

ABSTRACT

The doctoral thesis entitled "Research on the influence of technological factors on growth and body development in young Karakul de Botoșani sheep" represents a synthesis of the most important results regarding the technological factors that can be improved and optimized in order to increase zootechnical performance in the level of each holding, with some extremely low costs.

Most of the research carried out in order to evaluate the performances obtained from sheep and goats highlight the complex character and the multitude of factors that exert influence on the characters, traits and characteristics that influence economic growth.

Each group of factors includes several variables that when brought into a state of imbalance can exert some major influences on how the animal organism behaves in certain critical situations. That is why, when we discuss the influence of factors on the performance obtained from sheep, it is necessary, in addition to optimizing all factors, to take into account genetic variability as well as the repeatability of characters in offspring that indicate the upper limit of heritability.

According to their nature, the main factors that condition production and reproductive performance in sheep are the following:

- genetic factors (race, individuality, sex and type of calving);
- internal environmental factors (age, health, physiological state, inbreeding);
- external environmental factors (climate, soil and vegetation, reproductive intensification, technology).

In order to support farmers but also to find answers related to aspects of general interest, the theme addressed in the research was based on the application of a plan drawn up a priori with the aim of researching how some technological factors manifest an influence on growth and of body development in Karakul of Botoșani sheep breed youth.

The motivation that was the basis of the application of the experimental plan was supported by the fact that in the field of improvement the work must be accelerated since the native breeds have low performances in terms of basic productions. This aspect is largely due to the fact that the herds are exploited in small herds, by private breeders, who own small areas of land and have a deficient organization regarding the growth and exploitation of this species and compliance with the specific principles of the breeding program.

The research plan that was the basis of the present research was designed so that the analyzed factors could contribute to the economic growth of sheep raised for the production of pelts.

In order to achieve all the objectives, the conducted research was carried out in several stages in which the analyzed objectives were different and aimed at characteristics and traits specific to the activity of reproduction and growth of young sheep.

In developing the research plan it was started from the premise that every farmer who manages a herd of goats/sheep is always looking for ways to improve his herd, increase production and increase profitability. One way to achieve this is to implement technological flow that supports the growth of reproductive and production specific indicators. If he manages to find the solution that will attract an increase in these indicators, he will surely be able to more easily apply all the improvement activities aimed directly not only at increasing the productive performances but also at improving the genetic quality of the herd.

The main purpose of the research was to evaluate and investigate the effects due to the influence of technological factors, which exert a major influence on specific aspects of the growth process of young sheep, especially how they can influence the rate of growth and development corporal so that the transition period to the basic herd is considerably reduced, and by the age of 18 months the youth will have finished their first gestation.

The originality of the research is ensured by the fact that the study of the effect due to the additional feeding of adult sheep, as well as the evaluation of the body condition at the time of lambing, and their role on the reproductive characteristics, and those specific to the growth process of the young ewe, is studied in a organized for the first time in our country and from this point of view it represents a novelty and the results are based on a high degree of originality both for the field represented by sheep breeding and for the breed that was included in the experimental protocol.

The objectives of the research carried out were different, but they have a great impact on the economic growth of sheep.

Determining the effect due to additional feeding on reproductive activity was a first objective of the research plan on the basis of which the data and information necessary for the successful completion of the planned research were obtained.

The experimental factor that made the difference between the groups was represented by the fact that the females that were included in the L2 group benefited from additional feed. This was achieved by administering, 25 days before the start of the growing season, a mixture of cultivated concentrates consisting of crushed corn, sunflower meal, barley and oat grains.

The additional administration of this concentrated feed mixture to the L2 group had the purpose of improving the body condition of the females before the start of the breeding season, and for each female a daily amount of 150 g was provided. Through this additional feed, the aim was to ensure an intake additional energy of 15% compared to the feeding level benefited from the females that constituted L1.

Flushing was based on a temporary but intentional increase in the level of nutrition during the period of preparation for breeding. This technique is useful and beneficial as it positively influences and attracts an increase in the ovulation rate, the conception rate and the embryonic development process. Flushing can also increase the proportion of females in estrus and positively influence ovulation and fertility by an average of 10% to 20%. This is very important, because this reproductive indicator is one of the main factors influencing profitability.

Body condition assessment was used to derive the Body Condition Score (BCS). In both groups, the BCS was obtained based on the information gathered as a result of the palpation at the time of mounting of the muscle masses and the fat deposits located on the upper line of their body (back, saddle and rump) being given marks of 1 (for the lean ones) at 5 (for very fat ones) with 0.5 subunits. using a method developed by Jefferies et al., 1961 and Russel et al., 2009.

Body condition was assessed by two experienced individuals who assigned a score by consensus. If different opinions or certain controversies were recorded, the evaluation was extended until a total consensus and the same point of view was obtained.

The breeding season was carried out between September and October, with managed natural breeding being used, with 25 females assigned to one ram. The calving season took place between February and April and the lambs were weaned 70 days after calving.

In order to eliminate the influence of the season on the reproductive function, the moulting period was placed in the natural season in which the reproduction of the sheep in the area where the researches took place, respectively in the months of September and October.

The biological material subjected to research belongs to the Karakul of Botoșani breed of known origin, being bred and improved for the production of hides. During the period in which the research was carried out, the breeding nucleus of the Karakul of Botoșani breed was represented by the youth categories and respectively by adult sheep belonging to different color lines.

Specifically, the biological material used in the applied research was represented by two batches of adult sheep in the first phase and the youth obtained from them. Only adult sheep were included in the two batches, chosen randomly, each consisting of 100 females with a homogeneous body development and a minimum age of two years and a maximum of six years.

The two batches were rated L1 and L2 and the entire procedure applied in the scientific research was approved favorably and had the approval of the executive management of the Sheep and Goat Breeding Research and Development Station (SCDCOC) Popăuți-Botoșani.

Both groups were maintained in similar conditions throughout the year, and the experimental treatment that was established by the research plan was applied only to L2. In the case of this batch, 25 days before the date of mounting, an additional feed was applied in order to support the achievement of an optimal body condition at the time of mounting.

The working methods used to create the research panel were based on the use of appropriate and recognized working methods in the experimental technique in this field. As the main objectives were varied in number and different in nature, the methods used were also multiple and adapted to specific conditions.

The influence of supplementary feeding on the evolution of the body weight of young sheep in the lactation period

The calving campaign took place in optimal conditions and in the normal season that this breed goes through every year.

During the lactation period, the technology applied in raising the lambs was similar to the two batches, being the one traditionally used in the research-development unit from Popăuți. During the first 15 days postpartum the lambs were kept together with their mothers. After this period they switched to a directed growth by separating the lambs and reducing the contact time between the mother and the lamb.

In order to assess the pace of the body development process in the lambs obtained from the two batches of adult sheep, control weighings were carried out using a high precision scale. To eliminate errors that could occur due to different eating behavior of the thousands, the weighing was done by completing a 4-hour fasting period, and the weighings were carried out at approximately the same times of the day.

Research on the evolution of body weight in young sheep in the period of growth and body development

After weaning, the lambs obtained from the two batches of adult sheep benefited from the same experimental treatment, being kept in the stable with maintenance in common growth compartments.

The feed was unitary and was provided in the form of tains. Since the period after weaning corresponds to the vegetation period of the plants, the daily feed of the lambs included, in addition to the canned assortments, green fodder resources.

Being a period when the cessation of lactation could represent a stress factor, it was considered that the feed included varieties with a higher nutritional value and were easily accepted by the lambs.

The aim was to minimize the effects of weaning and to ensure favorable conditions for growth and physical development.

In order to be able to evaluate the pace of body development in the phase when the youth was passed to a higher age group, all lambs were subjected to control weighings. As in the previous cases, this activity was carried out after a period of fasting completed by each lamb.

Based on the data obtained and on the basis of their statistical processing, the average value of the live weight at the age of 6 and 9 months was obtained, respectively. Then by relating the average live weight of the lambs to the average weight of the ewes determined by weighing at weaning, a value was obtained that represents the proportion of the live weight of the adults at that time.

Assessment of growth intensity based on body dimensions

Multiple body measurements were taken at nine months of age. At that time growth measurements were taken to establish the relationships between size, volume and development of the main body regions. In this sense, measurements of height, depth and perimeters were carried out, using instruments accepted by the experimental technique.

All measurements were performed following the benchmarks for each measurement category and type.

The obtained data were processed using the test of significance and to evaluate the interdependence of body measurements, a factor analysis was performed based on procedures recommended by SAS Institute, 1990) for the categories of sheep in growth and body development.

Research on the early reproductive use of female youth from their first year of life was another focus of the research conducted

In planning this objective, it was started from the premise that the effect due to additional feeding will influence the lactogenic capacity of the mother ewes and indirectly the growth intensity of the obtained lambs.

Also, in the planning of this objective, it was also taken into account the fact that in the conditions in which the lambs will have more milk at their disposal, they will also have a more intense rate of growth and in these conditions the young females will fulfill from their first year of life the minimum conditions of introduction into the reproductive circuit.

By evaluating the specific features of the growth and body development process, it was found that the minimum requirement represented by body maturity was met in terms of weight at the age of 9 months, but also in terms of body dimensions.

Starting from the fact that the two batches formed by female youth obtained on the basis of the calvings made by the adult sheep included in the experimental plan, met all the biological (body maturity) and physiological (sexual maturity) requirements for use in the mountains, we proceeded to prepare them for mount in the natural season of the year in which they were born.

The purpose of these researches was to see if the effect due to the additional feeding of the ewes had the influence not only on the fulfillment of the minimum conditions for use in the mountain but also on some indicators specific to the reproductive function.

To avoid the influence of different factors, both groups of young females benefited from the same housing and feeding conditions, being maintained in permanent stables in common compartments, benefiting from identical conditions and treatments throughout the experimental period.

In order to stimulate the onset of heat in a limited time and in a larger number of females, the possibility of synchronizing heat was also considered. That is why the research plan provided for the use of breeding rams to stimulate the initiation of sexual cycles. In this sense, a breeding ram was introduced

into each batch of 35 females 15 days before the date set for the start of the lambing. In order not to mount the rams, they were equipped with an apron. The same rams also contributed to the detection of females in heat, but the mating was carried out with reproductive males distributed through the management and selection plan, being the naturally directed mating.

The use of the technique based on triggering heat by introducing the ram between the females is called the "ram effect" and has the role of inducing estrus in ewes in anestrus. The presence of the ram stimulates and causes an increase in the secretion of luteinizing hormone (LH).

In addition, the response may also differ due to other factors related to the preparation of the ewes for this procedure, such as longer maintenance away from breeding rams, maintenance status, body energy reserves and hierarchy.

If all these factors are met, their effect is minimized and the technique based on the ram effect will generate in a short time the onset of sexual cycles in sheep and will cause not only a manifestation of ovulatory heat but also an increase in the number of ewes that show estrus in an interval relatively short time.

The ram effect also has the advantage that it also induces an increase in the number of ewes in heat in a shorter interval, so it also has an effect on the synchronization of ovulation, and therefore also on the gradual advance of the start of a new mating season.

In order to effectively use the technique due to the ram effect, the two groups of young females aged 9 months were completely isolated from the breeding males 40 days before the date set for the start of breeding activity.

After this interval the rams were brought inside the groups, at first for the first 3 days the rams wore a protective apron in the abdominal area. On the fourteenth day, the sexually active rams assigned to the litter were introduced into the groups. They performed mating as the females exhibited sexual cycles.

Evolution of body weight during the lactation period in lambs resulting from the early use of females for breeding

By planning this objective, it was aimed to carry out a detailed study on the growth and development of lambs obtained from females used in breeding from their first year of life.

For this purpose, the applied experimental protocol was similar for the lambs obtained from both groups of females. Feeding was carried out by administering balanced rations in which the optimal values for most nutritional factors could be found.

Maintenance was carried out in common compartments provided with refuge spaces for lambs. In order to evaluate the evolution of body weight during the breastfeeding period, weighings were carried out at birth and at the age of 75 days after birth. An instrument with an accuracy of ± 100 g was used for weighing.