

# THE GROWING AND AMELIORATION OF KARAKUL SHEEP IN THE REPUBLIC OF MOLDOVA

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## Abstract

The purpose of this paper was to compare the historiography and evolution of the amelioration of sheep races Țușca, Karakul, to evaluate the efficiency of their crossing at the different stages of socio-economic development of the Republic of Moldova. The research was carried out on the basis of the analysis of the bibliographic sources of some authors from different historical periods of society development, as well as on own scientific researches in the long term (1989-2018). It was found that according to the historical traditions of the population in the northern and central areas of the Republic of Moldova, the locals grew local Țușca sheep breed, with mixed milk-wool-furskin production. The idea of improving the furskin qualities of lambs of the local Tusca race by crossing with Asian Karakul race appeared starting with 1884 in Basarabia, due to the excessively high furskin of Karakul pears worldwide and locally, compared to other ovine products (milk, meat, wool). The periodic imports from Turkestan of pure-blooded Karakul sheep at the end of the 19th century - the beginning of the 20th century, as well as in the interwar period, led to the establishment in Basarabia of nurseries of the pure Asian Karakul as pure race, as well as the first sporadic cross-breeding works with the local Țușca race for the improvement of the furskin qualities of lambs. After II World War, imports from Central Asia of Karakul sheep were systematically carried out every year in increasing quantities and the crosses of the local Țușca with the pure Karakul race had a mass character and were carried out by the absorption method. The mass crossbreeding of local ewes (Ț x K) with the Asian Karakul rams has led to some amelioration the lamb furskin qualities and, at the same time, to the reduction of sheep resistance to environmental hazards, a significant decrease in viability, body mass and milk production. From 1979 to 1980, the scientific researchers of the former Moldavian Branch of IUCȘK (Samarkand) applied a new approach to the process of selection of local sheep (ȚxK) after an integral complex of characters (furskin quality, body mass and production milk), elaborating the oviculture development strategy, a series of instructions and programs for genetic amelioration of sheep Karakul, methodical and technological recommendations for their selection under market economy conditions. As a result, in Republic of Moldova was created a new type of Moldavian Karakul sheep, adapted to the local environment conditions with increased production skills for furskin-milk-meat has been created and approved, which provides on average: the share of I sort furskins 65 -70%, body weight of youth at 6 months 35-40 kg , 55-57 kg in adult ewes, 90-95 kg in breeding rams, ewes milk production for the entire lactation 70-75 kg.

**Key words:** sheep, Țușca, Karakul, crossing, Moldavian type, furskin, milk, meat

## INTRODUCTION

Sheep farming is one of the oldest and most traditional branches of the zootechnical sector in the Republic of Moldova [42, 43]. There are about 720 thousand sheep in the republic, out of which about 350 thousand of Karakul race and its mestizos Țușca x Karakul (Ț x K). Annually about 20.0 thousand tons of

milk, 6.0 thousand tons of meat, 250 thousand pieces of furskin, 2.7 thousand tons of wool and other productions are obtained from the sheep. Sheep ensure food security to the rural population with dairy products (cheese, butter) and meat, and the processing industry - with natural raw materials (furskins, fur sheep, skins, wool). The sheep effectively use in feed the natural pastures and plant remains on the stubbles of agricultural harvested lands. For these reasons, sheep farming is an accessible and indispensable branch for the native

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population and have major importance to the national economy. [18].

The historical traditions of the population from the territory of the Republic of Moldova had a specific attitude towards the sheep breeding, especially in some areas. In the North and Center of the country, the natives had raising the local sheep race - Țușca, with mixed production skills for milk-wool-furskin. The spread of this race in the nominated areas was not accidental, but a sustainable one, established by human society during the evolution, because the sheep ensured, first of all, the rural population with products of first necessity [18]. About the importance of the raising of Țușca sheep for the native population, one of the biggest shepherds in the former Basarabia, Кауфман И. С. [47, p. 30], in 1911, had mentioned that if to proposed to uncle Ion to substitute this race for another, then he would respond with great anger: „*you're wearing a sheepskin coat with hood; your wife and daughters - in skirts; your home is adorned with carpets; all your family stuffed with cheese, curd, milk, butter, ham and fresh lamb meat; your home is heated with „tizic”*. All this are brought by Țușca, and you, the discontented, abet on the head of your benevolent trouble and perdition”. According to Ильев Ф. В. [45], from the lambs of this race, sacrificed at the age of 3-7 days, the poor quality furskins "smușca" were obtained, having usually worthless, in form of corkscrew, ring or semi-ring curls. Ewes were good for milk. Traditionally, from ewes milk the moldovan cheese is prepared, much demanded by native and foreign peoples. The coarse wool of Țușca sheep was widely used in making traditional carpets, cloths and other garments. Sheep meat was and is used in human food to the extent that about 55-70% of newborn lambs are sacrificed for furskin, and carcasses are traditionally used in human food under the name of "Easter lamb". The meat of reformed adult sheep is used in food, but for well-known reasons (harsh, specific odor) it is not always of adequate quality. For the mentioned reasons, the consumption of sheep meat in those areas is not a secular tradition, but only a fact derived from the basic traditions. Under these circumstances, the selection of Țușca sheep was mainly directed towards obtaining milk production and less in

improving the quality of the furskin and meat [18].

According to our research [7], the necessity of improving the quality of the furskin in the Țușca race, by crossing with Karakul race, was realized at the end of the 19th century, with the increasing demand for Karakul furskins on the Western markets. The landowners and owners of the Țușca sheep flocks from Basarabia took over from 1883-1884 the idea, propagated by the Agrarian Society of Poltava Gubernia concerning the amelioration of the local sheep by crossing with Karakul rams. For this, the Karakul sheep were imported from Central Asia periodically in the years 1884, 1888-1898, 1902-1913. By the 1910s, the biggest owners of imported Karakul sheep became Synadino brothers, who set up a nursery of 700 sheep pure Karakul sheep in Onițani, Uezd Orhei. In Hotin Uezd there were Kaufman brothers with 300 and 208 heads respectively, in the Corjeuți and Fetești localities, general Krupenski with 295 heads in the village of Lomacineț, and Tevanov with 278 heads in Târnova. Thus, in the corporate sector of the North and Central Areas of the country, there were at that time the nurseries of purebred Karakul sheep, with a total number of 1772 heads. In Bender Uezd, Zemstvo set up an agricultural room of 110 purebred Karakul sheep, which were used for the amelioration of the local Țușca sheep. Several owners from Chisinau, Akerman, Soroca, Balți, Orhei and others, bought the sheep in smaller flocks. At that time in Basarabia began a real "boom" of purebred Karakul sheep breeding and amelioration of local sheep Țușca, by crossing with the imported Karakul rams. The amelioration works of local sheep Țușca with the Karakul race took root, because the obtained results were encouraging. At the half-breed lambs the qualities of furskin had amelioration, the economic income from the sales of furskin which were paid very well, increased.

The Țușca x Karakul mestizos and their furskins, demonstrated in 1913 at the exhibition in Moscow, attracted the attention of many merchants and sheep breeders [39]. The local Țușca sheep race, which was mainly grown for wool-milk, after 1917-1918 began re-profiling the exploration direction towards furskin-milk, activity that became increasingly

pronounced in Basarabia [18]. The first guidelines for amelioration local race with Karakul sheep made by bassarabian specialists were published in 1925 by Synadino A.V. [22]. After 1930, in Basarabia, on the initiative of Professor Cardas A., a series of research was carried out in the Laboratory of Animal Husbandry of the Faculty of Agronomy in Chisinau in Karakul sheep amelioration and the cross-breeding of the local sheep Țușca. For this, Prof. Cardas, needed highly qualified specialists in the Karakul race. Having personal contacts with the great professors in Western Europe, he delegates his PhD candidate, Tudor Nică, to the Halle Zoological Institute. There was a single herd of pure blood Karakul sheep and a rich collection of over 30 races of sheep with thick wool, with which the remarkable german professors Kyun, Natuzias, Frolich and Tanzer performed crosses with the Karakul race, and then scientifically researched the heritability of the many characters of furskins.

Thus, Nica T., 1936 [20] performed the thesis of doctor, which was in that time in Basarabia a most remarkable work in the study of the Karakul race and its mestizos with race of sheep with thick wool. In his work, the author studied the degree of looping, the length and thickness of the fibers, the gloss, the width of the loops, the morphological structure of the pilose coat. The evaluation of these characters was done by applying the 13-classes German system.

Researching the results of crossbreeding Karakul with different races, the author makes some conclusions that: „*Karakulul dominates more easily in an hereditary unbalanced environment. Crossing the Karakul with another pure breed, no such good results are obtained, as if we were crossing the Karakul with a mestizos carrying the blood of two or three Karakul's alien races, apart from the fine wool races. More likely to be crossed with the Karakulul, its appear to be mestizos with smooth wool, to which mixed blood with mixt wool has been added, with exception of Zackel race*” [20, p. 164]. On the basis of the results of the research, the author concludes that: the presence of the fluff in the morphological structure of the pilose shell at Karakul is on average 17,6% and with the increase of its weight, the qualities of the loop

diminish; in lambs of the upper class, the average length of the fibers on the sacrum is 12.48 mm, and with the deviation from this medium both in diminishing and increasing, the qualities of the furskin fall; between the length of fibers and the size of the loops there is a linear positive correlation; large loops give a better gloss look than small loops (coincidence with our results) [18]. Despite the fact that not all conclusions are in line with current research, however, the data of T. Nica's on the Karakul race and the mestizos obtained after of crossing with another race were of great importance at that time.

The fact of the local sheep breeding through crossing with race Karakul was also mentioned at the First Congress of Sheep Breeders Karakul, Karakul x Țurcană black and greyish in Romania, which carried out its works in Chisinau in 1938. Pecuta N. [21] presents at this Congress, under the auspices of the Laboratory of Animal Husbandry, an ereditar analysis of the breeding for reproduction „Onițcani-Synadino” of sheep Karakul, in which 6 characters were evaluated: the shape of the loop, the gloss, the extension of the curling, the resistance elastic, degree of closure, skin suppleness and class after 5-step system. Among the newborn lambs, 55% were assigned to the first grade, 33% to the second grade, and the rest to the lower classes (III, IV, V).

For the first time in Basarabia, Cardas A. and Nica Gr. [19] performs a hereditary analysis of a valuable pure Karakul, as test of the furskin of the descendants. This ram was one of the elite breeders of pure-blooded Karakul sheep from at Costiujeni-Chisinau State Animal Farm. Among the qualities of furskin, the authors evaluated: the type of loop, the gloss, the degree of closure, the elastic resistance of the fibers and the lamb class. Characters were evaluated by a 8-point system and 8 classes. Comparing the medium value of the progeny with the medium value of the mothers, the conclusion about the value of the ram amelioration was deduced.

Thus, positively appreciating the ideas of amelioration the furskin qualities of the lambs of the local Țușca race by crossing the Asian Karakul, the great enthusiastic shepherds of Basarabia at the end of the 19th century - the beginning of the 20th century

and the researchers from the interwar period did not even assume what danger may threaten this crossbreeding of the local race in the later stages of economic development of human society.

Hence, the knowledge of the historiography and the evolution of the breeding and amelioration of the local sheep race Țușca by crossing the Karakul race allows an objective assessment of their value, adjusted to the current socio-economic conditions of the country. In this context, the purpose of this paper was to compare the historiography and evolution of the amelioration of sheep races Țușca, Karakul and to evaluate the efficiency of their crossing at the various socio-economic development stages of the Republic of Moldova.

## MATERIAL AND METHODS

The scientific researches were carried out on the basis of the analysis of the various bibliographic sources of various authors, found in the books library of the National Library of the Republic of Moldova, the Library of the State Agricultural University of Moldova (UASM) and the National Library of Romania. When studying the historiography of Karakul sheep breeding in Basarabia, was used some of the rare books of authors from Tarsite Russia as well as from the interwar period, generously donated from my own collection by my scientific leader Tudor Iliev, doctor habilitate, university professor, chief of the Department of Animal Breeding and Genetics of UASM. In appreciation of the evolution and impact of the amelioration of local Tusca sheep by crossing with imported race of Asian Karakul, some bibliographic sources from the work of the famous zootechnician, former head of the Moldavian Branch of the IUCȘK Institute for Scientific Research for Caraculture in Samarkand, Mr. Nicolae Bogdanovich [25], as well as the data of own research was used [9-17]. The results of the research have been systematized and generalized according to the principles of the general scientific methodology known in the field.

## RESULTS AND DISCUSSIONS

According to dates Ильев Ф.В. [41], after the Second World War, in the Soviet Socialist Republic of Moldova were systematically imported annually from Uzbekistan and Turkmenistan Karakul sheep in number from 315 (in 1945) to 1367 (in 1947) and 1038 heads (in 1953). The author concludes that mass use of rams Karakul pure cross race with Tusca ewes has led to significant amelioration in race and breed characteristics, as well as the quality of the furskin-goods. Thus, in 1953, of the total number of sheep in the Republic, sheep pure race Karakul constituted 5.1%, sheep mestizos (T x K) - 27.9%, sheep Țușca - 36.1% and sheep Țigaie - 30.9%. The share of furskin sort I+II was 54.0% in Karakul pure, Karakul-mestizos - 43.9%, the black smușca - 27.2% and the smușca greyish - 29.7%.

During this period the scientific researches for the amelioration of the local sheep were started by crossing the Karakul race. The first research in the field was carried out by Ильев Ф.В. [40], (tab. 1).

Table 1 The morpho-productive performances of the Țușca, Karakul and mestizos sheep resulting from their crossing (after Ильев Ф.В., 1957)

Specification	Race		
	Țușca	Karakul	Mestizos (T x K)
<i>Body weight of adult sheep, kg</i>			
Rams	69-74	63-65	65-70
Ewes	44-48	42-44	43-45
<i>Ranking of newborn lambs, %</i>			
Class I	(Mestizos F <sub>1</sub> ) 19.0	50.0	(Mestizos F <sub>3</sub> ) 38.0
Class II	(Mestizos F <sub>1</sub> ) 42.7	41.7	(Mestizos F <sub>3</sub> ) 43.3
Class III	(Mestizos F <sub>1</sub> ) 38.3	8.3	(Mestizos F <sub>3</sub> ) 18.7
<i>Milk production in lactating ewes, kg</i>			
Average per batch	77.6	43.2	55.6

The author studied mestizos of various generations (I, II, III), he developed a crossbreeding scheme which stipulated that the III-generation mestizos sheep would be raised "by themselves", thus creating a flock of sheep for the furskins of local type - Moldavian Karakul. The main attention in the selection is given to the amelioration of

the furskin qualities according to: shape and type of loops, loop strength and elasticity, skin thickness, fiber length and gloss, lamb class at the evaluation (I, II and III class).

As a result of the cross-breeding works, it was concluded that the mestizos lambs obtained in the III-rd generation practically do not yield, according to the furskin qualities, the pure race lambs of Karakul born in Moldova and are much more robust and viable than the ones pure race.

Appreciating the positive value of these researches as being pioneered in the aftermath of the war and hunger, we also notice that the data presented by the author points out that the results of the crossings made during the 5 years did not succeed with great success [18]. In spite of the fact that the quality of the furskin (evaluation class) amelioration, however, the share of the I-sort marketed furskins did not exceed 7-10%, compared to 70-80% in the Asian Karakul. The body mass of the mestizos rams was only 65-70 kg, compared to 69-74 kg in Țușca and 63-65 kg to Karakul, the mestizos ewes was 43-45 kg, compared to 44 - 48 kg in Țușca and 42-44 kg at Karakul. The production of milk at the mestizos ewes was 55.6 kg, compared to 77.6 kg in Țușca and 43.2 kg to Karakul. All these achievements were obtained on a effective of only 44 sheep. For these reasons, the author could not make a viable conclusion that a certain type of sheep moldavian Karakul was created, and motivates this by the fact that the imported pure breed Karakul rams were not of high quality and the flock of sheep mestizos was rather small (insufficient) for efficient selection and growth "in itself". In our opinion, the authors could not create in so short time (five years) a new type of sheep [18].

About the results of the local sheep Țușca crosses with the Karakul rams in the northern area of Zgurița (Drochia), Богданович Н.И. reports [25]. Author systematize results on largest herds of sheep heads of 3500 and reported that 90.5% of the total were mestizos (T x K) of different generations (tab. 2).

Table 2 Body mass and furskin qualities of the Țușca, Karakul and mestizos sheep resulting from their crossing (after Богданович Н.И., 1957)

Specification	The specified production indices		
	Rams	Ewes	Rams of 1,5 year
Țușca	72-81	46.6	52-56
Karakul	62-53	43.0	45-49
Mestizos	65-69	44.5	49-50
The lambs class, %	Elite +class I	Class II	Class III
Year 1952	12.2	51.3	36.5
Year 1955	32.1	41.3	26.6
Sort of marketed furskins, %	Sort I	Sort II	Sort III
Year 1953	5.1	42.8	52.1
Year 1954	6.6	37.8	55.5
Year 1955	12.1	41.7	46.2

The share of elite+class I lambs was 12.4 - 32.1%. Mestizos lambs mostly had thickened skin (77.7%) and thick (9.9%), medium loop size (64.5%) and large (29.5%). The average surface area of the black furskin was 1497 cm<sup>2</sup> and 1436 cm<sup>2</sup> of greyish. The share of I-sort furskins constituted 12.1-19.8%. Based on these results (after us, rather modest), the author concludes that in the households of this district were created sheep mestizos (K x T) of different generations with enhanced furskin quality skills. Neither this author could conclude to support the creation of a new sheep type with enhanced heredity, because the productivity indexes were modest and the creation term - quite short (5 years).

Subsequently, Ильев Ф.В., Богданович Н.И. [44] have carried out research on the selection and pairing of local greyish mestizos sheep Țușca x Karakul (T x K) of different local generation of Karakul rams of both import and local selection. The authors investigated the morphological structure of the pilose cover both after the numerical and the length of the white and black fibers co-report in the greyish furskin, depending on the color nuance (light, middle, dark). They found that the percentage of white fibers in the pilose cover of light nuance of greyish furskin was 75.3%, medium nuance - 58.4% and dark nuance - 39.8%. White fibers exceeded black fibers by length, respectively:

at furskins of light nuance - with 37.2%, medium nuance - 36.7% and dark nuance - 13.9%. In this paper, the authors studied the yield of black and greyish lambs as well as the yield of elite+class I lambs, depending on

the type of sheep mating according to the color of the wool coat (homogeneous, greyish x greyish or heterogeneous, black x greyish) also depending of generation of mestizos sheep (tab. 3).

Table 3 The results of homogeneous and heterogeneous crossing after color of mestizos ewes (T x K) with Karakul rams (after Ильев Ф.В., Богданович Н.И., 1966)

Type of mating		Livestock of lambs, heads	Class of lambs			
Rams	Mestizos ewes		Greyish		Black	
			heads	Elite and class I, %	heads	Elite and class I, %
Greyish of local selection	Greyish	36	20	55.0	15	40.0
	Black	133	52	38.5	75	30.6
Greyish of import	Greyish	23	14	42.8	8	37.5
	Black	62	24	29.1	34	35.3
Total local selection and import	Greyish	59	34	47.1	23	39.1
	Black	195	76	35.5	109	31.2

As a result, it was found that homogenous mating of the greyish ewes with greyish rams, are obtained 57.6% of the descendant lambs are greyish, 39.0% lambs are black and 3.4% of the lambs of other colors. The descendents obtained after mating of black sheep with greyish rams was 38.9% of the greyish lambs, 56.0% of black lambs and 5.1% of other lambs. The authors have shown that in the homogeneous mating of the greyish sheep, with the increase of the mestizos sheep generation (T x K), the yield of the greyish lambs of elite+class I increases from 38.5% in the I generation sheep to the 55.0% in III generation sheep. This regularity was also not recorded in the heterogeneous mating of black sheep with greyish rams. The authors conclude that the III generation of mestizos, obtained from the crossing of local ewes with Karakul rams, meet the requirements of the type requested, both according to the fur skin qualities and the degree of adaptation to the local maintenance conditions.

Positive appreciation of these researches as important in the Republic of Moldova, however, we note that the results obtained regarding the eritability of colors in the mating of Karakul greyish and black sheep deviates too much from the theoretical parameters recognized in the field [35-38] in the homogeneous variant ( $\text{♀}$ greyish x  $\text{♂}$ greyish = 75% greyish lambs and 25% black) and heterogeneous ( $\text{♀}$ black x

$\text{♂}$ greyish = 50% lambs greyish and 50% black). Regretfully, the authors have not elucidated the optimal variants of the morphological structure of the pilose cover, both after the numerical core part and the length of the white and black fibers, which produce a higher yield of lambs of the required colors and high ranking [18].

During the period 1960-1975 the import of Karakul sheep from the Central Asian republics continued in the amount of 1000-1500 heads per year. In the northern and central regions of the country were founded a number of sheep nurseries for pure Karakul sheep breeding. These nurseries began to produce breeding rams of their own choice. However, the amelioration of sheep effectives for furskins was difficult. The share of I sort furskins on the republic did not exceed 12.0-15.0%. As a result of crosses, a livestock of sheep mestizos ( $\text{T} \times \text{K}$ ) of different generations, which started to be called moldavian Karakul sheep, was created in the republic [25, 40]. The productivity of these sheep continued to be low because scientific selection work was not carried out even on breeding farms.

In order to amelioration the situation in this area, in 1976, besides the Moldavian Institute for Scientific Research in Animal Husbandry and Veterinary Medicine (Cricova Noua, Chisinau municipality), at the request of the scientific community in the republic,

especially with the contribution of Prof. Iliev F.V. the Moldavian Branch of the Union for Scientific Research for Karakulture (Samarkand, Uzbekistan) was established. With the founding of this Branch, the genetic amelioration works of the Karakul sheep race in the Republic began to be carried out on a scientific basis. The collaborators of this branch began to develop research programs for

the genetic amelioration of the Karakul sheep population and their mestizos (T x K) of various generations. There were found state farms specializing in pure-blooded Karakul sheep breeding.

According to our research [26], the sheep flock of the "Cainarschi" sovhoz, according to productive parameters, claimed to be a new elite type (tab. 4).

Table 4 The quality of Karakul furskin comercialized from the "Cainarschi" farm

Type of furskin, color	1976			1977			1978		
	Total		incl. sort I, %	Total		incl. sort I, %	Total		incl. sort I, %
	pieces	%		pieces	%		pieces	%	
Karakul pur	142	8.3	14.1	569	19.2	28.2	1282	46.8	41.4
incl: black	141	99.3	14.2	539	94.7	30.2	1025	80.0	38.0
greyish	1	0.7	-	20	3.5	-	200	15.6	41.5
Karakul mestizos	1564	91.7	18.9	2402	80.8	26.5	1455	53.2	33.3
incl: black	1320	84.4	17.4	2003	83.4	29.7	1214	83.4	33.0
greyish	175	11.2	26.3	304	12.7	3.3	166	11.4	27.7
<b>Grand total</b>	<b>1706</b>	<b>100</b>	<b>18.5</b>	<b>2971</b>	<b>100</b>	<b>27.0</b>	<b>2737</b>	<b>100</b>	<b>36.4</b>

But the appearance in 1978 at the farm of *Brucella mellitensis* epizootic disease has led to the killing of entire flock of sheep (4500 mother ewes).

Subsequently, the selection activity was resumed in two years (in 1980), importing pure-blooded Karakul sheep from Uzbekistan and buying Țușca sheep from some farms in the republic. The main direction of the selection activity was, at that time, the amelioration of the qualities of furskin. Researchers of the Moldavian Branch of IUCȘK conducted a number of technological researches, including selection [27-31, 46], which contributed to elaboration amelioration programs the development of Karakul sheep [4, 32] and technological recommendations for the growth and exploitation of Karakul sheep in the Republic of Moldova [2, 23, 24].

Particular attention was paid to the Program for the amelioration of sheep flock Karakul Moldovenesc of color greyish, in the sovhoz "Kotovski" of Cainari village [1, 32-34]. During the years 1991-1995, good results were obtained in the enhancement of the qualities of furskin. Thus, the percentage of I-sort furskins reached 66-70%. At the same time, it was observed that the parameters of other productive characters, such as milk and meat production (body mass), started to decrease [3, 26]. Under these circumstances,

taking into account the historical traditions of the local population to increase mixed-productivity sheep (milk-furskin), which provide the rural population with first-rate products and, taking into account the market economy situation, the sheep in the farms are not only to meet the needs of the family, but also to obtain an economic profit, when the market is demanded at a convenient price, first of all food (cheese, meat), we have approached a new concept in the selection of sheep Karakul local to the economic importance of productive characters. The Karakul sheep ovine genetic amelioration programs included three main production characters: furskin quality, body mass and milk production [2, 4-6, 8].

As a result, in Republic of Moldova a new type of sheep Moldavian Karakul [9, 11] was created and approved (in 2009), which ensures a superior quality of the furskin, a higher body mass, with increased potential of meat production and increased milk production (tab. 5).

From the data presented, we can see that the share of the furskin of I sort in the flock of new type of sheep is on average  $66.7 \pm 2.2\%$ , of which the furskin of the most valuable group Jacket is  $45.7 \pm 2.3\%$ . It is worth mentioning that the Karakul furskins obtained from lambs of Moldavian Karakul

have a fairly large surface area and are on average  $1753 \pm 18 \text{ cm}^2$ , which is much higher compared to the standard of the race ( $1400 \text{ cm}^2$ ) and by 23.5% compared to the furskins of Asian Karakul lambs.

Table 5 The morpho-productive performances of the new Moldavian Karakul sheep in the INZMV herd

Specification	N	Average per years 2003-2005
<i>The qualities of the Karakul furskin</i>		
Share of furskins sorts I, %	475	$66.7 \pm 2.2$
including: jacket group, %	217	$45.7 \pm 2.3$
The standard surface of a furskin, $\text{cm}^2$	475	$1753 \pm 18$
including: very big ( $>1800 \text{ cm}^2$ ), %	202	$42.5 \pm 2.3$
big ( $>1400 \text{ cm}^2$ ), %	418	$88.0 \pm 1.5$
<i>Body weight, kg</i>		
Breeding rams	18	$91.9 \pm 2.3$
Mother ewes	491	$55.2 \pm 0.3$
Rams of 18 months	7	$71.0 \pm 1.2$
Ewes of 18 months	257	$50.1 \pm 0.3$
Rams of 6 months	11	$41.4 \pm 0.9$
Ewes of 6 month	244	$32.3 \pm 0.2$
<i>Milk production throughout lactation, kg</i>		
Lactating sheep media (includin: lactation I - 22%, lactation II - 18% and adult - 60%)	491	$76.6 \pm 1.3$

The Moldavian Karakul sheep are quite precocious and reach a rather large body development. Thus, lambs having a body weight of  $4.5\text{-}5.0 \text{ kg}$ , attained at the age of 6 months the weight of  $41.4 \pm 0.9 \text{ kg}$  at rams and  $32.3 \pm 0.2 \text{ kg}$  at ewes. At the age of 18 months young rams had a body weight of  $71.0 \pm 1.2 \text{ kg}$  and the ewes of  $50.1 \pm 0.3 \text{ kg}$ . In the adult age, the mother-ewes have an average body weight of  $55.2 \pm 0.3 \text{ kg}$  and the breeding rams -  $91.9 \pm 2.3 \text{ kg}$ .

Sheep have increased milk productivity compared to the Asian Karakul race. Milk production of ewes Moldavian Karakul on the whole lactation is on average on the herd  $76.6 \pm 1.3 \text{ kg}$ , compared to  $45\text{-}50 \text{ kg}$  in the Karakul race.

## CONCLUSIONS

1. According to the historical traditions of the population in the Northern and Central areas of the Republic of Moldova, the locals grew local Tuşca sheep race, with mixed milk-wool-furkin production.

2. The idea of amelioration the furkin qualities of lambs of the local Tuşca race by crossing with Asian Karakul race appeared starting with 1884 in Basarabia, due to the excessively high prices of Karakul furskins worldwide and locally, compared to other ovine products (milk, meat, wool).

3. The periodic imports from Turkestan of pure-blooded Karakul sheep at the end of the 19th century - the beginning of the 20th

century, led to the establishment in Basarabia of nurseries of the pure Asian Karakul as pure race, as well as the first sporadic cross-breeding works with the local Tuşca race for the amelioration of the furkin qualities of lambs.

4. After II World War, imports from Central Asia of Karakul sheep were systematically carried out every year in increasing quantities and the crosses of the local Tuşca with the pure Karakul race had a mass character and were carried out by the absorption method.

5. The mass crossbreeding of local ewes ( $\text{T} \times \text{K}$ ) with the Asian Karakul rams has led to some amelioration in the lamb furkin qualities and, at the same time, to the reduction of sheep resistance to environmental hazards, a significant decrease in viability, body mass and milk production.

6. From 1979 to 1980, the scientific researchers of the former Moldavian Branch of IUCŞK (s. Samarkand) applied a new approach to the process of selection of local sheep ( $\text{T} \times \text{K}$ ) after an integral complex of characters (furkin quality, body mass and production milk), elaborating the oviculture development strategy, a series of instructions and programs for genetic amelioration of effective sheep Karakul, methodical and technological recommendations for their selection under market economy conditions.

7. As a result, in Republic of Moldova was created a new type of Moldavian Karakul sheep, adapted to the local environment conditions with increased

production skills for furskin-milk-meat has been created and approved, which provides on average: the share of I sort furskins 65 - 70%, body weight of youth sheep at 6 months 35-40 kg, 55-57 kg adult ewes, 90-95 kg breeding rams, ewes milk production for the entire lactation 70-75 kg.

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