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THE INFLUENCE OF THE TIME OF IMPLEMENTATION OF PMSG ON SOME OF THE REPRODUCTIVE PARAMETERS IN SHEEP WITH SYNCHRONIZED OESTRUS

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Communication

Abstract: Different schemes of PMSG treatment on some reproductive parameters in sheep were studied. Two groups of 6 sheep each at the end of the non breeding season were treated with vaginal sponges Chrono-gest (Intervet, Holland) containing 30 mg fluorogeston acetate (FGA). The sponges were removed 12 days after insertion. Sheep of the experimental group were injected with 500UI Folligon (Intervet, Holland) 48 hours before sponge removal whilst the corresponding control sheep were treated with the same dose Folligon at the day of of sponge withdrawal. The clinical signs of oestrus, plasma progesterone concentrations and changes in the ovarian morphology during the observation period were registered. The conception rate, fertility and twinning rate were also recorded. The results show that the earlier application of the gonadotropin influence positively the reproductive traits in ewes.

Key words: sheep, estrous synchronization, treatment

Introduction

Most of the sheep breeds reared in Bulgaria exhibit seasonal reproductive rhythmicity associated with changes in the natural dark-light cycle. Different schemes of estrous synchronization has been studied in order to improve reproductive efficiency *(Kusina et al., 2000)* adjusting the lambing time to the most favorable time of the year in relation to the forage availability, climatic conditions and market trends *(Karaca et al., 2009)*. According to *Jainudeen et al. (2000)* reproductive photoperiodicity may successfully be modified by progesterone treatment which would be expected to lengthen the luteal phase of the cycle. *Ungerfeld et al. (2002*) recommended the application of progestagens in the form of vaginal sponges for a period of 6-14 days in combination with PMSG. It was found that gonadotropins stimulate follicular growth, increase the ovulation rate

and fertility and improve synchronization *(Cline et al., 2001; Maurel et al., 2003; Ralchev et al., 2008)*.

The aim of the current study was to evaluate the effect of the various schemes of PMSG treatment on estrous synchronization, fertility and conception rate in sheep treated with progestagen, at the end of anestrus.

Materials and Methods

The study was conducted in the experimental farm of the Institute of Mountain Stockbreeding and Agriculture (Troyan) in August (late anestrus). Two groups of 6 Tsigai and Drysdale crosses each were kept indoor and daily ration consisting of 1.5 kg./head meadow hay (9.98% crude protein and 34.9% crude fiber) and 0.2 kg/head concentrate (14.3% crude protein and 7.9% crude fiber) was fed. Water and salt were offered ad libitum. Each ewe received an intravaginal sponge Chrono-gest (Intervet, Holland) impregnated with 30 mg fluorogestone acetate (FGA) for 12 days. The experimental sheep were injected with 500 UI Folligon (Intervet, Holland), 48 hour before sponge removal whereas the controls received the same treatment on the day of sponge withdrawal. The onset of estrous was detected twice daily – in the morning and in the afternoon by using a teaser ram. Ewes were checked visually and were considered to be in estrous when they allowed to be mounted. Sheep in estrous were hand-mated by a ram of the corresponding breed 24 to 72 hour after sponge withdrawal. Conception rate, fertility and twinning rate were calculated according to ewe performance at lambing.

Jugular venous blood samples were collected from three sheep of each group at the time of sponge insertion, on the day of their withdrawal and in two day intervals during the period of 16 days after mating. After centrifugation (4000 rpm for 10 min) the blood samples were stored at -20^0C up to the end of the observation when they were analyzed. In both groups of sheep uterus and ovarian were monitored and photographs were taken 72 hour after sponge withdrawal and again 17 days thereafter by means of micro camera Ricohn (Ricoh company, Japan) equipped with TTL flash Karl-Schorz-Endoskope (Germany). Laparoscopy was performed after 12 hours of food and water deprivation according to the method described by *Ralchev (1992).*

Results and Discussion

All ewes injected with Folligon 48 hours before the sponge removal showed estrous 24 – 36 hours after sponge withdrawal and some sheep continued to manifest signs of estrous during the next 12 hours. In ewes injected with PMSG on the day of sponge removal estrous occurred between 48 and 60 hours after treatment. Similar response pattern to exogenous hormone treatment in anestrous ewes was observed by *Dogan and Nur (2006)* in Kivircik breed and by *Hristova et*

al. (2010) in Il de France ewes. *Bonev et al. (2002)* also found that Il de France ewes manifested estrous 45 hours after PMGS injection. Before sponge insertion and during the first days after their withdrawal plasma progesterone concentrations were lower than 0.3 ng/ml. We also found that seventy two hours after gonadotropine injection progesterone concentration start to increase achieving in both groups the maximum values of 0.5 ± 0.16 and 0,4 ±0,13 ng/ml, respectively, by the 92nd hour after treatment and remained elevated up to the end of the observation.

Similar pattern in temporal changes of progesterone concentration was observed in Kivircik ewes treated with MAP (medroxiprogesteron acetat), 500 UI PMSG and 5 mg Dinaprost at the time of sponge removal *(Ekiz and Ozcan, 2006)*. Progesterone concentration started to increase 50 h after injection and at 122 h it already exceeded 0.5 ng/ml. Our results corresponded closely to the findings of *Ralchev et al. (2008)* who studied the changes in plasma progesterone concentrations in Tsigai ewes injected with 500 and 1000 UI gonadotropin at the time of sponge removal during the non-breeding season. In both groups of sheep progesterone concentration began to increase 72 h after gonadotropin injection reaching the peak levels of 0.47 and 0.33 ng/ml, respectively, by the 5th day post-treatment. The low level of plasma progesterone at the beginning of the estrous found in our study may be accounted for by the functional changes related to development and maturation of corpus luteum. According to *Barret et al. (2002)* progesterone levels lower than 0.2 ng/ml may be considered as a baseline.

The number of corpus luteum monitored at 72 h after sponge removal was equal in both groups whilst on day 17 it was higher in ewes injected with PMGS 48 h before sponge withdrawal (Table 1).

Table 1. Data from the laparoscopy performed at 72 h and 17 days after removal of the vaginal sponges

Sheep №	72nd hour		17th day		Lambs born
	right ovary	left ovary	right ovary	left ovary	
Experimental group					
170	non-observed	corpus rubrum (12 hours)	normal	gravid corpus luteum	2
701	3 corpora lutea	normal	2 gravid corpora lutea	normal	3
702	normal	corpus rubrum	normal	1 gravid corpus luteum	barren
704	normal	1 corpus luteum	normal	1 corpus luteum	1
705	1 corpus luteum	non-observed	1 corpus luteum	follicles	1
706	normal	corpus rubrum	normal	corpus rubrum	barren
Control group					
707	cyst	1 corpus luteum	normal	1 corpus luteum	1
709	normal	corpus rubrum	normal	corpus albicans	barren
710	1 corpus luteum, 3-4 cystic changes	1 non-ovulated follicle 1 corpus rubrum	1 corpus luteum	normal	2
715	3 cysts	1 corpus luteum	normal	1 corpus luteum	barren
718	normal	cyst	normal	corpus albicans	barren
719	1 corpus luteum	3 cysts	1 corpus luteum	normal	1

The incidence of ovarian cysts tended to be higher in sheep treated with PMGS at the time of sponge removal. This, in turn, may affect plasma progesterone concentration and influence negatively conception rate and fecundity.

Generally, our results suggest that time of PMSG treatment affect reproductive traits. Conception rate, fertility and twinning rate were 66.7%, 116.6% and 50% in experimental ewes and 50.0%, 66.6% and 33.3%, respectively, in control sheep (Figure 1).

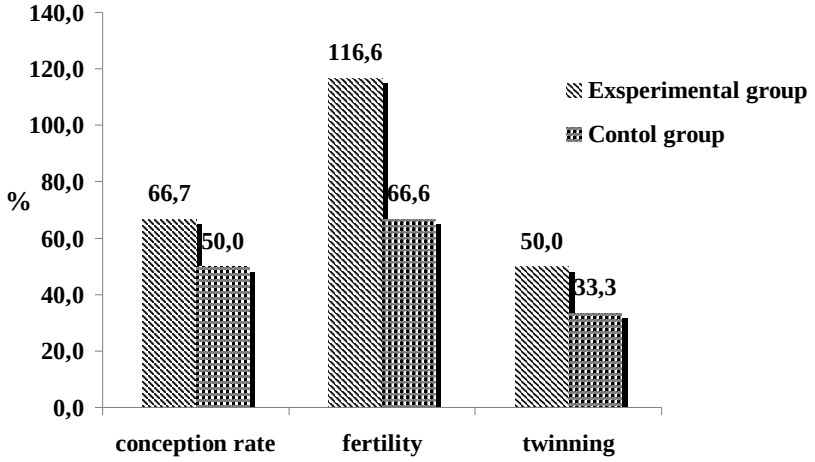

Figure 1. Reproductive traits in experimental and control ewes

Koyuncu and Ozis (2010) reported the highest values of in Kıvırcık ewes treated over the breeding season. These authors pointed out that in ewes injected with PMSG 24 h before sponge removal conception rate, fertility and twinning rate constituted 76.7%, 132.0% и 73.9%. The corresponding values in sheep receiving the same treatment at the time of sponge withdrawal were 86.2%, 127.6% and 61.9%, respectively. Similarly, *Zeleke et al. (2005)* found that PMSG treatment 24 h before sponge withdrawal increased fertility in sheep. The overview of findings showed that responses to hormonal treatment may vary according to breed, season, treatment regimes, management and mating system.

Conclusion

The data derived from the current study suggest that application of PMSG before sponge removal affect positively reproductive performance of sheep.

Folligon treatment at the time of sponge removal cause ovarian abnormalities increasing the incidences of ovarian cysts.

Uticaj vremena implementacije PMSG na reproduktivne parametre ovaca sa sinhronizovanim estrusom

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Rezime

U radu su prikazana ispitivanja uticaja različitih šema PMSG tretmana na reproduktivne parametre kod ovaca. Dve grupe od po 6 ovaca su na kraju vansezonskog perioda oplodnje tretirane vaginalnim sunđerima natopljenim Chrono-gest-om (Intervet, Holland) koji sadrži 30 mg fluorogeston acetata (FGA). Sunđeri su uklonjeni 12. dana nakon aplikacije. Ovce eksperimentalne grupe su tretirane sa 500UI Folligon (Intervet, Holland) 48 sati pre vađenja sunđera dok su ovce kontrolne grupe tretirane sa istom dozom Folligena na dan vađenja sunđera. Praćeni su klinički znaci estrusa, koncentracija plazma progesterona, promene u morfologiji ovarijuma, koncepcija, plodnost i nivo bliznjenja. Rezultati pokazuju da ranija primena gonadotropina utiče pozitivno na reproduktivne sposobnosti ovaca.

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