

## RESULTS OBTAINED AFTER USE OF TREATMENTS FOR INDUCING AND SYNCHRONIZING OESTRUS IN COWS

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### SUMMARY

The authors induced and synchronized the oestrus and ovulation at a number of 157 Romanian spotted dairy cows, using in association preparations of PGF<sub>2α</sub> (Proliz) and GnRH (Receptal), according to four therapeutic schemes.

The lowest levels of oestrus manifestation (80,09) were shown in cows treated according to scheme I and the highest levels (93,61) appeared at scheme IV.

Most of the cows and heifers synchronized after the scheme II manifested oestrus between 60 and 72 hours.

The lowest rates of pregnancy (46,15%) were observed at scheme III and the highest (53,12%) at scheme II.

In the experimental group, cows resumed the postpartum sexual activity in a natural manner, without hormonal intervention, the rate of gestation reaching 58,06%.

In USA, in dairy cattle farms with medium production, 50% of the cows pass the oestrus period unobserved (Stevenson 2005). Due to secondary effects generated by the application of several hormonal protocols (using progesterone, estrogen), the practice became oriented towards the use of hormonal protocols based only on PGF<sub>2α</sub> or the association of GnRH and PGF<sub>2α</sub>.

The administration of GnRH is followed by:

- The atresia of the dominant follicle;
- Ovulation (if the intervention was made during the luteal phase of the cycle);
- Stimulation of follicular maturation and ovulation of the dominant follicle by GnRH;
- Recruitment of a new follicular wave less than 4 days after treatment (Dolezel et al, 2002).

The Ovsynch procedure got its name because the GnRH- PGF<sub>2α</sub>-GnRH sequence assures synchronized ovulation (Pursley et al, 1995).

The Presynch procedure was proposed in 1998 and it is a modification of the Ovsynch procedure by completing its lacks (Thatcher et al., 1998). The rate of gestation is superior in the case of Presynch utilization (43%), comparing the results obtained ulterior of the Ovsynch use (29%) (Moriera et al., 2000).

### 1. MATERIALS AND METHODS

Out of the 308 cows examined in the two units, 157 cows pursuant to the gynecological diagnose in accordance to the protocols were treated conform the 4 therapeutic hormonal schemes.

For the recovering of these cows we used 4 therapeutic protocols of induction, synchronizing of oestrus and ovulation, as it shows below:

- **Scheme I** consisted in the administration in day 0 of a dose of PGF<sub>2α</sub> (Proliz), followed by the administration in day 3 of a dose of GnRH (Receptal), then, followed by the A.I. at 8 hours from administration of Receptal. Conform this scheme 42 cows have been treated in the 2 farms.
- **Scheme II** consisted in the administration of a PGF<sub>2α</sub> (Proliz) dose, followed by GnRH (Receptal) dose in day 17 and A.I. at 8 hours after the Receptal. Conform this scheme 37 cows were treated in the 2 farms.
- **Scheme III** or **OVSYNCH protocol** consisted in the administration of GnRH (Receptal) in day 0, a PGF<sub>2α</sub> dose in day 7, one more GnRH (Receptal) dose in day 9 and A.I. at 16 hours following this. Conform this protocol 31 cows have been treated in the 2 farms.
- **Scheme IV** or **PRESYNCH + OVSYNCH scheme** consisted in the administration of a PGF<sub>2α</sub> dose (Poliz) in day 0, then the administration of GnRH (Receptal) in day 4, then PGF<sub>2α</sub> again in day 12 and repeated GnRH (Proliz) in day 14, followed by A.I. at 16 hours after last administration. Conform this protocol 47 cows have been treated.
- **Scheme V** or **control group** consists of 62 cows in the 2 farms that manifested normal birth, with physiological puerperium. These cows manifested estrus in the first 60 days postpartum, being able to be inseminated.

The results obtained after A.I. of the cows synchronized with hormonal methods have been compared with the cows that had natural oestrus.

For the females synchronized with PGF<sub>2α</sub> we used the Romanian Proliz pharmaceutical product, which contains an active substance named Cloprostenol, a synthetic analog of PGF<sub>2α</sub>. The cloprostenol was administrated in 2 doses of 0,500 mg each, at an interval of 11-14 days.

Like a source of GnRH we used the pharmaceutical product Receptal, in 2 ml dose.

For a better precision in knowledge of the oestrus and ovulation inception moment, the females were observed 3 times a day (early morning, noon and late night), moments when we appreciated the modifications that appeared at the genital tract by trans-rectal examination and by observing the females behavior.

To establish the moment of the ovulation, trans-rectal examinations were done twice a day, at an interval of 12 hours (morning and night). The females found in heat, synchronized with synthetic analogs of  $\text{PGF}_{2\alpha}$ , were artificially inseminated, conform the protocol antepartum/postpartum and those synchronized with the Ovsynch method, scheme I, were inseminated first time at exactly 60 hours after administration of Cloprostenol.

## 2. RESULTS AND DISCUCTIONS

The experiments were done in years 2007-2009, on 308 dairy cows and heifers.

The cows that had to resume the reproductive cycle postpartum were submitted to gynecological investigation by the veterinary doctor.

Females that presented functional corpus luteum (CL) on one of the ovaries and that were not diagnosed with genital affections, were considered having normal cyclic ovarian activity and were synchronized with  $\text{PGF}_{2\alpha}$ .

The two doses of  $\text{PGF}_{2\alpha}$  were administered at an interval of 14 days in cows and 11 days in heifers.

Any of the dominant follicles has the capacity to ovulate.  $\text{PGF}_{2\alpha}$  has no effect over the normal development of the follicular waves, but it has the capacity to destroy the CL. The stage of follicular development in the moment of  $\text{PGF}_{2\alpha}$  administration, will influence the period of time from the injection to the first oestrus. The animals injected at the time of dominant follicle growth will get in heat in 2-3 days, while the animals with dominant follicle in regression need 4-6 days until a new follicle will come to ovulation. A new "synchronized" follicular wave is initiated in 2-3 days. Because the dominant follicle will develop a luteal tissue, due to GnRH stimulation, a larger percent of cows will show better results to the  $\text{PGF}_{2\alpha}$  injection, 7 days later. This gives better results in comparison to  $\text{PGF}_{2\alpha}$  used alone.

Even if GnRH is synchronizing the follicular development in the majority of cows, some cows are not responding at the first GnRH injection.

If the GnRH injection is not determining the follicular luteinization of the animals that should naturally enter in heat after the  $\text{PGF}_{2\alpha}$  injection, the treatment fails.

We have to report that a quarter of the cows with prolonged anoestrus showed ovarian hypoplasia, maybe due to the foraging and maintenance of these cows, that were not the best ones.

The obtained results have been appreciated, based on: the grouping of heat, the reproductive function stimulation, the repeated oestrus and A.I. at induced estrus and on the number of females that remained pregnant after the A.I. (Table 1).

**Table 1.**

**SUMMARIZER** of the results obtained in the 2 farms regarding the inducing and synchronizing of oestrus and ovulations, applying the 4 therapeutic hormonal schemes

Crt. Nr.	S <sup>1</sup>	Ex. cows <sup>2</sup>	Tr. Cows <sup>3</sup>	Cows in heat		Cows A.I.		Pregnant cows	
				N	%	N	%	N	%
1	Scheme I	57	42	37	80,09	34	91,89	18	52,94
2	Scheme II	59	37	34	91,89	32	94,11	17	53,12
3	Scheme III	57	31	28	90,32	26	92,85	12	46,15
4	Scheme IV	73	47	44	93,61	43	97,72	20	46,51
5	Control group	62	-	62	100,00	62	100,0	36	58,06
	<b>TOTAL</b>	<b>308</b>	<b>157</b>	<b>205</b>	<b>-</b>	<b>197</b>	<b>96,09</b>	<b>103</b>	<b>52,28</b>

1. Synchronization
2. Examined cows
3. Treated cows

In the experiment realized in the two zootechnical units, 308 cows were taken in study, of which 157 cows were treated conform the four therapeutic schemes.

Of all the examined cows, 205 manifested oestrus, 197 have been inseminated artificially, obtaining a rate of pregnancy of medium 52,28%.

In case of scheme I, the estrus was manifested at 37 cows (80,09%), 34 cows got A.I. (91,89%), obtaining a medium rate of gestation 52,94%.

The scheme II used 37 animals to treatment out of which 91,89% (34 cows) manifested oestrus. Out of these, 32 cows have been inseminated, the rate of gestation was 53,12%.

Conform scheme III OVSYNCH, in the two units were treated 31 cows, 90,32% (28 cows) manifested oestrus, 26 were inseminated. The rate of gestation was 46,15% (12 animals).

In scheme IV we treated 47 cows, 93,61% (44 cows) manifested oestrus and 43 cows were inseminated. After applying this protocol we obtained 46,51% the rate of gestation (20 cows).

Out of 62 inseminated cows from the control group, 36 cows were diagnosed pregnant (58,06%).

Concluding the number of cows taken in study from the total 308, 157 got treatment and 205 presented oestrus; counting the natural oestrus of the control group, 197 cows were inseminated (96,09%) and the gestation was present in 103 cows (52,28%).

Using the OVSYNCH method in inducing and synchronizing the heat and ovulation in cows, gives good results, producing a grouping of ovulation on a short time, between 60 and 70 hours after the treatment finished, allowing the A.I. on a fix time with high results, without need of tracking the heat.

In case of using method OVSYNCH – scheme I, no late ovulation was determined, nor anovulatory heat, due to GnRH that induces ovulations.

Even if this method of synchronizing is pretty costly due to the high cost of the pharmaceutical substances based on gonadotropin releasing hypothalamic hormones (GnRH), it is justified the use of this method regarding to the advantages brought up by no need to track down the heat, use of a single A.I. at fix therm.

The biotechnological view of oestrus synchronization is different from the ovarian activity of the females. At cyclic females, which present ovarian activity, with or without heat manifestation (silent heat), the time control of the CL function is done by luteolytic hormones ( $\text{PGF}_2\alpha$ ).

In females with anoestrus due to ovarian inactivity, the ovulation must be induced with the help of GnRH.

These cases are frequently met in lactating cows and in those cows that doesn't get the maintenance comfort, in which the endogen progesterone doesn't imply uptake of the estrus cycle nor the synchronizing treatment does.

Tracking the females in heat puts lots of problems, especially in farms in which cows are grassing all summer season.

STEVENSON and col. (27) observed that nearly 50% of the manifested estrus cycles are not being detected, which means big economy loss.

As well, 30% of cows present shorter estrus then 12 hours, this needs more observation per day for tracking as many females as possible. These all ideas impose upon the use of biotechnology of reproduction in the management of reproduction of dairy cattle farms, inducing and synchronizing the oestrus makes the work easier and reduces the costs of tracking heat and reducing the number of estrus cycles unobserved.

HOLMANN, (1984) cited by (27) have shown that the optimal time of interval between birth (C.I.-calving interval) in dairy cows is 12-13 month, with an uterine rest of 85 days. Because all the cows are acyclic on a variable duration after birth, and the fecundity is almost 50%, it is important that the cycles are resumed as fast as possible after birth.

Inducing and synchronizing the oestrus in cows with prolonged anoestrus as well as synchronizing the oestrus in cyclic females, consists in a biotechnological method of upgrading the principal indicators of reproduction (rate of gestation, uterine rest, C.I.).

### 3. CONCLUSIONS

3.1. The lowest rates of oestrus manifestation (80,09%) appears in cows treated conform scheme I ( $\text{PGF}_2\alpha + \text{GnRH}$ ), the highest rates (93,61%) consisting in scheme IV (Presynch + Ovsynch);

3.2. The majority of cows and heifers synchronized with Ovsynch method, scheme II (one dose of GnRH and two doses of Cloprostenol), manifests heat between 60-72 hours.

3.3. Cows react better then heifers at hormonal treatment for synchronizing heat, no matter what method had been used. Heifers show a tendency to reduce the rates of manifesting heat with 9-12% in the first two schemes, comparing to cows.

3.4. The lowest rates of pregnancy (46,15%) are registered in scheme III (Ovsynch) and the highest in scheme II (53,12%).

3.5. Females synchronized by Ovsynch method, scheme I showed grouped ovulation at 12 hours interval between 60-72 hours after treatment.

3.6. Using the scheme II ( $\text{PGF}_2\alpha + \text{PGF}_2\alpha + \text{Gn-RH}$ ) of ovarian stimulation in postpartum cows has the advantage of being less costly and permits A.I. in fix time.

3.7. Cows which resumed the postpartum sexual activities after hormonal treatment or medications a rate of 58,06% was obtained, little more superior of that obtained in control groups.

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