

MORFOMETRIC CHARACTERISTICS OF SHEEP BREED KARAKUL AND HALF BREED AWASSI OF DIFFERENT AGE AND SANGUINE COTTAGE

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Abstract

The research was carried out within the doctoral studies program, examining the herd structure within a zootechnical sheep farm situated in the Center area of the Republic of Moldova (Peasant Farm, „Turcan Andrei Ion” village Zorile, district Orhei). During the study of evaluation the structure herd of sheep by age, the level of expression of the breed characteristics in Karakul sheep, were taken into consideration the specific features of the outer appearance of Karakul sheep - the shape of the head (profile), the size and the ears hanging, the shape and size of queue specificity for sheep of pure-bred sheep, age after dentition. The blood level (genotype) of the meticultures (Karakul x Awassi) was established according to the monte and calving records as well as the sheep numbers of sheep in the farm. Body weight and measurements were determined by the autumn weighing (a. 2016) - until the start of the insemination campaign. The results of research shows that the herd studied (sheeps, lambs and rams - 200 heads) after genotype is represented as follows: karakul (pure-bred) – 10 heads (8%); karakul half breed (F²) – 29 heads (20.4%); karakul half breed (F³) – 30 heads (21.1%); half breed with Awassi breed: 25% – 63 heads (44.4%); 62.5% – 10 heads (8%) breedingrams Awassi (pure-bred) – 2 heads (1.4%). According to weight and body measurements, the sheeps half breed with Awassi (25%) at the age of 2.5 and 3.5 years old were superior to Karakul, and the baseline values gradually increased with age advancing and reaching physiological maturity full.

Key words: Karakul, Awassi, half breed, genotype, body weight, measurements and body indexes.

Introduction

Sheep breeding for skin-milk production is a centuries-old tradition in the Republic of Moldova, especially in the North and the Center of the country (Iliev, 1971). The main population of sheep grown in this direction was represented by the indigenous breed Tsushka, which for several decades was subjected to crosses (different variants) with the Karakul sheep breed imported in the republic from the countries of Central Asia (Buzu, 2012, 2016). During the breeding and selection works with the local sheep Tsushka and the mestizos obtained from the crosses with Karakul breed (Buzu et al., 1993; Buzu, 1996), decades have focused on improving the quality of the leather required in the manufacture of various national haberdashery, the increase in the body weight of sheep and the production of milk (Lutskanov et al., 2015). At the same time, the better results in the selection of sheep for the skin were

obtained in the northern part of the republic, while in the Center the majority of the herds are heterogeneous according to the race structure, the effective womb being represented by various metis with unknown origin, but with clear signs of hybridization with the Karakul breed, which, as it is known, is not found among sheep breeds with high milk production (Pascal, 2007). Under conditions when for the economy of these sheep farms, the main role has the production of milk at sheep, necessary for the production of the cheese-product which in the last decade determines the sheep breeders to orient themselves towards effective measures and actions for amelioration of the lactogenic capacities of raised sheep (Mashner et al., 2011). In order to obtain larger quantities of sheep's milk, in the republic, have appeared some sheep nuclei of specialized breeds for milk production such as Friza, Awassi, Lacoune, Assaf. The rams of those breeds are required for crossing with the sheep from the native breeds to increase milk yield at the exploited metids and eventual creation of some populations of sheep ameliorated for milk production (Mashner et al., 2014).

Taking into account the importance and the correlation of the exterior of the dairy animals with the respective production, which is also evident in the specialized breeds of sheep (Ivanova and Raicheva, 2013; Pascal, 2007), the researches carried out aimed at the morphometric characterization of sheep Karakul and Karakul x $\text{\text{Țsushka}}$ with different expression of the degree of amelioration after the ameliorative breed (various genotypes), as well as their descendants - sheep of different generations, obtained from experimental crosses with Awassi rams, grown under the same conditions of exploitation - maintenance, nutrition, milking.

Materials and methods

The research was carried out on a sheep farm in the Center area of the Republic of Moldova (d. Orhei, v. Zorile) on a total number of 200 heads, including 198 females and 2 rams of breed Awassi. The number of females were represented by Karakul and those metises (Karakul x $\text{\text{Țsushka}}$) with a different degree of expression of the Karakul exterior (head profile, tail, trunk) and females of different ages and generations obtained from experimental crosses with the Awassi rams.

The studied flock of sheep was maintained, fed and exploited (milking, grazing) under identical conditions, according to the traditional technology in that area.

In order to assess and determine the degree of hybridization of the effective womb ($\text{\text{Țsushka}}$) with the Karakul breed, it was appealed to the evaluation and comparison with the prototype (pure Karakul) of the head profile, the size and hinging of the ears, the specificity of the tail: the degree of fat deposition at the base and the position of the weak pointer of the tail which at Karakul is represented by the letter "S"), it was effectuated the examination of dentition for age determination and individual description of sheep with their weighing and determination of body weight (specialized electronic weighing machine with the precision of 0,1 kg). The sheep appreciated in the described way were grouped: Karakul (pure race), Karakul metis (F2), Karakul metis (F3). Concomitantly, metises sheep obtained from crosses with the Awassi rams ($\text{\text{ȚKarakul}} \times \text{\text{Awassi}}$) were appreciated and grouped according to the farmer's records: 25% Awassi blood and respectively with 63% - blood count after Awassi and weighed individually in the same way.

For the objective evaluation of the sheep exterior of the investigated flock at 5 heads of females from each lot (genotype), basal body measurements were made (height at withers, height at croup, oblique length of trunk, breadth and depth of the chest, perimeter of thorax

and whistle) using appropriate instrumentation (stick, compass, ribbon). In the base of body measurements, were calculated body indices, expressed as a percentage: body shape, thoracic, robustness, bones, using classical methods (Pascal, 2007; Tafta, 2008).

The obtained numerical material has been protooled (in written form) in the research register, systematized and statistically processed using the special program "STATGRAPHICS Centurion XV", and the degree of certainty of the differences between the analyzed indexes at the comparison groups was established using the Student criterion (Plohinsky, 1969).

Results and discussion

As a result of the assessment and evaluation of sheep flock in the examined farm, it was found that in the herd structure, according to the genotypic aspect, predominate mestizo females with the race Awassi (table 1).

Table 1. Specifics of flock analyzed according to the structure of different genetic groups

Race / genotype	Nr. of animals, head	Share in the total flock, %
Karakul (pure race)	10	5.0
Karakul metis (F ²)	29	14.5
Karakul metis (F ³)	30	15.0
Mestizos Awassi (25%)	63	31.5
Mestizos Awassi (63%)	66	33.0
Rams Awassi (pure race)	2	1.0
Total effective	200	100.0

According to the data presented in the table it is obvious that in the studied flock of sheep the share of sheep of Karakul pure breed is reduced, being only 5% (10 heads), the metes sheep (Karakul x Tsushka) represent 14,5% (F²- 29 heads) and 15% (F³-30 heads).The analysis of the studied flock by the age criterion highlighted the following characteristics: for the 10 heads of sheep considered to be of the pure Karakul breed , all females were over 5 years old, including: 3 heads - about 5 years, 3 heads - about 6 years old and 4 heads were about 7 years old;of 29 heads of females Karakul metis (F²): 3 heads were 4 years old, 7 heads - 5 years, 8 heads - 6 years, 7 heads - 7 years and 4 heads were 8 years old; those 30 heads of the Karakul females (F³): 3 heads were about 4 years old, 5 heads about 5 years old, 11 heads about 6 years old, 7 heads about 7 years old and 4 heads about 8 years old.

As for the age of metis female (63 heads - 25% blood count of Awassi breed), they were distributed as follows: 7 heads - 1.5 years, 23 heads - 2.5 years and 33 Heads - 3.5 years.

The 66 heads of metis female with blood count of Awassi breed of 63 percent at the time of the evaluation were 1.5 years old - 10 heads and 56 heads were lambs with an average age of about 7 months. From the specificity of the age structure of the respective flock, it is clear that the Karakul metis females represent the maternal base for the crosses made with the Awassi

rams and practically gradually will be replaced with the metis females obtained from these crosses. At the same time, the Karakul sheep age (metis) denotes a high potential of productive and reproductive longevity of these sheep, an important fact for the native breed used in crosses with the ameliorating breed Awassi.

In order to analyze the level of development of body weight at the investigated sheep the individual weighing was used. The results of the investigations are presented in Table 2.

According to the results of the body weight evaluation at females of all genetic groups and age (without female youth up to one year old) it was established that at the females pure Karakul and metis (F^2 and F^3) body weight by group oscillated between 57-61 kg, indicating a good corporal development specific to the karakul sheep raised in that area of the republic. Among the analyzed groups, the difference in body weight had statistically unauthentic values.

Table 2. Body weight of females of different genetic groups and age, kg

Specification (Race / genotype / age)	Nr. of animals, head	$\bar{X} \pm S_x$	V, %
Karakul (pure race) - over 5 years	10	61.21 $\pm$ 2.26	11.7
Karakul metis (F^2) - over 5 years	29	57.65 $\pm$ 1.43	13.4
Karakul metis (F^3) – over 5 years	30	58.59 $\pm$ 1.04	9.8
Metisse with Awassi (25%) - 1.5 years	7	54.62 $\pm$ 2.91	14.1
Metisse with Awassi (25%) – 2.5 years	23	61.50 $\pm$ 1.44*	11.3
Metisse with Awassi (25%) – 3.5 years	33	63.23 $\pm$ 1.21*	11.1
Metisse with Awassi (63%) – 1.5 years	10	51.55 $\pm$ 1.83	11.3

* $P \leq 0.05$

Regarding the body weight at the metis females with Awassi breed, it was observed that at young sheep 1.5 years, regardless of the metis degree (25% or 63%) after the ameliorative breed the body weight is quite high for such an age, being 54.62 $\pm$ 2.91 kg at sheep with 25% Awassi blood and of 51.55 $\pm$ 1.83 kg at those with 63% Awassi blood. Meanwhile, at the metis sheep of 63% of the body weight was slightly lower (3.07 kg or 5.6%) than to semen with 25% Awassi blood, the difference being not significant. It should be noted that, in comparison to body weight at Karakul and metis sheep (F^2 and F^3) the metis sheep with Awassi breed at 1.5 years they reach about 85% and more of the weight of adult sheep (over 5 years) of the native breed, that demonstrates a higher precocity at metis sheep, due to the influence of Awassi rams. Comparing body weight values at metes sheep 25% of blood of Awassila breed age 2.5 years (first lactation) and at 3.5 years (second lactation) with that of Karakul metis breed (F^2 and F^3), the superiority of Awassii breeds ($P \leq 0.05$) is evident. The values of the body weight variation coefficient at all female groups indicate sufficient homogeneity of the animals in the analyzed groups.

After performing body measurements on lots consisting of 5 representative heads within each genetic group and age, it was established that according to these values they correspond to the

production direction of the sheep and the ages examined (table 3). At the same time, examining and comparing the body measurements between different groups of sheep, an absolute superiority has been demonstrated for all metis with a 25% blood count on the Awassi breed and the age of 3.5 years. Depending on the body region, the value of the statistical significance constitutes $P \leq 0.01$ or $P \leq 0.001$ in comparison to pure karakul and metis (F^2 and F^3). Concomitant, were highlighted and metis sheep of 25% with Awassii breed through authentic statistical superiority ($P \leq 0.01$) compared to the pure Karakul and the Metis (F^2 and F^3) for the development of the thorax in width and depth.

It should be noted that the metis sheep Awassi breed at all ages were net superior to the pure Karakul and metis sheep (F^2 and F^3) after the perimeter of the whistle with $P \leq 0.001$, indicating the considerable contribution of the Awassi breed in the transformation of skeleton at descent to more robustness than that of the maternal base used at crosses.

Table 3. Values of body measurements at females of different genetic groups and age, ($X \pm Sx$, cm)

Specification (Race / genotype / age)	Height at withers	Height to croup	The oblique length of the trunk	The breadth of the chest	The depth of the chest	The perimeter of the chest	Perimeter of the whistle
Karakul (pure race) - over 5 years	68.7 $\pm$ 0.89	71.4 $\pm$ 0.97	72.4 $\pm$ 1.15	23.3 $\pm$ 0.85	32.5 $\pm$ 0.42	87.6 $\pm$ 2.82	7.0 $\pm$ 0.16
Karakul metis (F ²) - over 5 years	68.4 $\pm$ 1.82	71.6 $\pm$ 2.05	71.2 $\pm$ 2.27	22.4 $\pm$ 1.15	32.8 $\pm$ 0.42	87.4 $\pm$ 5.86	6.8 $\pm$ 0.22
Karakul metis (F ³) - over 5 years	69.0 $\pm$ 0.79	71.2 $\pm$ 0.74	73.6 $\pm$ 0.76	24.2 $\pm$ 1.34	32.2 $\pm$ 0.82	87.8 $\pm$ 2.43	7.2 $\pm$ 0.22
Metisse with Awassi (25%) – 1.5 years	70.1 $\pm$ 0.13	73.5 $\pm$ 0.98	74.7 $\pm$ 1.03	24.1 $\pm$ 0.93	30.8 $\pm$ 0.51	93.5 $\pm$ 2.10	9.3 $\pm$ 0.16***
Metisse with Awassi (25%) – 2.5 years	72.8 $\pm$ 1.20	75.8 $\pm$ 1.39	77.2 $\pm$ 1.06	27.8 $\pm$ 0.66**	36.4 $\pm$ 0.74**	95.8 $\pm$ 1.46	9.4 $\pm$ 0.18***
Metisse with Awassi (25%) – 3.5 years	75.4 $\pm$ 1.36**	76.6 $\pm$ 1.02**	81.0 $\pm$ 0.63***	28.2 $\pm$ 1.11**	37.4 $\pm$ 0.50***	101.6 $\pm$ 1.16**	9.8 $\pm$ 0.12***
Metisse with Awassi (63%) – 1.5 years	69.0 $\pm$ 0.89	71.2 $\pm$ 0.58	73.8 $\pm$ 1.01	23.8 $\pm$ 1.2	30.4 $\pm$ 1.56	91.4 $\pm$ 2.90	9.3 $\pm$ 0.12***

* $P \leq 0.05$ ** $P \leq 0.01$ *** $P \leq 0.001$

In order to amplify the external characteristics of the studied sheep groups, based on the body measurements, 4 basic indexes for ovine animals were calculated, as shown in Table 4.

Table 4. Body indexes at females of different genetic groups and age, ($X \pm Sx, \%$)

Specification (Race / genotype / age)	Format corporeal	Thoracic	Robustness	Skeleton
Karakul (pure race) - over 5 years	105.00 $\pm$ 1.10	71.10 $\pm$ 2.54	131.60 $\pm$ 3.47	10.00 $\pm$ 0.21
Karakul metis (F2) - over 5 years	103.81 $\pm$ 1.74	67.80 $\pm$ 3.29	136.44 $\pm$ 5.10	9.6 $\pm$ 0.0.24
Karakul metis (F3) - over 5 years	106.20 $\pm$ 1.31	74.43 $\pm$ 3.58	126.80 $\pm$ 4.06	10.40 $\pm$ 0.24
Metisse with Awassi (25%) – 1.5 years	106.77 $\pm$ 1.56	78.45 $\pm$ 2.31	123.14 $\pm$ 2.08	13.33 $\pm$ 0.17
Metisse with Awassi (25%) – 2.5 years	107.54 $\pm$ 1.81	75.55 $\pm$ 3.79	125.44 $\pm$ 1.45	13.01 $\pm$ 0.38
Metisse with Awassi (25%) – 3.5 years	106.12 $\pm$ 1.93	76.50 $\pm$ 2.50	124.12 $\pm$ 1.59	12.92 $\pm$ 0.35
Metissewith Awassi (63%) – 1.5 years	106.96 $\pm$ 1.93	78.36 $\pm$ 1.56	123.74 $\pm$ 2.53	13.48 $\pm$ 0.07

Analyzing the average values of calculated body indices, are observed some differences in the proportion of the body regions of the sheep according to the main production direction. Namely, at metis sheep with the Awassi breed indifferent of age body size and robustness index is more characteristic to dairy animals and, at the same time, is visible the difference between the skeleton index with the same at karakul sheep and those metis (F^2 and F^3), which essentially ensures the required transformations in the morphoproductive type of the animals. The stated differences confirm that at metis sheep from crossing with the Awassi breed physiological and anatomical transformation takes place towards the morphoproductive type specific to ameliorating breed.

Conclusions

Crossing Karakul and Metis (Karakul x Tsushka) breeds with Awassi rams contributes to increasing of the precocity of the metis youth and increasing the body mass the fact confirmed by body development (weight and body measurements).

By the age of 2.5 years metis sheep with blood count of 25% of the Awassi breed achieved a body weight of over 60 kg and at 3.5 years – 63.23 $\pm$ 1.21 kg, being significantly higher than compared to sheep of maternal base.

At metis sheep with Awassi breed is realizing a physiological and anatomical transformation towards the morphoproductive type specific to the ameliorative breed, the metis having a superior body development and a strong robust appearance.

References

- Buzu, I. (2012): Type of sheep Moldovan karakul corpulent: theory and practice of creation and improvement. Monograph. Chisinau, Ed. "Elena-V.I.", 514 p.
- Buzu, I., N. Zelinschii, S. Evtodienco (1996): Instructions for the certification of sheep karakul with principles of amelioration in the Republic of Moldova, Chisinau, 72 p.

- Buzu, I (2016): Raising sheep and improving the Karakul breed. Synthesis work. Chisinau, Ed. "Elena-V.I.", 80 p.
- Buzu, I., V. Babenco, N. Marzanov et. al. (1993) Recommendations on the technology of oyster products in the Republic of Moldova. MAA. Chişinău, Ed. Agroinformreclama, 96 p.
- Ivanova, T., E. Raicheva (2013): Exterior of Sheep from Synthetic Population Bulgarian Milk. Animal sciences, 4-5: 32-36 (BG).
- Iliev, F.V. (1971): From the history of lambskin-dairy sheep breeding in Moldova. Breeding and maintenance of karakul sheep. In: Proceedings of VNIK. Tashkent. Publishing house. «FAN», P.17, P. 86-94.
- Lutskanov, P., O. Mashner, I. Buzu (2015): Creation of new types of Tsigay and Karakul sheep in Moldova. Saarbrücken (Germany), Ed. Palmarium Academic Publishing, 138 p.
- Mashner, O., P. Liutskanov, V. Radionov, S. Evtodienco (2011): Technologies for obtaining and capitalizing of sheep milk. Chisinau, Ed. "Prin-Caro", 54 p.
- Mashner, O., P. Liutskanov, S. Evtodienco, A. Dănuţa (2014): Breeding and improvement program for sheep and goats in the Republic of Moldova for the years 2014-2020. Maximovca. Ed. "Print-Caro", 34 p.
- Pascal, C. (2007): Sheep and goat breeding. Iasi, Ed. "PIM", 520 p.
- Pascal, C. (2007): The technique of assessing and evaluating productive performance at sheep and goats. Iasi, Ed. "ALFA", 268 p.
- Tafta, V. (2008): Raising sheep and goats. Bucharest, Ed. "CERES", 394 p.
- Plohinsky, N. (1969): Guide to biometrics for livestock specialists. Moscow, 256 p.