



Volume 1 Issue 1

NEW PROMISING PRE-SYNCHRONIZATION SYSTEM FOR LACTATING COWS

~ DOUBLE-OVSYNCH ~

A recent research trial done by the University of Wisconsin, at Dr. Milo Wiltbank's lab, (Souza et al., 2008) has shown promising fertility improvements following the use of the Ovsynch program in lactating dairy cows. The Ovsynch program is a sequence of hormonal treatments that combines gonadotropin releasing hormone (GnRH) and prostaglandin ($\text{PGF}_{2\alpha}$) to synchronize the time of ovulation in bovines allowing for timed artificial insemination (TAI).

Ovsynch protocol has been shown to increase service rates and improve reproductive efficiency in dairy herds. However, Ovsynch has some limitations when used in cows that are either not cycling or in cows that are not in the

ideal phase of the estrous cycle at the beginning of the program. Therefore, several experiments tried to implement prostaglandin injections used at 14 days apart as pre-synchronization treatments to ensure that most of the cows were at the right stage of the reproductive cycle when Ovsynch starts (day 5th to 10th of the cycle).

According to the traditional pre-synchronization system, Ovsynch injections must begin 12 to 14 days following the last $\text{PGF}_{2\alpha}$ treatment. Most of these trials observed improvements (of about 5 to 10% points increase in conception rate) in the first postpartum A.I. when prostaglandin treatments were used prior to Ovsynch.

However, these $\text{PGF}_{2\alpha}$ treatments cannot induce cyclicity in anovular cows (animals with follicles > 10mm without CL). It is important to mention that anovulatory condition is very common in high producing herds at the end of the voluntary waiting period in the United States – normal incidence ranges from 20% to 30% in lactating cows around 60 days in milk (DIM). In other words,

the regular pre-synchronization with two $\text{PGF}_{2\alpha}$ does not seem to be effective to pre-synchronize anovular cows. In addition, there is a high dispersion of ovulations following a $\text{PGF}_{2\alpha}$ treatment (ovulations occur within 3 to 7 days after $\text{PGF}_{2\alpha}$). Such high variation can produce follicles of different sizes when the Ovsynch protocol begins, which in turn might reduce ovulatory response by the first GnRH injection.

In order to overcome these limitations of the regular pre-synchronization strategy with two $\text{PGF}_{2\alpha}$ injections, a new pre-synchronization system – called Double-Ovsynch – has been developed recently by University of Wisconsin researchers. This new pre-synchronization is named Double-Ovsynch because an Ovsynch protocol is used during the pre-synchronization period instead of two $\text{PGF}_{2\alpha}$ injections. Figure 1 on the next page shows the experimental design used in the research trial done by Souza et al. (2008) comparing two pre-synchronization strategies (Traditional Presynch x Double-Ovsynch).

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This trial was performed by researchers on two commercial dairy farms in Wisconsin, and used only first postpartum breedings from multi-parous and primi-parous lactating cows. The results of this trial shows that cows treated with Double-Ovsynch had greater conception rates at first postpartum A.I. compared with the traditional Presynch with two PGF_{2α} (Fig. 2).

Researchers found no treatment-by-farm interaction, which means that Double-Ovsynch was superior to traditional Presynch in both farms. Thus, Double-Ovsynch seems to yield consistently greater fertility when used in different herds (Figure 3), on next page.

Figure 4 shows some of the blood sampling results collected in a subset of cows treated with these two pre-synchronization strategies (traditional Presynch x Double-Ovsynch). The "X" axis is showing the circulating progesterone concentration at the beginning of the TAI-Ovsynch. It is clear that a greater proportion of cows had higher circulating progesterone following Double-Ovsynch compared to traditional Presynch. Thus, Double-Ovsynch induced more cows to cycle before the timed A.I. protocol.

Further ongoing trials are being performed by Dr. Wiltbank's group at the University of Wisconsin to study the physiological underlying reasons for greater fertility following the Double-Ovsynch protocol (Dr. Wiltbank, personal communication). For instance, a recent study using two variations of Double-Ovsynch (Cunha et al., 2008), is in accordance with the hypothesis that greater circulating progesterone concentrations during the interval from the first GnRH to PGF_{2α} of the Ovsynch

Figure 1. Experimental design (adapted from Souza et al., 2008).

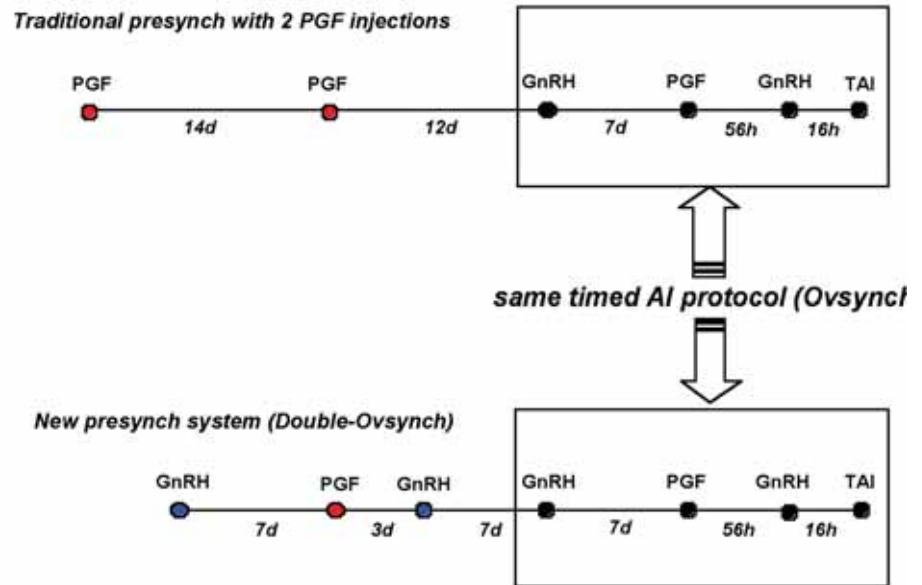


Figure 2. Conception rates at first postpartum A.I. in lactating cows pre-synchronized with Double-Ovsynch (red bar) or traditional Presynch (black bar) with two PGF_{2α} injections (adapted from Souza et al., 2008).

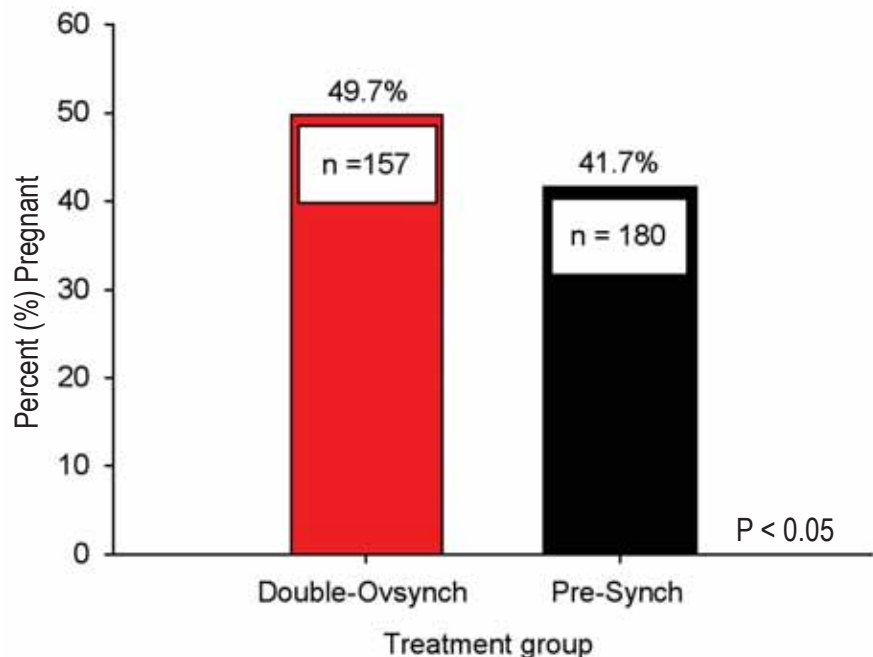




Figure 3. Conception rates in two different dairies (A and B) in cows pre-synchronized with Double-Ovsynch (red) or traditional Presynch (black) (adapted from Souza et al., 2008).

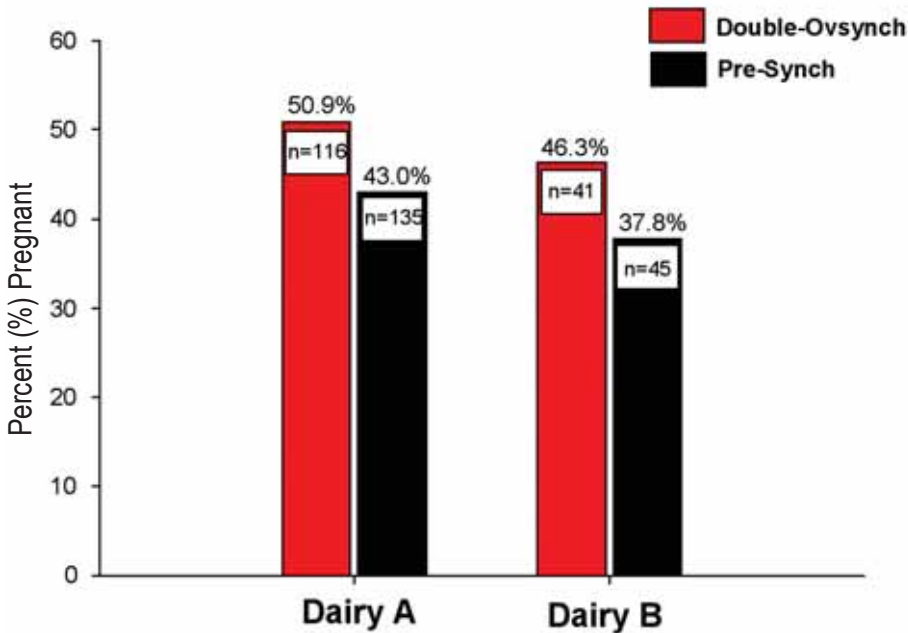
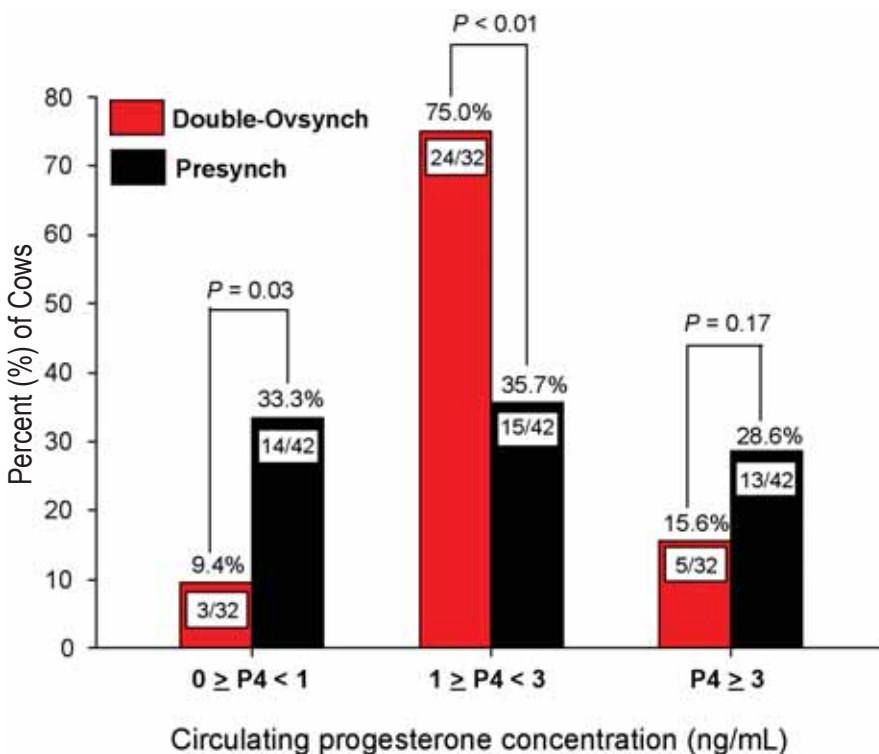


Figure 4. Circulating progesterone concentrations at the beginning of Ovsynch in cows pre-synchronized with Double-Ovsynch (red) or traditional Presynch (black) (adapted from Souza et al., 2008).



protocol is needed for maximal fertility responses in cows receiving TAI (protocol with low progesterone = 33.2%, n = 259 vs protocol with high progesterone = 48.2%, n=255). Therefore, recent modifications in TAI procedures seem to improve conception rate in Ovsynch treated animals.

Although Double-Ovsynch seems to be a very consistent protocol for lactating cows, farmers must make sure that all hormonal treatments are being given at the correct times, to correct cows, with the correct doses. Therefore, the suggested weekly schedule presented on the next page, (Figure 5) should be precisely followed by producers in order to improve compliance while using Double-Ovsynch. Notice that pre-synchronization injections are highlighted in red, and TAI-Ovsynch treatments are highlighted in blue. According to this calendar, TAI is scheduled to be performed on Thursdays starting at 8:00 am.

Producers should take into account that although this new pre-synchronization system called Double-Ovsynch is more labor intensive (adds one more hormonal treatment during pre-synchronization), it has been proven to produce more pregnancies than the standard pre-synchronization with two prostaglandin injections. Thus, if well implemented, Double-Ovsynch can significantly improve reproductive efficiency in your dairy.

REFERENCES:
Souza AH; Ayres H; Ferreira R; Wiltbank M. A new pre-synchronization system (Double-Ovsynch) increases fertility at first postpartum timed AI in lactating dairy cows. Theriogenology, Vol. 70, Issue 2, Pages 208 – 215.

Cunha AP; Guenther JN; Maroney MJ; Giordano JO; Nascimento AB; Bas S; Ayres H; Wiltbank MC. Effects of high vs. low progesterone concentrations during Ovsynch on double ovulation rate and pregnancies per AI in high producing dairy cows. J. Anim. Sci. Vol. 86, E-Suppl. 2/J. Dairy Sci. Vol. 91, E-Suppl. 1.



Figure 5. Proposed weekly schedule of treatments for Double-Ovsynch.

SA	SU	MO	TU	WE	TH	FR
						GnRH1 - Presynch (AM)
						PGF - Presynch (AM)
		GnRH2 - Presynch (AM)				
		GnRH1 - Ovsynch (8:00 AM)				
		PGF - Ovsynch (8:00 AM)		GnRH2 - Ovsynch (4:00 PM)	TAI (8:00 AM)	

Important: Each group of cohort cows should receive different color codes (with the use of chalks) to minimize mistaken or missed hormonal treatments throughout the protocol.

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