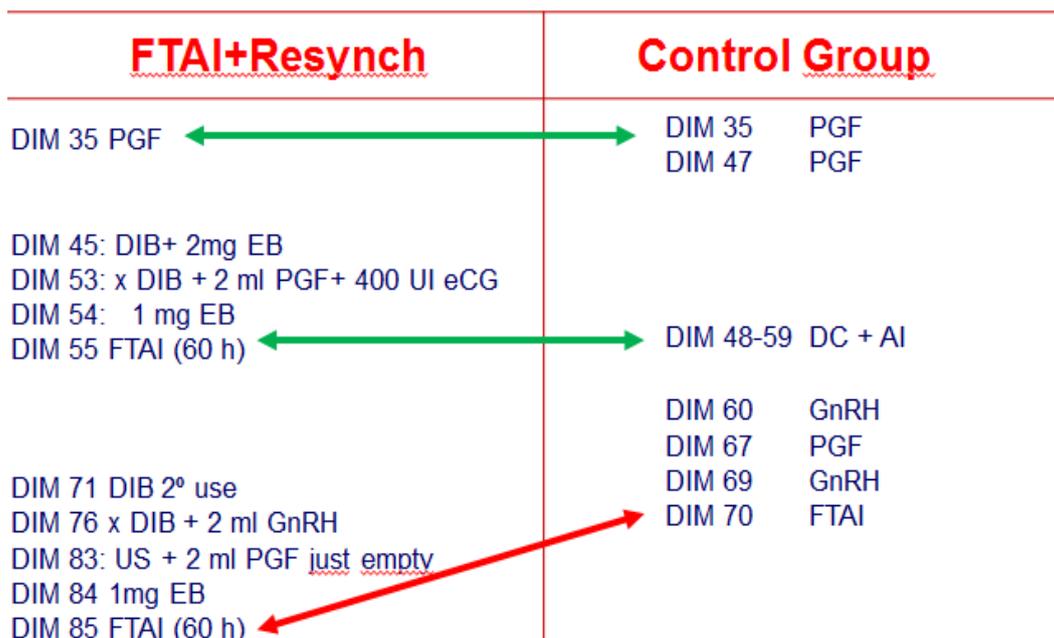
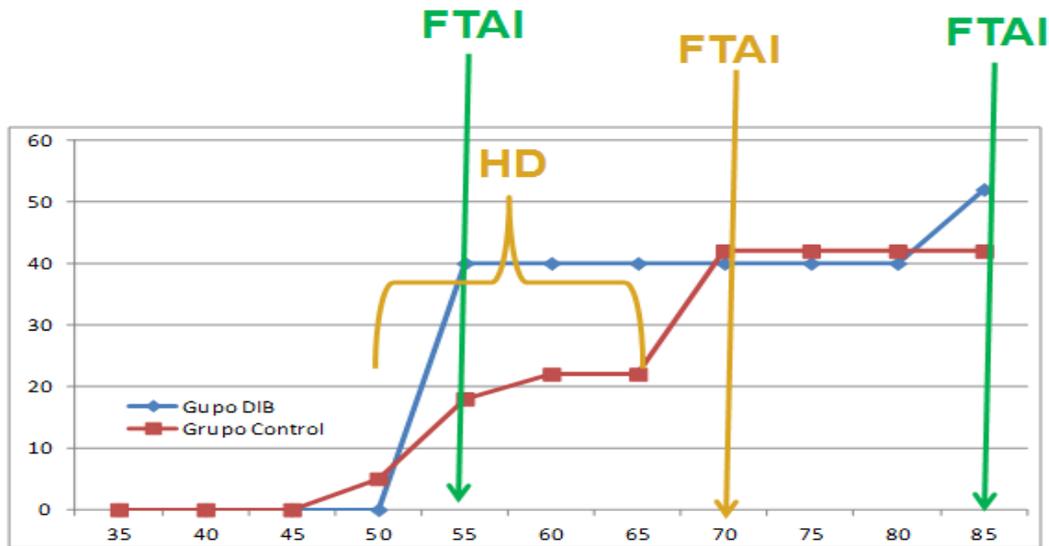


Table 2. Pregnancy rates in cows submitted to FTAI + Resynch or to a presynchronization treatment with PGF and Ovsynch (GPG)

	FTAI+Resynch n=344	Control n=336
PR 1 ^a IA	138/344 (40.12 %) a	71/336 (22.66 %) ^b
PR 2 ^a IA	42/206 (20.39 %)	72/265 (27.16 %)
Overall PR	180/344 (52.33 %) ^a	143/336 (42.56 %) ^b

In Graph 1, the cumulative pregnancy curve can be observed day by day in both treatment groups.



Graph 1. Cumulative pregnancy rate in cows submitted to FTAI + Resync or to a presynchronization treatment with PGF and Ovsynch (GPG)

Protocols for resynchronization of ovulation without heat detection in beef cows

The objective of this work is to report the pregnancy rates obtained by applying FTAI protocols with re - synchronization at fixed time (TF), using fresh semen of proven quality in a retrospective analysis. The following database is the result of work done in herds of the Buenos Aires Province, La Pampa and Rio Negro. From 2007 until the end of 2010, this protocol was carried out on almost 4000 (A. Angus and Hereford) animals from 35 different herds of this area. And these treatments were applied in beef sulked cows, in dry cows and heifers. The protocol used was as follows: Day 0, a progesterone-releasing device (DIB 1 g, 1 g P4, Syntex S.A., Argentina) and 2 mg oestradiol benzoate (OEB; Syntex S.A.) were applied. On Day 8 the DIBs were withdrawn and 500 µg of Cloprostenol (DL Cyclase, Syntex) was applied together with 400 U.I. Of eCG (Novormon, Syntex) plus 0.5 mg of estradiol cypionate (CE; Cipiosyn, Syntex). The FTAI, on average, was performed at 54 ± 2 h post-withdrawal the DIBs. At day 16 post FTAI, the DIB was reinserted, the DIB were withdrawn at Day 21 and 100 µg of Gonadorelin Acetate (Gonasyn GRD; Syntex S.A.) was applied to all animals. On Day 28 post FTAI, the US was performed, and non-pregnant animals were given 500 µg of Cloprostenol (Cyclase DL, Syntex) along with 0.5 mg of estradiol cypionate (CE; Cipiosyn, Syntex). The insemination was performed with fresh semen, of proven quality. Final pregnancy was diagnosed at 32 days of the second FTAI by ultrasonography (Chison 500 Vet, 5.0 Mhz). The results obtained are shown in Table 3.

Table 3. Pregnancy rates of the different categories of animals after FTAI protocols were applied with Re synchronization to TF, and pregnancy losses.

CATHEGORY	Nº in 1st FTAI	PR of 1st FTAI	Nº in 2nd FTAI	PR of 2nd FTAI	Overall PR	Embryonic Loss	FINAL PR
<i>Heifers</i>	2721	59%	1006	52%	78.5	4%	75.8
<i>Sulked Cows</i>	900	57%	390	52%	79.0	1%	78.3
<i>Dry Cows</i>	374	66%	126	52%	83.9	2%	82.3

	3995	59%	1522	52%	79.1	4%	77.0
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Conclusions

We conclude that DIB treatments with OEB and eCG plus Resynch result in higher pregnancy rates at 90 DIM than the Presynch-Ovsynch treatment in high producing Holstein dairy cows that are inseminated at fixed time.

The implementation of these protocols results in a higher pregnancy rate accumulated in the same unit of time. This has a direct impact on reducing the number of open days of lactating cows. On the other hand it completely eliminates the detection of heat in the first two breeds.

The application of FTAI protocols, with re-synchronization to TF and inseminating with fresh semen, to different herds and different categories of beef animals, allows us to obtain pregnancy rates close to 80% in the first thirty days of breed.

Achieving earlier pregnancies in dairy herds by using these kinds of protocol reduces significantly the cost of open day cows. On the other hand, in beef herds, the number of births at the beginning of the calving season increases, which increases the weaning weight of the calves.

References

1. Macmillan, K.L., Peterson, A.J. 1993. A new intravaginal progesterone releasing device for cattle (CIDR-B) for estrus synchronization, increasing pregnancy rates and the treatment of post-partum anestrus. *Anim Reprod Sci*; 33:1-25.
2. Macmillan KL, Taufa VK, Day AM. Manipulating ovaries follicle wave patterns can partially synchronize returns to service and increase fertility of second inseminations. *Proc NZ Soc Endocrinology* 1996; 25.
3. Bó GA, Cutaia L, Pincinato D, Peres L, Mapletoft RJ. Synchronization treatments for fixed-time artificial insemination and embryo transfer in beef and dairy cows, factors affecting pregnancy rates. 2007 CETA/ACTE & CLGA, JOINT CONVENTION, September 13-15, 2007, Summerside Prince Edward Island, Canada.
4. Cutaia L, Tribulo R, Tegli J, Moreno D, Bó GA. "The Use of Estradiol and Progesterone Devices During Mid-Diestrus to Synchronize Return to Estrus in Beef Cows and Heifers". Annual Meeting International Embryo Transfer Society, Foz do Iguzcu, Parana, Brazil 2002. *Theriogenology* 2002; 57: 373. Abstr.
5. Maraña D, Rosillo P, Moran J, Garza A, Cutaia L. "Tasa de preñez a los 90 DEL en vacas lecheras de alta producción tratadas con dispositivos con progesterona o Presynch-Ovsynch" Simposio IRAC 2008, Córdoba, Argentina. CD