

## SPERMOGRAM IN BREEDING RAMS - BREED OF TSIGAIYA WOOL-MEAT-MILK

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### Abstract

*The assessment of the quality of the semen taken from the breeding rams of the breed of Tsigaiya Wool-meat-milk has been the subject of our research. As a result of the research it was found that the volume of sperm was  $1.38 \pm 0.40$  ml, the sperm mobility of 81.17%, the sperm concentration of  $1.47 \pm 0.10$  mlrd/ml and the number of sperm moving in a straight line of 53.5%. The spermogram indices of the semen obtained from the breed of Tsigaiya wool-meat-milk correspond to the standard of the Tsigaiya breed and allow its use in artificial sowing of sheep. In the subsequent follow-up, research was conducted on the kinetics of freshly collected raw sperm.*

**Key words:** ram, semen, insemination, spermogram.

### INTRODUCTION

In breeding sheep male reproducers play a particularly important role. From this point of view the breeders require maintenance and qualitative nutrition in order to ensure a high spermatogenesis, mainly during the breeding period. During this period the breeding ram must produce a larger amount of sperm in order to be able to mount more sheep. At the same time, the sperm produced must also be qualitative, that is, it corresponds to qualitative indices that would ensure a resultant amount. Several methods of ejaculate sampling (in the artificial vagina, electro-ejaculation, etc.) are used in the process of harvesting the ram's sperm, and each method influences in its own way the sperm indices analyzed later (Darie, 2016).

The determination of sperm quality includes the analysis of a series of indices and parameters, which characterize the aptitudes of the sperm (Nauk, 1991). A high quality of sperm will lead to a longer preservation of sperm viability and eventually increase their fertilizing capacity (Ostasco, 1978). In the last years, with the development of the informational software and the improvement of

the research techniques and methods, the methods of analysis of the spermatogenic indices have been improved (Zahan, 2017). For sperm harvesting for refrigeration or cryopreservation purposes, previously tested, healthy and vigorous race rams are selected. In the main mountain season it is recommended to harvest sperm daily, 1-2 ejaculates from each ram, and in the secondary season once every 2-3 days (Darie et al., 1992). Before harvesting the rams are washed and sanitized to avoid sperm contamination in the process of sampling with various bacteria and impurities.

### MATERIALS AND METHODS

As research material, the rams - breed of the Tsigaiya wool-meat-milk and fresh sperm from them served. The breeding sheep were kept at the sheep farm of the Technological - Experimental Station "Maximovca", of the Scientific-Practical Institute of Biotechnologies in Zootechnics and Veterinary Medicine R. Moldova. Maintenance and nutrition conditions corresponded to the zoo-hygienic norms according to the requirements of the breeding sheep for breeding sheep. The semen was taken using the artificial vagina. Immediately after

sampling, the sperm was subjected to a macroscopic analysis after which the volume of sperm, consistency, color, odor and some visible unknown impurities were analyzed. Subsequently or performed and microscopic analysis - mobility, concentration and rate of progression of spermatozoa, assessed with the help of a specific computerized program that allowed a detailed analysis of the spermogram to be performed on all the ejaculates taken from the rams included in the research. Thus, in our researches the appreciation of the quantitative and qualitative parameters of the sperm taken was performed with the help of the computer software of the "CEROS" Program. The nominated program performs the analysis of sperm samples in a very short time and allows the determination of an entire block of quantitative and qualitative indices. As a result, we expressly obtain the spermogram of the analyzed sperm of each ram and even of each ejaculate with the determination of the average level of the indices.

The analysis for the assessment of the sperm concentration in the ejaculate was performed under the microscope using the Goriaev chamber after dilution of the sperm by 1:1000.

## RESULTS AND DISCUSSIONS

Appreciation of the qualitative indices of the semen of the sheep breed Tsigaiya of wool-meat-milk, with the elaboration of the individual spermograms was performed both

under the conditions of the main breeding season and in the secondary season. This condition was respected because of the need for appreciation of the behavior of the breeding rams in both seasons, the existence and manifestations of the libido and as a result finding changes in sperm quality depending on the season. During the period of the researches to monitor the spermatoc indices from the breeding rams, 46 ejaculates were taken per season. The organoleptic analysis of the sperm found that the color of the semen was normal, white to yellow in all the ejaculates analyzed, the specific odor of proteins, of fresh egg which is characteristic of the smell of natural sperm, freshly taken. Following the data from the figures shown below, we find that the values of the characteristics of the raw sperm fall within the specific limits of the Tsigaiya breed.

The volume of ejaculate raw ram sperm is shown in Figure 1.

The average volume of ejaculate (Figure 1) is 1.38 ml in the main breeding season and 1.23 ml in the secondary season, with individual limits of variation from 0.9 ml to 1.52 ml. The volume of the ejaculate with minimum values it was mainly recorded in the secondary breeding season of sheep. In appreciating the quality of the ram's sperm, a large seed has the sperm concentration in the ejaculate.

Figure 2 shows the data on sperm concentration in 1 ml of sperm.

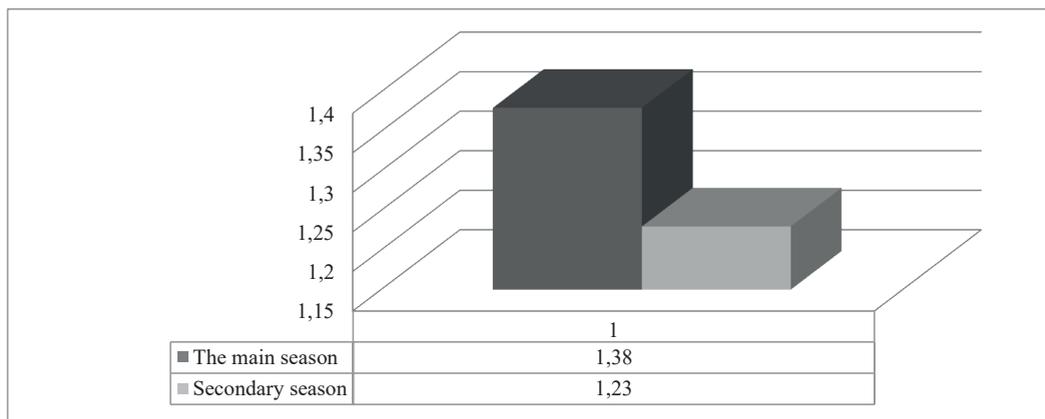


Figure 1. The volume of the ejaculate

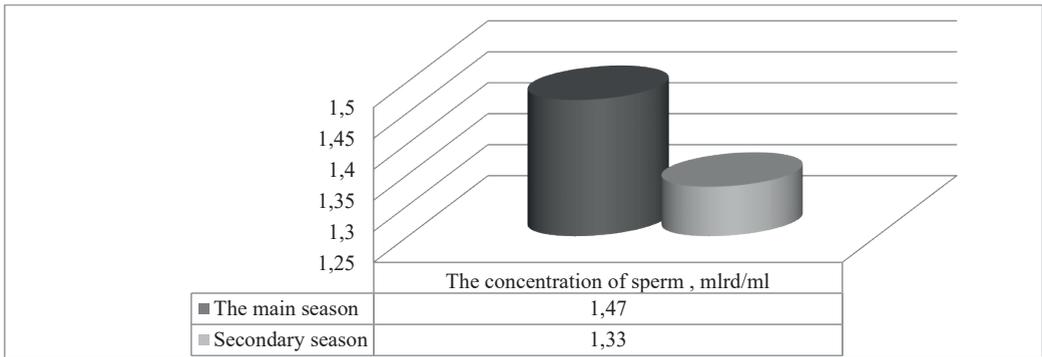


Figure 2. Sperm concentration in the ejaculate

The concentration of sperm (Figure 2) in the main season is 1.47 billion/ml and 1.33 billion/ml in the secondary season, with oscillations between 0.683 billion/ml and 2.313 billion/ml. The wide limits of the sperm

concentration oscillation are expressed by the fact that ejaculates were taken from breeding rams of different ages.

The quantity (amount) of sperm in the ram's sperm ejaculates is shown in Figure 3.

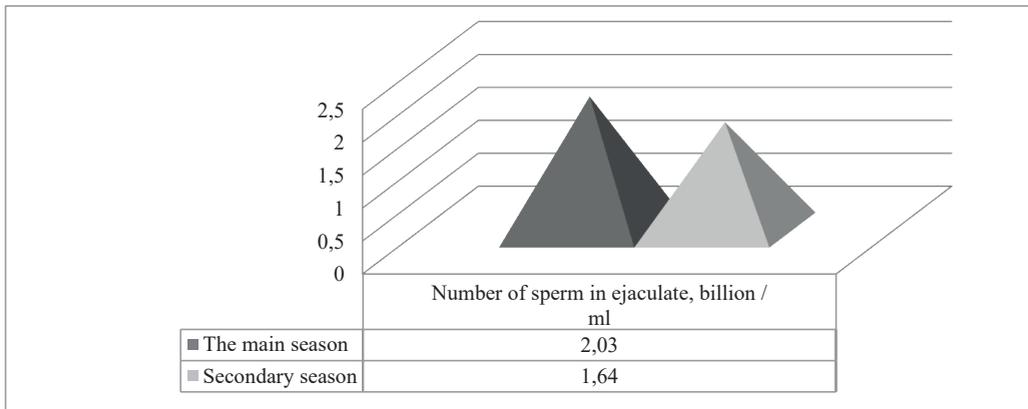


Figure 3. The number of sperm in the ram's ejaculate

As we can see, in the ejaculates taken from the breeding rams in the main mountain season the number of sperm constitutes 2.03 billion/ml, and in the secondary season 1.64 billion/ml, the difference in favor of the main season being

quite essential. A large role in assessing the quality of the sperm has the mobility of the sperm, shown in Figure 4. The viability of the sperm depends largely on the values of this index.

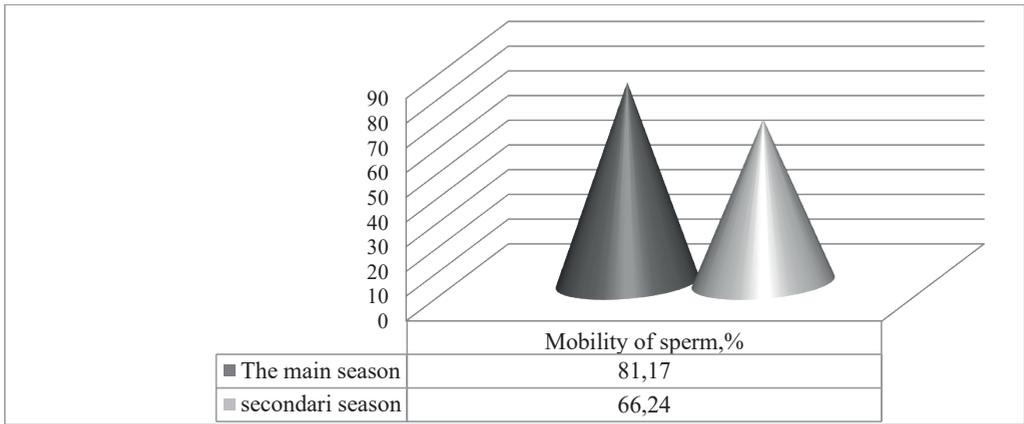


Figure 4. Ram sperm mobility, %

The mobility of sperm is quite high, even sometimes very high, with average rates of 81.17% in the main breeding season, and the limits of variation are relatively low. The minimum grade for sperm mobility of 0.8 allows the use of ejaculates for further processing, even for those that are qualitatively lower ranked. In this regard it is important to note that the minimum requirement for sperm mobility was 0.7 points. As we can see from Figure 4, the mobility of sperm in the extra-season is much lower than in the main breeding season and constitutes 66.24% compared to

81.17% in the main season. A major ability of sperm is their rate of advancement. The evaluation of the rate of sperm advancement was performed with the help of computer software "CEROS" by finding 3 main indices; - average forward speed - VAP, - straight forward speed - VSL, and - curvilinear speed - VCL. Sperm movement rate indices (VAP, VSL, VCL), both in the breeding season and in the extra-season, are shown in Tables 5, 6, 7. Figure 5 shows the average sperm advancement rate.

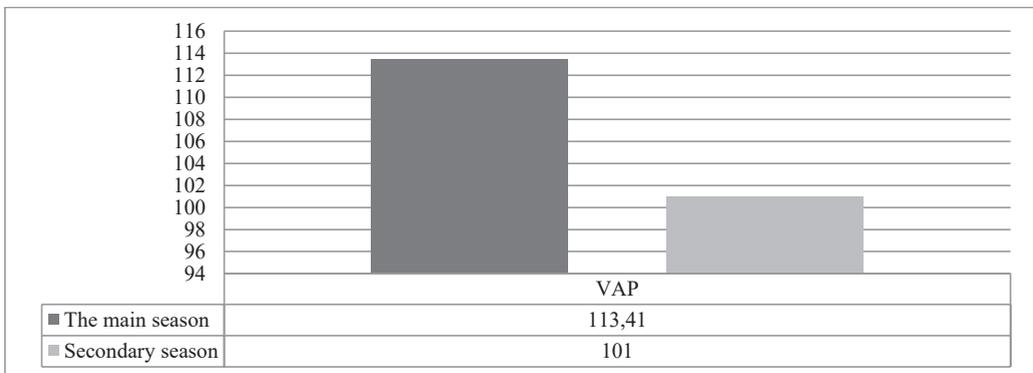


Figure 5. The advance speed (VAP) of ram sperm,  $\mu\text{m/s}$

The data in Figure 5 show that the average advancement rate (VAP) of rams' sperm in the main breeding season is 113.41  $\mu\text{m/s}$  and in the

secondary season it is 101.0  $\mu\text{m/s}$ . Figure 6 shows the advancement speed (VSL) of ram sperm.

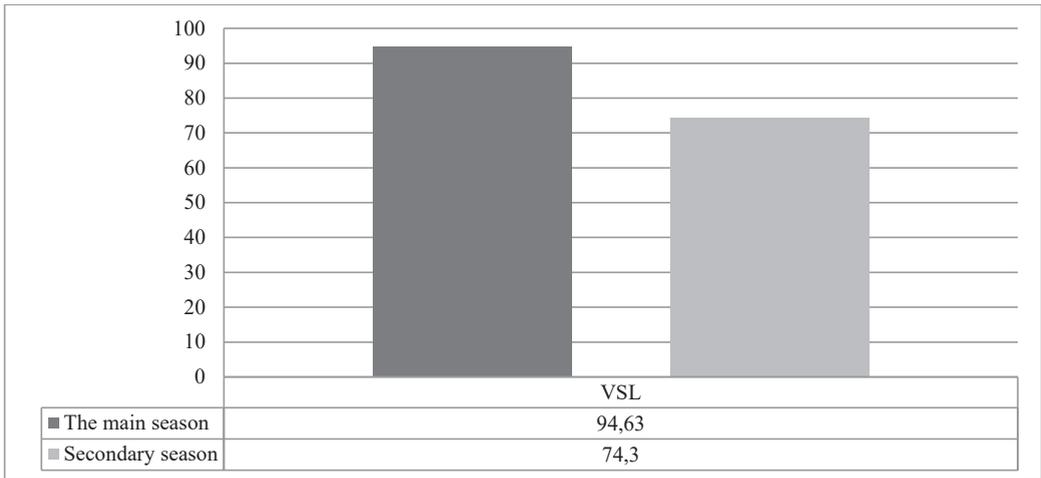


Figure 6. The advancement speed (VSL) of ram sperm,  $\mu\text{m/s}$

From Figure 6 it can be seen that the velocity of movement in the straight line (VSL) of the sperm in the main breeding season is  $94.63 \mu\text{m/s}$ , and in the secondary season the speed is only  $74.3 \mu\text{m/s}$ . The data in Figure 7 show that

the curvilinear movement speed (VCL) of the sperm in the main breeding season is  $202.57 \mu\text{m/s}$ , and in the secondary season it is much lower and constitutes  $164.8 \mu\text{m/s}$ .

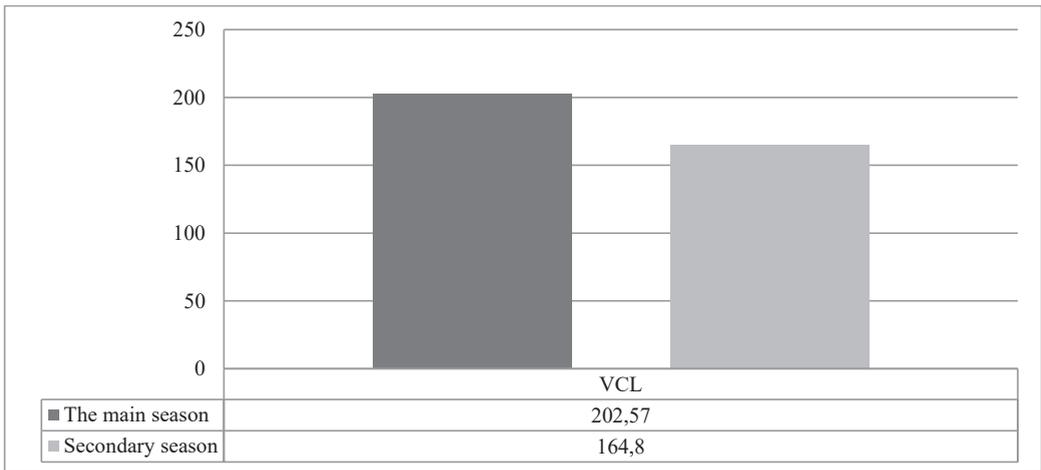


Figure 7. The advancement speed (VCL) of ram sperm,  $\mu\text{m/s}$

The decrease of the qualitative and quantitative indices of the ram's sperm in the extra-season compared to the period of natural reproduction are dictated by the character and the particularities of the species. For these reasons, there are differences in the value of the spermogram indices in the species of animals with seasonal reproduction, when the activity of the breeders and the libido in the extra-season are relatively minimized. The average rate of advancement of rams' spermatozoa

according to some scientists' data is  $77 \mu\text{m/s}$  (V.K. Milovanov, 1962). Sperm with an average advancement rate of  $113.41 \mu\text{m/s}$  are 25.01% of the total sperm volume, and with a rectilinear movement speed of  $94.63 \mu\text{m/s}$  - 31.46%. Thus, we can see the fact of obtaining a qualitative sperm of the Tsigaiya breed of wool-meat-milk, in the main breeding season. In the secondary season the average rate of advancement of the native sperm of the domestic breed Wool-meat-milk shingles is

relatively low and constitutes 101.0  $\mu\text{m/s}$ , the speed of movement in the straight line is 74.3  $\mu\text{m/s}$ , and those with curvilinear motion they have a speed of 164.8  $\mu\text{m/s}$ . As we see the rate of sperm progression is relatively lower in the secondary season than in the main breeding season. Thus we find the manifestation of a stable tendency to reduce the movement rate of the sperm in the secondary sheep breeding season. The percentage of sperm with forward movement in the straight line prevails in ejaculates taken in both seasons, but in the main breeding season it is significantly higher than the secondary season (31.46 V% compared to 21.42 V%).

## CONCLUSIONS

1. The values of the characteristics of the raw sperm of the rams of the domestic breed Tsigai of wool-meat-milk fall within the specific limits of this breed.
2. The volume of the ejaculate and the qualitative indices of the sperm change during the year depending on the breeding season of the sheep.
3. The mobility of sperm in the main breeding season is quite high, with average

indices of  $81.17 \pm 0.01\%$ , with relatively low variation limits.

4. In the main season, the number of sperm with a rectilinear feed rate of 94.63  $\mu\text{m/s}$  constitutes 31.46% of the total ejaculate volume.

5. In the secondary breeding season the mobility of the sperm is lower than in the main breeding season (66.24% against 81.17%).

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