



ON THE ISSUE OF NON-HORMONAL STIMULATION OF THE REPRODUCTIVE FUNCTION OF RAMS

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ABSTRACT

This work was carried out in the course of research aimed at finding the possibility of non-hormonal stimulation of the reproductive function of rams outside the lambing season. The subjects of the study were sheep of different breeds. The research was conducted in production conditions. Natural preparations were used, which were administered as injections or as a feed additive. When stimulating the reproductive function of rams through the use of non-hormonal drugs, the indicators of sexual activity and the parameters of reproduction were taken into account. Also, biochemical blood parameters and testosterone levels were monitored. The positive influence of the used stimulation schemes on sexual activity and the quality of the sperm of rams were established. Testosterone levels in sheep experimental groups to the end of the study were 9.85 ± 5.23 and 18.21 ± 8.28 mmol/l, and in the control was 6.05 ± 2.5 mmol/l. Some regularities of changes in biochemical indices of rams' blood are noted in experimental groups.

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Introduction

In sheep farming [1-3], as in other animal husbandries, stable reproduction of the herd is always very important. A wide variety of modern technologies, methods, and tools are used to ensure it [4-6]. Preference is given to methods that have such qualities as cost-effectiveness, maximum efficiency and complexity of impact, safety of application, and environmental safety. In addition to the mandatory protein-mineral-vitamin complexes included in the diet, various substances with adaptogenic properties are used as additional stimulators of reproductive function (both in combination with other means of stimulation and as the main means) [7-9]. These may be preparations from plant or animal tissues, industrial waste, or various additives from medicinal plants since they are usually effective, inexpensive, and environmentally friendly [4, 10-13].

Despite the widespread use of such stimulants in this area, there are many unexplored questions about the impact of drugs from animal tissues and various medicinal plants that can supplement the animal's diet. Besides, it should be taken into

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account that the use of stimulating therapy has a pronounced effect on the course of metabolic processes, and their improper use can cause functional failures in the work of individual organs and systems [5, 14-17]. Thus, the purpose of the research was to study the effect of new tissue preparation and certain types of medicinal plants on the reproductive function of sheep in preparation for the lambing season.

Material and Methods

The experiment was carried out in a sheep farm belonging to the technical experimental station "Maximovka" in the village of Maximovka, Novo-Anenskiy District, Republic of Moldova. These studies were conducted as reconnaissance, aiming to test the effectiveness of a new tissue preparation and granulated feed with an additive from medicinal plants. The experiment was carried out using 3 groups of animals: 2 experimental and one for control. During the research period, the method of keeping sheep was stable-pasture. In addition to coarse feed, the sheep received 300 g of granulated feed daily, consisting of 50% of a mixture of cereals and 50% of alfalfa hay. At the beginning of the experiment, rams of all groups were once intramuscularly injected with the preparation "Vitamin E+Se", which has an antioxidant effect, at the rate of 1 ml/50 kg of weight.

During the experiment, the animals of the first experimental group were given 1 ml of a new tissue preparation subcutaneously 4 times a week. Before use, the drug was mixed with an equal amount of 0.5% novocaine solution. The tissue preparation was prepared from animal tissues in the Laboratory of Biotechnology of Reproduction and Embryo Transplantation of the Research and Production Institute of Biotechnologies in Zootechnics and Veterinary Medicine. The method of production of the drug is at the stage of patenting.

Rams of the second experimental group were fed granulated feed containing the studied additives by an individual method for 30 days, at the rate of 300 g per day per animal. The composition of the experimental feed pellets included 50% of a mixture of cereal concentrates used in the farm and 50% of medicinal plants (flax, calendula, and milk thistle) grown on the land plots of the technical and experimental station.

Animals of all groups were subjected to regular clinical examination and weekly blood samples were taken to monitor the level of testosterone and individual biochemical indicators that characterize the state of metabolic processes. In rams of all experimental groups, semen was selected twice a week for an artificial vagina and its quality was evaluated.

To assess the reproductive qualities of sheep producers in the lambing season, the number of cages was taken into account. During manual mating, the severity of sexual reflexes and endurance were also taken into account. The quantity and quality of the resulting offspring were determined in the subsequent lambing season.

Results and Discussion

Monitoring of testosterone during the experiment showed the following:

Table 1 – Dynamics of testosterone in the blood serum of rams, mmol/l.

Groups	Week of experiment				
	1	2	3	4	5
1	4.98±1.26	6.5±0.5	13.18±4.7	16.21±6.8	18.21±8.28
2	5.1±1.16	5.3±1.08	6.14±1	8.69±3.94	9.85±5.23
Control	4.98±1.26	5.78±1.8	6.43±5.77	5.17±3.08	6.05±2.5

Data in table 1 shows that the positive dynamics of the hormone in all three groups can be clearly traced. But the most pronounced increase in testosterone levels was observed in the group receiving the tissue drug. Thus, after the first administration of the new drug, the hormone level in the blood of animals in the experimental group was 6.5±0.5 mmol/l, which is 16.78% higher than in the control group. In the future, although the level of testosterone gradually increased in all groups, in the first experimental group it was constantly higher than in the second experimental and control groups and amounted to 13.18±4.75 mmol/l at the third blood sampling. In the fourth and fifth blood tests, the hormone levels were 16.21±6.8 mmol/l and 18.21±8.28 mmol/l respectively, which were 2 times, and then 3 times higher than the control group index value. The second experimental group also had positive dynamics of growth in the level of testosterone, although it was inferior to the data of the first experimental group. So by the time of the 4th blood selection, the hormone level was 8.69±3.94 mmol/l, and by the 5th it was 9.85±5.23 mmol/l, which is 68.01% and 62.81% higher than in the control group respectively.

According to the results of morphological and biochemical studies of the blood of animals of all groups, the activation of metabolic processes in the body of animals of the first and second experimental groups was visible. At the same time, all the studied indicators did not go beyond the limits of the physiological norm.

Observations of animals of all groups during mating allowed us to establish a higher activity of rams in both experimental groups, but it was most clearly visible for the rams of the first experimental group. Thus, the total number of cages registered

in animals of the first experimental group was 88 (on average 22 per ram), which was 2.5 times more than in animals of the control group (35 copulation per group and 11.6 on average per animal) for the same mating period (table 2). Thus, already during the lambing season, significantly increased sexual activity of rams stimulated by the introduction of a new tissue preparation was noticeable.

Table 2 – Sexual activity and the results of mating

Groups	n	Number of copulation		Number of lambs (n/%)			Remained infertile after mating, (n/%)
		Total	per ram	Total	Young animals		
					viable	unviable	
Experimental group	4	88	22	83/94.3	82/98.8	1/1.2	5/5.7
Control	3	35	11.7	31/88.6	30/96.8	1/3.2	4/11.4

According to table 2, it should be noted that the viability of young animals in the experiment and the control group did not have significant differences. However, 2.7 times more viable offspring were obtained from the experimental group (n=4) than from the control group (n=3). In addition, the experimental group showed a significantly lower percentage of infertility in ewes (5.7 vs. 11.4%).

Thus, the experiment proves the feasibility of using a tissue preparation during the preparation of rams for the lambing season and demonstrates its positive impact on the reproductive qualities of sheep producers.

Results of the research of the seed material selected during the experiment demonstrate the influence of the experimental feed additive on the level of sperm production. Thus, the analysis of table 3 data showed that the volume of ejaculate in animals of the experimental group was 18.4% (0.23 ml or 1.184 times) more than in rams of the control group and amounted to 1.48 ± 0.18 and 1.25 ± 0.34 ml, respectively.

Table 3 – Semen quality of rams

	Experimental group	Control
Volume of ejaculate, ml	1.48 ± 0.18	1.25 ± 0.34
Live sperm, %	64.80 ± 6.85	65.54 ± 5.39
Spermatozoa with rectilinear translational motion, %	39.82 ± 5.18	33.08 ± 5.39

The percentage of live spermatozoa was approximately the same in the experimental and control groups and amounted to $64.80 \pm 6.85\%$ and $65.54 \pm 5.39\%$, respectively. It should be noted that in the second experimental group, the percentage of live sperm was 1.13% less. But the level of spermatozoa with translational movement in the experimental group was $39.82 \pm 5.18\%$, which is 20% more than in the control group, where the number of spermatozoa with translational movement was $33.08 \pm 5.39\%$.

When studying blood serum samples taken from animals of this group, it was found that all the studied parameters were within the limits of physiological norms, which allows us to conclude that there is no negative effect of medicinal plants used in the experiment on the animal body. Thus, the effectiveness of using a feed additive based on a composition of medicinal herbs, introduced in preparation for the lambing season, can be traced mainly by the quality indicators of sperm. Research in this direction is recognized as promising and will continue.

Conclusion

1. It was found that the tissue preparation introduced at the stage of preparation of sheep producers for the lambing period had a pronounced stimulating effect on their reproductive function, which gives reason to recommend this method for practice. The results of the research were conducted in production conditions so it has as scientific as practice interests.
2. When preparing rams for the lambing season to stimulate their reproductive functions, it is advisable to use a feed additive containing the composition of the medicinal plants we have proposed. They have a positive effect on the level of sperm production, providing a significantly higher percentage of sperm with a straight-forward movement.

Recommendations

To increase rams reproduction activity, it is appropriate to include a new tissue preparation and feed additive containing a composition of medicinal plants (flax, calendula, and milk thistle) in the preparation schemes for the lambing season.

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