

EFFECT OF APPLIED PMSG DOSE ON REPRODUCTIVE PARAMETERS FOR IMPROVED SJENICA SHEEP IN ANESTROUS SEASON

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Abstract

This paper shows the results of the effects of higher dose 700 i.u. of natural gonad tropic hormone PMSG application in comparison with usual 500 i.u dose which is used at the farms during the induction and synchronization of estrus in anestrus season in Sjenica improved sheep. This experiment included 90 grown sheep divided into two groups (control group 30 sheep and experimental group 60 sheep). Both groups received polyurethane sponges impregnated with 20 mg of Fluor Geston Acetate (FGA). After 14 days both group sponges were removed. First group received 500 i.u of PMSG, usual dose, and second (experimental group) received 700 i.u of PMSG. Insemination was conducted 48-72 hours after gonad tropic hormone application. Number of sheep that lambed compared to the number of sheep that were treated was 93.33% (control) and 88.33% experimental group. Average fertility of control group sheep was 150.00% while experimental sheep had average fertility of 209.43%, which is more than 59.43% higher compared to control group. Higher dose of PMSG led to higher number of triplets by 7.34%, quadruplets by 14.41% and quintuplets by 4.50% in the experimental group. Higher dose by 200 i.u of PMSG had a positive effect and increased fertility by 59.43%, which negates zero hypothesis that there is no difference between researched treatments and it proved hypothesis that higher dose of PMSG has a positive effect on Sjenica improved sheep during anestrus season.

Key words: *Fluor Geston Acetate (FGA), PMSG dose, sheep, sheep fertility*

Introduction

Main goals of modern animal husbandry production are how to increase animal fertility, extend their usage period and get and grow highest possible number of high quality offspring. Sheep are seasonal poly estrous animals. A seasonal sexual activity phenomenon is influenced by different length of sunlight and dark cycle in specific seasons (Spring, Summer, Autumn, Winter). A mating season for sheep starts when days become short, which in our northern hemisphere happens in the period from second half of August till the first half of January (Stančić, 2008).

Complex neural-endocrine apparatus is under a direct influence of differences in photoperiods during the year, so it is being manifested as mating season (estrous season) and sexual inactivity season (anestrus) (Nenadić et al., 1993).

In anestrus season sheep are not sexually active, they do not have estrus cycles and ovulation, and they do not show estrus signs. Today intensive sheep production is based on genetic potential and life cycle of the animal, mainly on increasing the biologic base of reproductive cycle (Mekić et al., 1997, 2012, 2013). Methods that are used with goal to increase the reproductive efficiency of sheep are mainly oriented towards shortening the seasonal anestrus time, increasing the number of born lambs per sheep and introduction of young sheep in reproduction.

Evocation and synchronization of estrus in sheep by applying hormonal substances has important role among the methods for sheep reproduction increase, therefore it has important role for total sheep production increase. For example, if the sheep is being treated with intra vaginal sponges during 12-14 days of anestrus season, and they receive injection of PMSG after sponge removal, evoked ovulation is followed by visible estrus signs (Stančić, 2008).

Progesterone hormones are in wide usage for small ruminants with the goal to induce estrous synchronization (Zelege et al., 2005; Dogan and Nur, 2006). In anestrus season estrous induction and synchronization effect in sheep by using Progesterone and PMSG were researched by (Mekić and Stojković, 2002; Dogan and Nur, 2006; Zonturlu et al., 2011; Moradi et al., 2012). During the productive cycle sheep breeders have to know if their sheep are in proper condition or if they are too skinny or too fat. Body weight in each phase of productive cycle represents an excellent parameter. Sheep body weight is not constant throughout the year. It changes with the change of production phase (Mekić et al., 2007).

Polyovulation is expressed more often in heavy and well fed sheep than in weaker and inadequately fed sheep that also have high prenatal mortality rate. In the research by (Allison, 1978) influence of body weight on induction, ovulation and number of follicles was researched. It has been determined that heavier sheep for entire estrous cycle time had higher number of follicles compared to lower weight sheep. Robinson, 1983 and Chursh, 1986, quote that there is a specific correlation between body weight (condition) and ovulation, success in sheep insemination. Body condition of the sheep is connected with specific body weight during the mating season which makes the base for number of egg cells that will be released for fertilization during the ovulation. For estrus evocation mostly used method is an application of intra vaginal sponges that are applied on 12th or 14th day into the sheep vagina (Amer and Hazzaa, 2009).

The aim of this paper was to give contribution to enlighten the questions regarding the influence of different dose of gonadotropic hormone application influence on fertility of Sjenica sheep in anestrus season.

Materials and methods

Research of different dose of natural gonadotropic hormone influence on sheep fertility in anestrus season was conducted at a private sheep farm in Valjevo rural area. Researched sheep was Sjenica improved breed. Induction and synchronization of estrus was conducted in anestrus season by using polyurethane sponges impregnated with 20mg of Fluor Geston Acetate (FGA), and they were kept inside sheep vagina for 14 days.

Experiment included total number of 90 sheep. Two groups of sheep were formed: control group (30 sheep) which after removal of polyurethane sponge received the injection of 500 i.u of PMSG (Foligon) which is a usual application dosage. Experimental group (60sheep) received dose of 700 i.u of PMSG.

After 48-72 hours from sponge removal and PMSG application all sheep were individually inseminated.

Main data processing was done using usual mathematical and statistical methods for this type of research.

Results and discussion

Reproductive parameters: Reproduction represents most important and limiting factor for increasing the production and profitability of sheep herding. In wide practice by controlling estrus with hormonal treatments fertility can be significantly increased and lambing can be precisely synchronized.

The results of the effects of different doses of PMSG hormone on sheep reproductive parameters are shown in Table 1. From the data shown in Table 1 it can be seen that the percent of sheep that were inseminated compared to the sheep that were treated was equal and it was 96.67%. The percent of sheep that lambd compared to the number of sheep that were inseminated was for control group 96.5% and for experimental 91.38%, meaning that sheep in experimental group lambd 5.17% more.

Table 1. Sheep reproductive parameters depending on applied PMSG dose

N°	Parameters		PMSG dose		
			Control 500 i.u.	Experimental 700 i.u.	
1.	Number of treated sheep		30	60	
2.	Number of inseminated sheep compared to number of treated		29	58	
	%		96.67	96.67	
3.	Number of sheep that lambd compared to number of inseminated		28	53	
	%		96.55	91.38	
4.	Percent of sheep that lambd compared to the number of treated sheep		93.33	88.33	
5.	Total number of lambs		42	111	
	Type of birth	Singles	♂	9	8
			♀	7	6
		Twins	♂	11	25
			♀	9	27
		Triplets	♂	2	17
			♀	4	7
		Quadruplets	♂	-	9
			♀	-	7
		Quintuplets	♂	-	3
			♀	-	2
6.	Sheep fertility, %		150.00	209.43	

For experimental sheep group higher fertility by 59.43% was determined. Higher fertility for experimental group can be explained by the fact that experimental group had more triplets by 7.34%, quadruplets by 14.41% and quintuplets by 4.50% than control group.

Based on given results we can conclude that higher dose of PMSG by 200i.u per sheep had positive effect on increase of the number of ovulated egg cells on ovaries, which resulted with birth of higher number of lambs per sheep in the experimental group.

Research by Mutavelić et al. (1989) confirms that higher dose of PMSG has positive effect on increasing the sheep fertility. In his experiment he treated sheep with 750 i.u of PMSG and compared it with control group that received 500i.u of PMSG. Sheep that were treated with higher dose of PMSG had higher percent of lambing and higher fertility than control group. Mekić et al. (2012) determined higher fertility for Ile de France breed by 23.17% for sheep that received 750 i.u. of PMSG compared to group that received 500 i.u. In earlier research by Mekić et al (2009) Sjenica improved sheep were treated by 1000 i.u of PMSG and then fertility rate of 192.00% was achieved.

Based on above results we can conclude that increased dose of 700 i.u of PMSG compared to usual dose of 500 i.u of PMSG had positive effect on fertility of treated animals by 59.43% compared to experimental group. Higher fertility of experimental group was explained by higher number of lambs per sheep (triplets, quadruplets and quintuplets) compared to control group.

Besides the above mentioned parameters, fertility rate depends largely from the number of factors including heritage, breed, season, age, environment, diet, health condition, female hormonal status, sperm quality (Webb et al., 1994; Lewis et al., 1996; Beck et al., 1996; Husein et al., 1996, 1998; Yavuzer, 2005).

Conclusion

Based on conducted research of the effect of the application of induction and estrus synchronization for Sjenica improved sheep using sponges impregnated with 20mg of Fluor Geston Acetate (FGA) and different doses of gonadotropic hormone PMSG (500 i.u for control group and 700 i.u for experimental group) following conclusions can be made:

1. Number of sheep that lambed compared to the sheep that was treated for control group was 96.55% and for experimental group 91.38%.
2. Average fertility for sheep of the control group was 150.00% while for experimental group it was 209.43%, meaning that experimental group had fertility rate higher by 59.43%. Higher fertility was expressed through higher number of triplets, quadruplets and quintuplets than in control group.

This research clearly shows that application of higher dose of gonadotropic hormone by 200 i.u led to increased number of lambs at birth and higher fertility what has a direct influence on higher production of mutton per sheep thus increasing the economy and profitability of sheep production.

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