

SHORT TERM PROGESTAGEN TREATMENT FOR ESTRUS SYNCHRONIZATION AT NULLIPAROUS EWES FROM THE SYNTHETIC POPULATION BULGARIAN MILK

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Abstract

The aim of the present study was to induce synchronized estrus by short-term progestagen treatments plus PMSG at nulliparous ewes from the breed Synthetic Population Bulgarian Milk at the beginning of the estrus season. The experiment was carried out with 30 ewes, divided in 3 groups (each group – n=10). I group – vaginal sponge impregnated with 30 mg FGA for six days, as at the time of the placement of the sponge 125 µg cloprostenolum was put i.m. At the time of the removal of the sponge, 300 UI PMSG was put i.m.; II group – the same as the I group, but without cloprostenolum treatment; III group – control. The applied schemes had good synchronized effect, but low fertility (90% and 66,67%, 22,22% and 33,33 respectively for Group I and Group II).

Key words: ewes, estrus, synchronization, progestagens

1. INTRODUCTION

When the breeding campaign is carried out in the flock with ewes at different ages, the nulliparous ewes show estrus signs later than multiparous. This is due to the social-behavior stimuli and mainly to “the role of learning” (Martin et al. 2004). Experienced ewes, were more receptive than inexperienced (Gelez et al. 2003), and that is the reason why rams prefer multiparous to nulliparous. Also female to female stimulation exists and ewes in oestrus can stimulate ovarian activity in seasonally anoestrous ewes (Zarco et al. 1995). So, if the breeding campaign lasts 35-40 days (which is the standard in Bulgarian sheep breeding practice), the nulliparous ewes will start to cycle during the second part of the campaign. Thereby the extension of breeding campaign becomes and hence extension of lambing campaign. Therefore it is suitable to stimulate nulliparous ewes earlier to show estrus cycle.

The methods of estrus synchronization can be classified as natural (non-hormonal) and pharmacological (hormonal) (Bankov et al. 1989; Tyankov et al. 2000; Wildeus 2000; Dankó 2003). The traditional progestagen treatments for ES of small ruminants are with intravaginal sponges, impregnated with progestagen (flurogestone acetate FGA or medroxyprogesterone acetate MGA), inserted over the periods of 9 to 19 days and used in conjunction with PMSG, particularly for out-of-season breeding, injected at the time of sponge removal or 48 hours prior to sponge removal (Wildeus 2000). Long-term progestagen treatments effectively synchronized estrus, but with variable fertility (Menchaca & Rubianes 2004). For the last 15 years an alternative methods for ES of small ruminants, named short-term progestagen treatment (consisting of 5-7 days progestogen priming) were developed (review, Menchaca & Rubianes 2004).

The aim of the present study was to induce estrus synchronization by short-term progestagen treatments in the beginning of breeding campaign at nulliparous ewes from the Synthetic population Bulgarian milk.

2. MATERIAL AND METHODS

The study was carried out with 30 nulliparous ewes (aged 18 months) from the breed Synthetic population Bulgarian milk during July, 2013, raised in the experimental farm of the Institute of Animal Science – Kostinbrod, Bulgaria. The ewes were clinically healthy, body condition score – 2,6 and average weight - 40 kg.

The ewes were divided in 3 groups (n=10 for each group): I group (PGPgPMSG – vaginal sponge, impregnated with 30mg FGA (Synchropart®, CEVA SANTE ANIMALE, France) for six days, as at the time of the placement of sponge 125 µg cloprostenolum (0,5 ml Synchromate BREMER PHARMA, Germany) was put i.m. At the time of removal of the sponge 300 UI PMSG (Synchropart® PMSG, CEVA SANTE ANIMALE, was put i.m.; II group (PgPMSG) – the same as the I group, but without cloprostenolum treatment: III group – control.

At group II, during the removal of the sponges, one ewe was rejected, because its sponge was fallen. Also in that group, one ewe died, before giving a birth and its data was used only for synchronized effect. Another ewe manifested estrus on 72 hours, and its data was taken as negative for effect of the estrus synchronization.

The teasers were introduced to the ewes on 46 h after sponge removal. The ewes in estrus was inseminated in fixed time artificially, with fresh, non-diluted semen, with dose of 0,4 ml on 48 h and 56 h after sponge removal. Only ejaculates with the next parameters were used: volume $\geq 0,5$ ml and motility 70%.

The observation of the ewes from Group I and Group II for repeated estrus and from Group III for spontaneous estrus continued 30 days.

The following parameters were studied:

- Effect of estrus synchronization (EES) - ewes in estrus on 46 h after sponge removal
- Fertility (at first estrus) for Group I and Group II
- Total fertility of the three groups
- Fecundity
- Fertility and fecundity were calculated after lambing. Fertility is defined as the ratio of the number of ewes pregnant to the number of ewes, exposed to artificial insemination at the first estrus. Fecundity is defined as the number of born lambs from pregnant ewes (included all born lambs – live and dead). All results were presented in number (n) and percentage (%).

3. RESULT

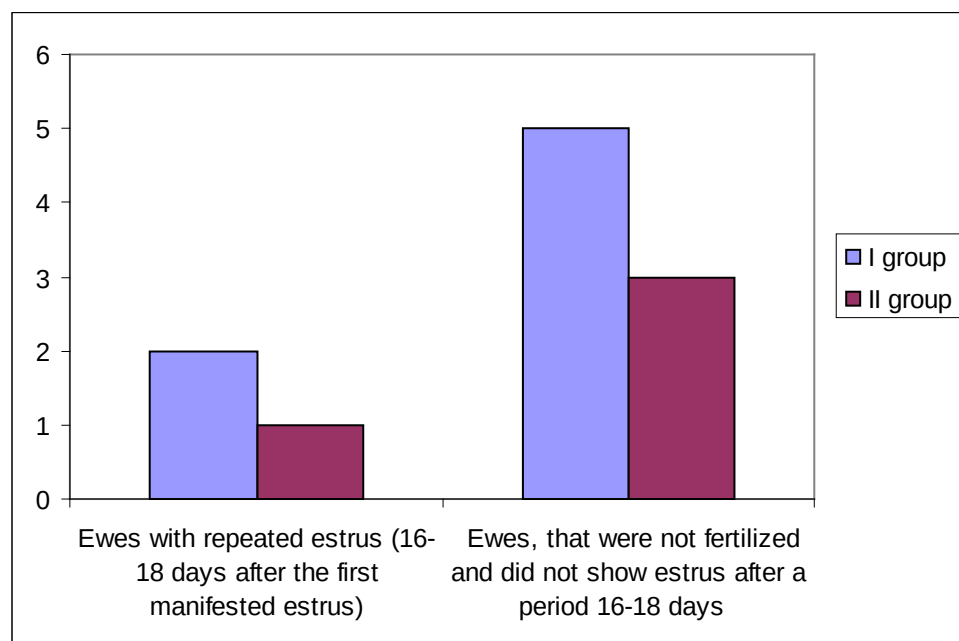
The scheme of synchronization, that was applied at Group I had better EES, than the scheme of Group II – 90% vs. 66,67% (Table 1). If we added to Group II the ewe that show estrus on 72 h (see Material and methods), the percentage will increase.

The fertility at first estrus is low for both groups - 22,22% and 33,33% respectively for Group I and Group II, or 2 ewes from a group (Table 1). Also only two ewes from Group I and one ewe from Group II showed repeated estrus after non - fertilization (figure 1). The rest of the ewes – 5 from Group I and 3 from Group II didn't show estrus after a period of 16-18 days, but they also were non-fertilized (figure 1). As a whole for the studied 30 day period, the ewes with clinically manifested estrus were more than the ewes from the control group, where only 3 from 10 ewes showed estrus.

The fecundity of the ewes from the experimental groups after the first estrus fertilization was good – 3 lambs from 2 ewes or 150% (table 1). The total fecundity of the all fertilized ewes for the studied 30 day period, was presented in Table 2. The fecundity of the control group was the lowest – 2 lambs from 2 ewes or 100% (table 2).

Table 1. Reproductive parameters of the groups with progestagen devices

Group	Ewes with manifested estrus		Fertility		Fecundity	
	n	%	n	%	n	%
I, n=10	9	90	2	22,22	3	150
II, n=9	6	66,67	2	33,33	3	150

Figure 1. Number of ewes with repeated estrus and with non-repeated estrus.

Note: All of these ewes manifested estrus on 46 hour after the sponge removal.

Table 2. Fertility and fecundity of all groups for the first 30 days of the mating campaign

Group	Ewes with manifested estrus in the first 30 days of the mating campaign	Total number of all fertilized ewes, in that number ewes with repeated estrus from Group I and Group II	Total born lambs, n	Total born lambs, %
I	9	4	5	125,0
II	8	4	5	125,0
III (Control)	3	2	2	100

Note: From Group II one ewe showed estrus on the 72 hour after the sponge removal and was fertilized successfully and was also included in that summarized data. Another ewe from Group II did not show estrus after the sponge removal, but later in the campaign showed natural estrus.

4. DISCUSSION

The obtained results for the EES are similar to those obtained from other authors (Ungerfeld & Rubianes 1999, Viñoles et al. 2001, Ustuner et al. 2007, Karaca et al. 2009, Maslev et al. 2010, Martemucci & D'Alessandro, Metodiev & Raicheva 2011). The authors report that the EES is from 80-85% to 100% till 144 h after the sponge removal. The comparison of the obtained results from us and the results of the other authors, give us opportunity to evaluate the applied scheme as good and suitable for use, as we give superiority to the scheme of Group I. The aim of our study was to achieve estrus synchronization on 46 h after the sponge removal to nulliparous ewes. From the cited authors above, only Karaca et al. 2009 used the same animals as ours – aged 18-24 months from

the breed Tahivora, but it is unclear whether they are nulliparous or multiparous. The author achieved 88,5 EES with the scheme that is similar to ours, but eCG was in dose of 400 UI, and the analogue of PGF2 α was put at the moment of the sponge removal.

Our results for the fertility were lower than those, reported from other authors. & Rubianes (1999), Viñoles et al. (2001), Karaca et al. (2009), Martemucci & D'Alessandro (2011) reported fertility from 80%, but after natural mating and multiparous ewes, not fixed-time and nuliparous. Ustuner et al., (2009) after six days progestagen treatment and 300 UI PMSG at Awassi ewes at the age of 2,5 years and fix-time AI with diluted semen on 40 and 60 hour, obtained similar result – 20%. In our previous study with multiparous Ile de France ewes, we applied the same schemes and obtained better results for the fertility - 63,64% for the scheme of Group I (with synthetic analogue of PGF2 α) and 45,45 % for progestagen and PMSG. It is right to note, that in that experiment, we used AI, but with non-diluted semen and insemination was in 12 hours interval till cessation of estrus.

According to us, the low values of the fertility are due to the next reasons: methods of synchronization, body condition and type of insemination. It is well known, that the use of progestagen devices, such as intravaginal sponges lead to lower conception rates than nonhormonal natural services, due to alternations in patterns of LH release, in quality of the ovulations and/or in sperm transport and survival in the female reproductive tract (by the review of Abecia et al. 2011). The low BCS (2,6) also is the reason for lower fertility. As a whole, the low BCS and realization of negative energy balance has negative impact on the reproduction of sheep (review of Scaramuzzi et al. 2006). Positive correlation exists between the ovulation rate and the live weight/BCS, which reflects at the later stages on fertility and fecundity (Kleeman & Walter 2005).

The greatest differences in sexual activity occurred in the transitional period between the seasonal anoestrus and the reproductive season, when a moderately high body condition induced a significant increase in the proportion of ewes in estus (Forcada & Abecia 2006). And that is the reason, according to us, for the small number of ewes from the control group, that showed estrus in the first 30 days of the campaign.

Also, it is interesting the number of ewes, that was neither fertilized, nor showed estrus after non- fertilization after 16-18 days (figure 1). According to us, this is due to the early embryonic death, but we could not prove that clinically. Low BC, which is consequence of the undernutrition, increases the cases of embryonic losses (Abecia et al. 2006).

The obtained fecundity of all ewes (Table 2) is in the standard bounds of the breed. In our previous study (Metodiev 2013) about the influence of the age on the fecundity in that flock, the mean value of the fecundity of the 2 years old ewes was 126,8%.

5. CONCLUSION

The applied schemes had good synchronized effect, but low fertility (90% and 66,67%, 22,22% and 33,33 respectively for Group I and Group II). These schemes could be applied, if the farmer wants to shorten the terms of mating campaign, or to induce earlier sexual activity of nulliparous ewes. For better results of the fertility we recommend to apply these schemes only to ewes with BSC 3,0 – 3,5 and natural mating or AI till cessation of estrus, not in fix-time.

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