

# STUDY ON SPERMOGRAM IN MOLDOVAN KARAKUL RAMS

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## Abstract

The specific objectives of the research were the collection of semen and the analysis of qualitative and quantitative parameters of raw semen belonging to Moldovan Karakul rams used in their own research as well as the statistical interpretation of those performance parameters. Within the statistical interpretation or compared the quantitative and qualitative parameters of the sperm of the rams of the autochthonous breed represented by the Karakul breed Moldavian type belonging to the varieties of black color and ash colors. The research took place between September and October 2019. The biological material used was represented by a herd of 8 black Moldovan Karakul rams and 8 bumblebee rams. The actual collection of the semen material was carried out on the sheep in heat with the help of the artificial vagina. Following the research carried out, the black Karakul rams, the semen obtained at harvest was in high quantity ( $1.7 \pm 0.10\text{ml}$ ) and of good quality parameters presenting the following average values: sperm mobility  $83.2 \pm 1.3$ ; sperm concentration  $1.7 \pm 0.1$  billion / ml; sperm count / ejaculate  $3.0 \pm 0.1$  billion; VAP (total speed)  $105.4 \pm 2.3 \mu\text{m} / \text{sec}$ ; VSL (Straight Line Speed)  $82.9 \pm 2.5 \mu\text{m} / \text{sec}$ ; VCL (curbolineal velocity)  $172.1 \pm 5.1 \mu\text{m} / \text{sec}$ . The ram-colored rams have good quality semen; the mean value of ejaculate volume is  $1.6 \pm 0.1$  ml., sperm motility of  $84.3 \pm 0.9\%$ , concentration of  $1.8 \pm 0.1$  billion / nl, sperm count of ejaculate of  $2, 8 \pm 0.2$  billion, sperm advance rate VAP  $109.8 \pm 1.4$ , ESL  $87.6 \pm 1.6$ , VCL  $176.1 \pm 4.2 \mu\text{m} / \text{sec}$ ; Regarding the interindividual differences depending on the color of the rams, they were generally insignificant in terms of all the parameters studied.

**Key words:** ram, sperm, mobility, color

## INTRODUCTION

The rapid transformation of populations of sheep with lower productive traits into those with a higher level of productivity cannot be achieved without the implementation of artificial insemination using breeding rams from breeding nuclei created within a specific breed or from breeding breeds used for crossbreeding and obtaining of crossbreeds with programmed genetic and productive properties. [4, 7]

The production of breeding rams is a technology that must be well developed in which the key element is the selection nucleus formed by the most representative and performing breed breeders. [5]

Ensuring genetic progress increases the influence of high-value breeders. Under these

conditions, artificial insemination as a method of reproduction allows the increase of the selection intensity of the breeding rams and implicitly the increase in the efficiency of the selection herd.

Of particular importance in this biotechnology are the methods of preserving and diluting ram semen in order to ensure proper fertility and birth, whether the unity of a male depends on the quantity and quality of semen. The notion of sperm quality refers to the macro and microscopic properties of ejaculate, correlated with sperm fertility. [3,6]

Laboratory methods are used to evaluate the quantity and quality of semen, which is performed immediately after collection. At the same time, the widespread development and implementation of artificial insemination in animals has changed the thinking on the influence of this technique on the process of animal breeding by intensive use of valuable males and tested by the quality of offspring

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The manuscript was received: 08.10.2021

Accepted for publication: 15.01.2022

which has increased the productive potential of many animal species.

Sheep breeding is influenced by biological efficiency and mainly by the way it coordinates the reproductive activity at the level of each breed or population. Therefore the reproductive function must be directed towards the intensity of sheep breeding but developed and applied depending on the relationship with the particularities of each breed because the success of this activity is influenced by the value of breeding characters. [1,2]

## MATERIAL AND METHOD

The researches were carried out according to the protocol of the Institute during October-November 2019 on a number of 16 rams of the Karakul breed, Moldovan type of different black colors and mists. The rams used in the research were grouped into two experimental groups according to their color:

- Lot 1-8 ram-colored rams
- Side 2-8 black rams

For each experimental group, the semen was harvested by the artificial vagina collection method. All phases of the research complied with the requirements in force regarding the ethics of the use of animals for scientific research purposes.

The objective of this research was to determine the data on ram semen from the Moldavian Karakul breed belonging to the varieties of bruma and black. The actual collection of semen was carried out on sheep in heat or on sheep in anesthesia.

In order to harvest, 8 Moldovan Karakul ash colors rams and 8 black rams aged between two and three years were used. The harvesting technique involved the preparation of the artificial vagina followed by the actual harvesting. After harvesting, the quantitative and qualitative parameters of the sperm were analyzed. The macroscopic analyzes regarding the appearance and volume of the sperm were followed by the microscopic ones regarding the mobility, concentration, sperm count / ejaculate and the speed of sperm advance VAP, VSL, VCL assessed using the computer-assisted program "CEROS".

The experimental plan used to determine the differences between the varieties of rams

was in repeated measurement blocks. This plan allows a small number of individuals to be able to notice the factors and the interaction between factors that determine the quality of semen in rams. Each individual constituting the experimental unit is considered as a block of data and repeated measurements performed on samples taken at different times from the same individual are taken into account. In order to notice the possible differences in size and their significance after the analysis of variety, the "Student" test was used according to the known methodology. Statistical parameters were calculated using the STUDENTS program.

## RESULTS AND DISCUSSIONS

The breeding and exploitation of sheep requires the implementation of a program whose objective is to improve the number of sheep by changing the genetic productive potential in the direction of increasing and improving the quality of meat and milk production. Ensuring genetic progress leads to an increase in the influence of high-value breeders from specialized breeds for the production of meat, milk and skins, such as those belonging to the Moldovan Karakul breed. Under these conditions, artificial insemination as a method of reproduction allows to increase the intensity of selection of production rams and implicitly to increase the efficiency of the selection herd, a special importance in this biotechnology.

The formation and quality of semen in rams is influenced by hereditary dowry, feeding maintenance conditions and the regime of use in reproduction. The hereditary factor acts mainly through the neurohormonal mechanism involved in the development and regulation of the functioning of the male genital tract.

The analysis of the quantitative and qualitative parameters of the sperm obtained from the Moldovan Karakul rams were the main purpose of the research presented in this paper due to their practical importance.

Experimental data on the average volume of semen taken from rams of the ram variety are presented in the diagram 1.

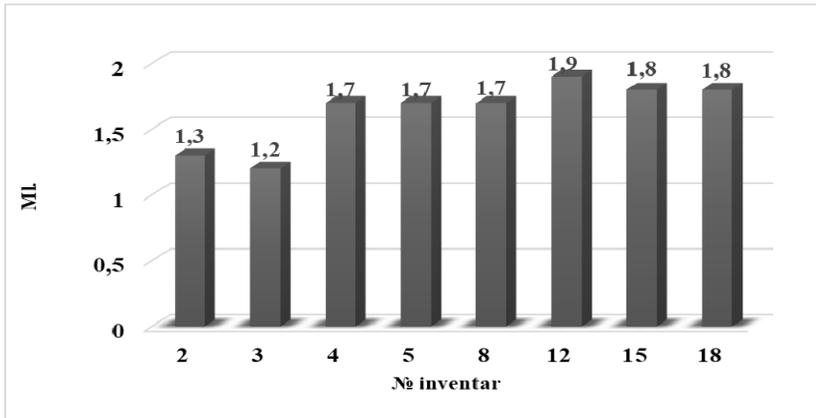


Diagram 1. Average volume of semen taken from rams of the Karakul breed brumărie variety, ml

Following the researches, it was found that the semen obtained at harvest from the rams of the bumblebee variety is in high quantity  $1.6 \pm 0.1$  ml, with oscillations between 1.4 and 1.8 ml. Following the quantitative analysis of the raw semen in rams of the ash colors variety, it can be observed that in general the

quantitative values fall within the physiological parameters of this species.

Aries from the black variety, the semen material obtained at harvest being in higher quantities than those from the ash colors variety.

The experimental data are presented in diagram 2.

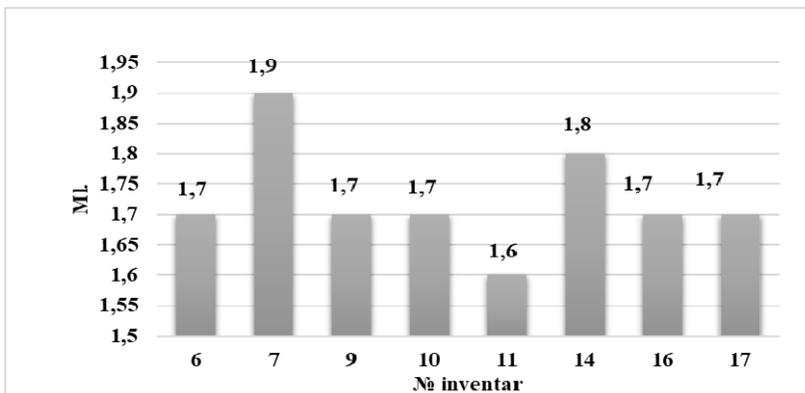


Diagram 2. Values of the average volume of semen taken from rams black variety, ml

The experimental data presented in diagram 2 show that the volume of ejaculate taken from the rams of the Moldavian Karakul breed, black variety, had a volume of  $1.7 \pm 0.1$  ml or 0.1 ml higher than the ash colors (black and white) variety with variations from 1,5 to 1.9 ml.

Regarding the differences between individuals and between color varieties, they were generally insignificant in terms of the parameter studied.

Microscopic examination of the sperm provides us with more reliable data on the quality of the ejaculate and allows us to assess the concentration of sperm, sperm mobility, the percentage of sperm in the ejaculate.

The following average indices were recorded in the experiment initiated to monitor sperm mobility indices (diagram 3).

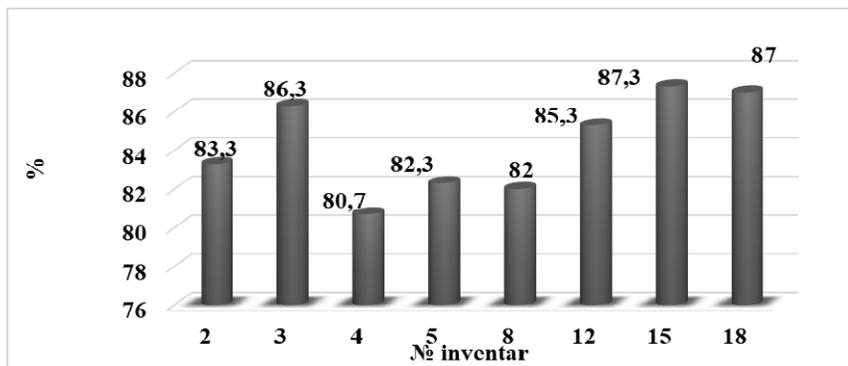


Diagram 3. Average indices of sperm motility in ejaculates taken from rams, bromaria variety, %

The experimental data presented in diagram 3, demonstrate that the average indices of sperm motility in ejaculates taken from rams bromaria variety was  $84.3 \pm 0.9\%$  with minimal variations of 81.1% and highs of 87.5%.

Research has shown that the average indices of sperm motility in ejaculates taken from Moldovan Karakul rams of the black variety are of good quality.

The experimental data are presented in diagram 4.

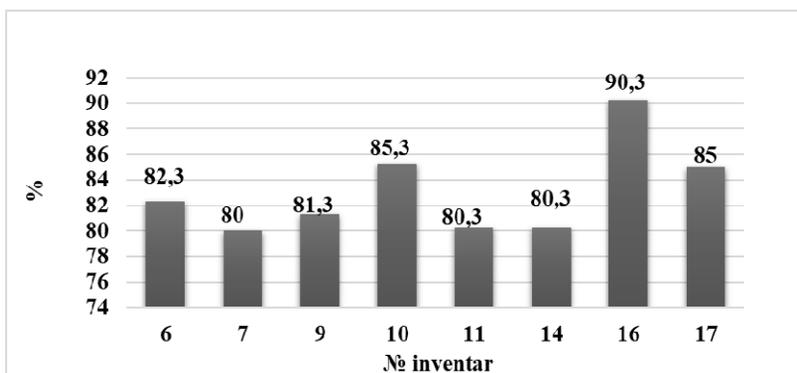


Diagram 4. Mean indices of sperm motility in ejaculates taken from rams, black variety, %

The experimental data presented in diagram 4 show that the semen obtained from the harvest of Moldovan Karakul rams is of good quality, the parameters of sperm motility being on average  $83.1 \pm 1.3\%$  with minimum mean values of 78.4% and maximum average values of 88.3%.

The average value of sperm mobility obtained from black variety rams being 1.2% lower than in ash colors (black and white) variety rams, the statistical data being insignificant.

The most important property on which the whole process of spermatogenesis in males depends and depending on this, but

also the fertilizing capacity of the ejaculate, is its concentration in sperm. Experimental data on the study of sperm concentration in ejaculates obtained from rams of the Moldavian Karakul breed ash colors (black and white) variety are presented in diagram 5.

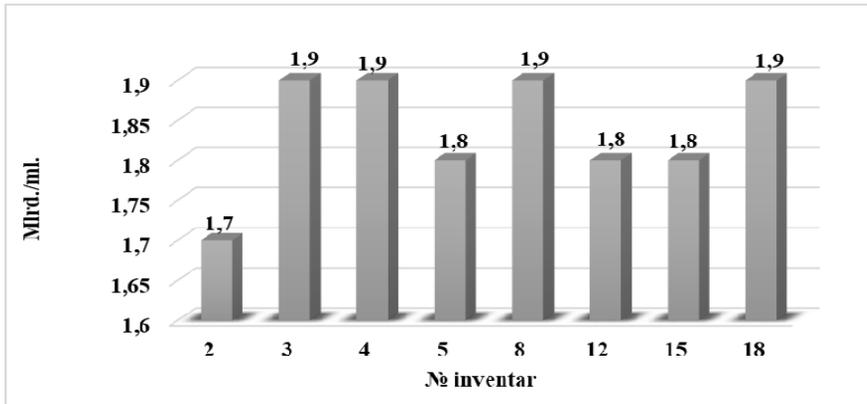


Diagram 5. Average indices of sperm concentration in ejaculates obtained from rams, bromaria variety, billion / ml

The experimental data presented in diagram 5 show that the group of rams of the Karakul breed Moldovan type ash colors (black and white) variety the average concentration of sperm in the ejaculate was  $1.8 \pm 0.1$  billion / ml with oscillations of 1.70 to 1.97 billion / ml .

The experimental data obtained on the concentration of sperm in the ejaculate are

below the level of physiological norms (2.0-2.5 billion / ml), but it is an important index in conservation technologies for determining the degree of dilution of sperm.

The average concentration of sperm in the ejaculates obtained from Karakul rams of the Moldavian type, black variety, is present in diagram 6.

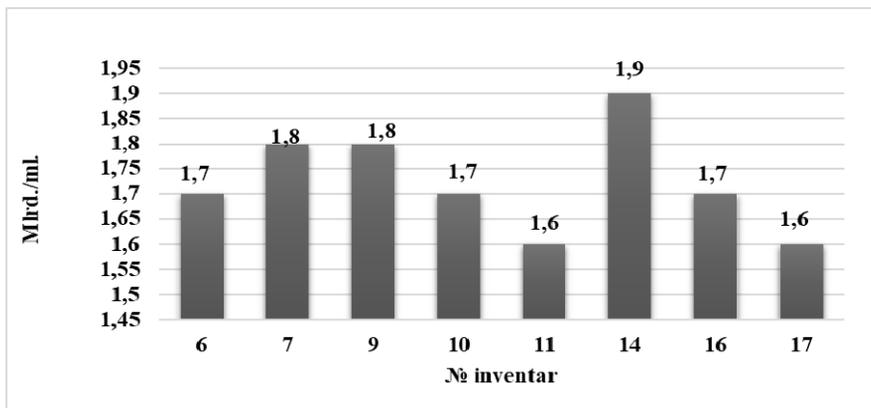


Diagram 6. Mean indices of sperm concentration in ejaculates obtained from rams, black variety, billion / ml

The experimental data presented in diagram 6 show that the sperm concentration in the ejaculates obtained from the Karakul rams of the Moldavian type, black variety, showed lower values than those obtained in the brumaria variety with the following average values: sperm concentration  $1.7 \pm$

0.1 billion / ml with oscillations between 1.6 and 1.8 billion / ml.

Regarding the total number of sperm in the ejaculate, the differences between the varieties were generally insignificant ( $P > 0.05$ ).

The experimental data are shown in Figure 7.



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