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RESEARCH REGARDING SOME SPECIFIC FESTURES OF MOLDOVAN KARAKUL LAMBS HIDE

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Abstract

The purpose of this research was to evaluate the particularities of Moldovan Karakul lambs hide features and identify factors influencing its quality. The research was conducted on Karakul sheeps in sovhoz "Kotovschi" from Căinari district and Experimental Station of the National Institute of Animal Husbandry and Veterinary Medicine, from Anenii Noi district, Republic of Moldova. The lambs hide thickness was determined according to the purpose of research, through the palpation and measurement methods using cutimeter (foldimeter) on the lambs evaluation, made on the next day after being born, and measuring under the microscope using eyepiece micrometer on histological samples of hide, taken for evaluation purpose. The density and hide reserves were determined by the palpation method at the evaluation. The research results have shown that the qualities of Karakul lambs hide is related to a number of factors both internal and external. The Moldovan Karakul lambs have thicker hide compared with Asian Karakul lambs, average hide thickness measured with cutimeter on the evaluation constituting 2.0 to 2.6 mm. Features of lamb hide qualities are correlative link between them and a string of other characters, such as curls size, curls type, lamb constitution, class of evaluation, age of ewes-mothers at birth, etc. Hide thickness of Moldovan Karakul lambs is in a positive phenotypic correlation with the size of their curls and ewes- mothers at birth, and in negative correlation with hide density, reserve hide, fertility, type of curls and general class of its own. The hide of Moldovan Karakul lambs after evaluation is suitable dense (83.8% of individuals) and very dense (12.8% of individuals), being in positive phenotypic correlation with the type of curls and in negative correlation with hide thickness and lamb constitution. Karakul lamb's hide reserve after evaluation is, in the majority, free (from 46.1 to 72.0% of individuals) and folds (at 12.9 - 26.9% of lambs), being in positive phenotypic correlation with the type of curls, hide density and class of its own, and in negative correlation with the thickness of the hide and its own constitution.

Key words*: Karakul lambs, features, hide, thickness, density, reserve.*

INTRODUCTION

Karakul lambs hide, unlike other animals, represent a particulary interest, given thatdermal tissue papilla is covered with a shiny, elastic and silky curls exposed as the original, forming a noble fur. The following properties are valued live lamb important: thickness, density, reserve (area) and flexibility (elasticity).

The skin thickness is important because this determines the character of hide weight, respectively coat made of them, and her durability. Is considered valuable skins have a thinner thickness and the worthless - thicker. Skins thin - normal are required because these clothes are made of lighter than the thicker skins. One should remember that skins too thin is not always appreciated because of weak resistance of the dermis, for which can be easily broken in industrial processing and exploitation.

Like other animals, Karakul lamb hide histological structure consists of three layers: the *epidermis* - the outer layer of skin, the *dermis* - the main layer (middle), and *hypodermis* - bottom layer, the connection between the hide and the body itself animal. Among these, interest in the first place, the epidermis and the dermis, the latter being formed in the substrate *papillary* and *reticular*. The epidermis is the germination substrate (of Malpighi) which generates follicle sheath formation and keratinized epidermal substrates. In the dermis, papillary substrate is about 70% of its total thickness. It is composed of connective tissue with collagen and elastin fibers. In this layer are

plunged hair follicles, sebaceous and sweat glands, blood capillaries, arrectori muscles and nerve fibers. The substrate reticular dermis is made up of strips of elastic collagen fibers thick printed with a developed network of blood vessels and nerve threads by means of which the receiving power of the upper substrates of the hide and hair root sheath. Given that Karakul lamb skin sacrificed 1-5 days after birth, has a cargo of fur own features, such as thickness, density, reserve (area) and flexibility (elasticity) are of particular importance. They are subject to multiple factors such as the orientation of the collagen fibers and the connection character (which determines to a large extent, the density of the dermis), the correlation thickness dermal substrate, the histological structure. Each of these traits hide deserves a separate study and a proper assessment as part of skin qualities as a whole, causing its value.

Among the many general functions of the hide, draws attention of researchers, primarily producing the hair fiber. Between the structure, characteristics of its skin and follicle sheath there is a very close functional link because the fibers are derived hide.

Therefore, knowledge of the structure, functions and features of utmost importance hide to identify the possibility of influencing the process of formation and growth of hide and follicle coating to improve their qualities (Рахматов, 1978; Баратов et al., 1975).

In this context, the aim of this research was to evaluate the particularities of Karakul lambs hide features Moldovan and identify factors influencing quality.

MATERIALS AND METHODS

The research was conducted on Karakul sheep in farms: Sovhoz "Kotovschi" s. Cârnățănii Noi, Căinnari adistrict and Experimental Station of the National Institute of Animal Husbandry and Veterinary Medicine, Maximovca, Anenii Noi district.

The hide's qualitative assessment of lambs was performed by evaluation marks the second day after birth, according to the Instructions of evaluation of Karakul sheep breeding principles in the Republic of Moldova (Buzu et al., 1996), with supplemented and amended modifications (Buzu, 2012). The evaluation marks lambs were investigated following hide properties: *thickness, density*, *reserve* and *flexibility*.

Lambs *hide thickness* was determined according to the purpose of research by one of the following methods: *farm method* (field testing) or *laboratory method*.

The *method of farm* field was applied to the evaluation marks and lambs was carried out by one of the ways: first - the determination of the thickness of the hide tactilo-visual (palpation), and the expression level of hide thickness words and scores (from 1 to 10 points), and the second - measured by using foldimeter (callipers) and expression of hide thickness in millimeters.

In determining hide thickness by means of probing fingers grab a fold of hide on lamb rump stretched up. In this case researcher simultaneously assesses several properties such as thickness, book and flexibility. The hide thickness at probing was expressed in words: *thin*, *medium, thickened,* and *thick*. *Thin* hide - normal is fine, dense and elastic. This leather is assessed by 8-10 points and enrolls in the register of evaluation symbol "thin". *Medium thick*hide on palpation is moderately fine, dense with the feeling of being resistant and elastic. The register of evaluation falls under the symbol "med". *Thickened* hide on palpation is slightly thicker, less dense, with feeling low elasticity. Thickened hide on evaluation marks is assessed only by 3-4 points. This hide is part of the registry with the "tknd". *Thick*hide on palpation, is considerably bulky and coarse sponge. Thick hide, the evaluation marks, is assessed by 1-2 and entered in the register of evaluation with "thick".

In determining hide thickness using cutimeter, the thickness of skin folds was measured (ie, double thickness hide) with accuracy of 0.5 mm. By dividing two fold size was determined thickness of the hide itself. This method is more objective than the probing method, but the value increased skin thickness is more than its absolute thickness, being conditioned by the subcutaneous layer coating roots and taken into the fold.

Laboratory method (most accurate) was applied to measure the absolute thickness of

skin on hide samples taken from histological evaluation marks lamb. The hide thickness, including the histological part of each layer was determined with a microscope equipped МБИ-1 eyepiece micrometer gradually with the increase of 280 times. For this, hide samples taken from the evaluation marks lamb rump were frozen and cut using microtome, and prepared by special methods (Диомидова, 1960) and fixed on microscope slides. Histological preparations were prepared as the raw hide, and the hide samples preserved formaldehină solution with a concentration of 10%.

Hide *density* was estimated by the method of probing the evaluation marks lambs. To do this, grab a fold of hide with your fingers (double) of the thigh, squeezing it between your fingers and feel so determining the degree of relative density of the hide. According to the instructions of evaluation Karakul lambs were observed following degrees of hide density: *very dense, fit* dense, *low* and *loose*. *Very* dense hide, to touch, produce very strong feeling of dermal tissue (contrary soft). The clamping fingers are not deep into the fold of hide that opposes a relatively stiff resistance against their action. The evaluation marks, very dense hide is assessed by 8-10 points and entered in the register of evaluation with the rating "v.dens". Fit dense hide according to palpation, produce the sensation of hard tissue, but less hard than the hide very dense. The clamping fingers deepened assessor little slack, but not too much. Hide resistance to palpation is also sentient. The evaluation marks, such lambs skin are appreciated by 5-7 points and entered the adjective "fit". Low density hide sensation on palpation produce dermal tissue less hard (to soft). When clamping, researchers fingers deep into the skini. The hide resistance to palpation is poor. At evaluation marks, such hide is appreciated only by 3-4 points and entered in the register of evaluation with the rating "low". Th hide with soft density (sponge) on palpation, produce the sensation of a sponge and has a soft dermal tissue. When clamping fingers researcher fingers deepen in tyhe hide tissue. The hide resistance to palpation is very poor. The evaluation marks, loose skin (sponge) is appreciated only by 1-2 and entered in the register of evaluation with the rating "loos".

Karakul lambs *reserve* hide was assessed by examination and palpation of the evaluation marks of folds of skin in different body regions usually, on the rump. The reserve is understood, by property of the hide to form (after detachment from the chassis) some additional area of hides usually larger than the body of the lamb alive. This additional area is formed due to hides suppleness (elasticity, stretching property) and folds (creases) natural hide that can be lamb. The notion of slack should be distinguished two kinds: natural fold (folds) and fold artificial hide formed by adding assessor fingers. To assess suppleness, hide fold should be stretched with fingers over the lamb. The search for more stretching, the hide is more supple, therefore, and the hide is greater reserve.

According to the instructions of evaluation in force following degrees were outstanding character development reserve Karakul lambs hide: reserve *folds*, *free, tight* and *insufficient*. Reserve Karakul lambs hide folds is observed visually free (without probe) and is characterized by the presence of natural folds in the neck, ribs, rump and tail. On palpation and stretch, bend naturally extends far beyond the body and after cessation extent, retains some time enlarged. The hide is very elastic, thin to medium thickness and produces the feeling that her body poorly stitched. Reserve hide folds is estimated at 8-10 points and evaluation marks in the register of evaluation with the rating "fold". Free reserve is characterized by placing free hide on the body surface, but without folds (folds). On palpation, the hide on the rump gets down slightly, forming box with fingers and extends moderately over the body. Hide elasticity is moderate. Reserve free hide evaluation marks is estimated at 5-7 points and entered in the register of evaluation with the rating "fre".

Tight reserve is characterized by confusion, indeed, stretched hide on the body. On palpation, the hide of the thigh hardly gets down to form less crease and extends over the body. The elasticity of the hide is reduced. Reserve hide stretched evaluation marks is estimated at only 3-4 points and entered in the register with the qualification "tig".

Insufficient reserve is characterized by very large settlement body lamb hide. On palpation, the hide on the rump gets down very hard, so it is very difficult to form a fold fingers. The hide does not stretch at all over the body and creates a feeling that her tightly against the body. Hide elasticity is sufficiently low (almost absent). The evaluation marks, this reserve is considered the lowest, with only 1-2 points and entered in the register of the mark "ins".

The data obtained were statistically experience using computer software "STATISTICA - 6" and rated their certainty, according to statical variational biometric methods (Плохинский, 1969).

RESULTS AND DISCUSSIONS

Research results have shown that the qualities Karakul lambs hide is linked to a number of factors both internal and external. Hide quality are related (connection) rather complicated with other phenotypic characteristics of the parcel roots, the curls and the development of the whole body and body constitution (Buzu, 2001, 2012).

Hide thickness is hereditary determined and influenced by many factors, such as during intrauterine development of fetal, lambs sex, maternal age at birth, pregnant sheep nutrition etc. Heritability coefficient is not higher hide thickness h^2 = 0,201 (Закиров, 1987). Therefore, the thickness of the hide is very much influenced by external factors, in particular the environment, such as the second feeding sheep in gestation period.

In the Republic of Moldova, more favorable in terms of fodder base compared with the conditions of Central Asia, there is a tendency of Karakul lambs hide in thickening. Under the same conditions for growth and maintenance, according to information from other regions rams young is a thickening of the rams there, compared with hide ewes (Table 1).

Thus, according to Кошевой, 1975, newborn lambs population share with thin hide ewes was 16.3% higher than of the rams ($P < 0.001$), while the share of individuals with thickened hide and thick of rams was 9.1% higher than of the ewes ($P < 0.001$). In our research, the essential differences between hide thickness of ewes and rams were not recorded, but obviously it is noted that the Republic of Moldova lambs hide thicker than those investigated by Кошевой M.A. in Uzbekistan.

Table 1.The thickness of Karakul lambs hide depending on the sex

Lambs sex	Head	including hide thickness					
		Thin		Medium		Bold thick	
		head	%	head	%	head	%
Our researches (Republic of Moldova)							
Rams	334	70	21.0	159	47.6	105	31.4
Ewes	292	59	20.2	145	49.7	88	30.1
After Кошевой M.A. (Uzbekistan)							
Rams	890	501	56.3	188	21.1	201	22.6
Ewes	992	720	72.6	138	13.9	134	13.5

In domestic conditions, the weight of lambs with thin hide is less compared to those in Uzbekistan, with 35.3% rams and 52.4% to lamb ewes ($P < 0.001$). The share of medium thick lamb hide is higher by 26.5% of the rams ($P < 0.01$) and 35.8% of the ewes ($P < 0.001$), while the share of individuals with thickened hide tends to to be higher in both groups of lambs local sex. These differences could be explained not only by various madiu and feeding conditions but also by the biology (genetics) the types of Karakul sheep Asian and Karakul sheep Moldovian bred in these regions.

The hide thickness is related to the type of buclaj of lambs (Table 2).

Table 2. Type of the curls of Karakul lambs depending of hide thickness

Hide thickness	n	Including curls type, %			
		jacket	coastal	flat	kaukazian
Thin	133	31.6	30.8	23.3	14.3
Medium	299	38.5	29.1	15.4	17.0
Thickened	176	30.7	24.4	12.5	32.3
Thick	18	11.1	38.9	5.6	44.4

Research has shown that Karakul lambs in Republic of Moldova, most of them have medium skin thickness (47.8%) and slightly thickened (28.1%).

Type jacket lambs were mostly middle-thickness skin (38.5%) and thin (31.6%). Lambs to the type of curls costal have a thicker hide. Among these are 38.9% of individuals with thick hide, 24.4% - thickened hide and 29.1% - medium hide. Lambs with

thick hide in this beatch belong to the thick rib apron. The lambs with flat type curls have thinner hide, from the first two beatchs. In this beatch predominates individuals with thin hide (23.3%), while in this beatch are lambs and 15.4% and 12.5% medium hide of lambs with thickened hide. The lambs with type of curls kaukazian compared with the first three batches were much thicker hide. In this batch predominates both thick-skinned individuals (44.4%) and with the thickened (32.3%).

Mentioned that the lambs with thin hide and medium generates valuable curls types. Thus, the batch of lambs with thin hide was recorded the highest share valuable summary of curls types lambs (jacket, coastal and flat) and the lowest percentage of individuals with unwanted curls type (kaukazian). However, in batches of lambs with thickened hide and thick is worth the largest share of individuals with unwanted curls type (kaukazian).

Karakul lambs hide thickness is relatively strong relationship with lamb class (Table 3).

Table 3. Hide thickenss of Moldovan Karakul lambs depending on class

Class	n	Including hide thickness, %			
		thin	medium	thickened	thick
Elite	160	20.1	51.1	27.5	1.3
Class I	315	20.0	51.0	28.0	1.0
Class II	144	22.5	40.1	30.6	6.8
Bad	7	14.3	14.3	57.1	14.3

Due to the fact that the class is an index reflected in the final synthetic hide qualities as a whole, resulting from the coating and buclaj roots which are produced in the hide, then it is natural that these qualities are related to the hide, and vice versa, the hide is related to class lamb.

The lambs of higher class (elite and class I) were hide predominantly middle (51.1-51.0%) and thin (20.0 to 20.1%), and slightly thickened (28.0 to 27.5%). Individuals with thick hide, among these batch, were very rare (1.0 to 1.3%). However, lambs from lower classes (class II and brac) have hide predominantly thickened (30.6 -57.1%) and medium (14.3 to 40.1%), and less thin (14.3 - 22.5%). Among these lambs, often meet individuals with thick hide (6.8 to 14.3%). Therefore, the superior qualities of skins, such as lambs and elite class, is associated with thick hide and thin middle and lower ones, such as lambs and class II brac, thicker hide or thick.

A relationship was found between the rather obvious hide thickness and size curls Karakul lambs (Table 4).

Table 4. Hide thickness depending on curls size of Moldovan Karakul lambs

Curls size	n	Including hide thickness, %			
		thin	medium	thickened	thick
Large	156	12.7	38.0	43.0	6.3
Medium	372	20.5	53.5	24.4	1.6
Small	98	35.9	43.4	19.8	0.9

The research shows that lambs curls possess high usually thickened hide (43.0%) and medium (38.0%).

Those with medium curls and hide were predominantly middle (53.5%) and thickened (24.4%). This relationship is reciprocal, so lambs of thickened hide usually have larger loops and thin cell lambs were smaller and shorter loops. Lambs with small loops have a thinner hide thickness (35.9%) and medium (43.4%). Therefore, as the loop is smaller, and the hide is thinner and, conversely, the loop is higher, and the skin is thicker. Also we found that both hides too thin hide and the hide too thick, not required by manufacturers cunt because too thin hide has insufficient resistance to traction and exploitation clothing and hide generates a weight too heavy too great Karakul lambs hide clothing.

The measuring done with cutimeter, the average thickness of the hide Moldovian Karakul lambs varies on average, depending on the type of curls, class, and size of the curls from 2.00 to 2.88 mm (Table 5).

Obvious differences were established between sole lambs hide thickness and the twins hide. The twin lambs hide is definitely thinner than sole contemporaries, like by type of curls and curls size. The elite class with twin lambs with curls middle and curlstype jacket, had thinner hide to 0.24 mm sole congeners or 9.3% ($P < 0.01$), twin lambs with curls class type Jackets and middle curls had thinner hide to 0.31 mm the sole congeners or 12.1% ($P < 0.001$), and twin lambs curls class with large loop type jacket and had hide thinner peers to sole 0.45 mm and 16.4% ($P < 0.001$). Such significant differences were seen in batchs of

lambs buclaj type of cost, payment, kaukazian and mestizos Karakul x Ostfriz of F1 generation.

Table 5. Hide thickness (meassured with cutimeter) of black Moldovan Karakul lambs, depending on the curls type, class and size loop (mm)

Curls type, class, curls size	Solo lambs			Twin lambs		
	n	$x \pm s_x$	v %	n	$x \pm s_x$	v %
Jacket						
Elite, sm	8	2.25±0.13	17.2	-	-	-
Elite, med	108	2.57±0.03	12.7	15	2.33±0.09	14.9
Elite, high	9	2.85±0.15	15.2	-	-	-
Class I,sm	32	2.28±0.05	12.0	12	2.08±0.12	19.3
Class I, md	210	2.57±0.02	12.1	63	2.26±0.04	15.0
Class I, hg	103	2.75±0.04	15.8	14	2.30±0.07	11.8
Coastal						
Elite	53	2.74±0.05	12.1	2	2.50±0.00	0.00
Class I	59	2.73±0.04	10.8	4	2.12±0.24	22.5
Class II	9	2.63±0.14	16.0	-	-	-
Flat						
Elite	24	2.53±0.08	15.8	3	2.17±0.16	12.9
Class I	46	2.61±0.05	14.1	9	2.22±0.09	11.8
Class II	16	2.53±0.07	11.9	9	2.19±0.13	17.8
Kaukazian						
ClassII,sm	5	2.10±0.06	6.7	2	2.00±0.00	0.00
ClassII,md	55	2.56±0.05	13.5	16	2.20±0.09	17.7
ClassII, hg	30	2.88±0.07	12.8	6	2.83±0.11	9.1
Kark-Ostf, crossed F_1	32	2.66±0.05	11.1	4	2.00±0.20	25.0

The data demonstrate that the thickness of the hide, measured by cutimeter also is closely correlated with the size of the curls. The thin hide is found in lambs with small curls. The thick hide is observed in lambs with large curls.

The lambs middle curls has a medium thick hide. For example, type lambs jacket with small loop elite class had hide thickness of 2.25 mm, the middle curls- 2,57 mm, and those with large curls - 2.85 mm. In these batchs, small curls lambs were thinner hide to middle loop congeners, 0.32 mm, or 12.5% ($P < 0.001$) and to congeners with large loop - 0.60 mm, or 21.1% ($P < 0.001$). In the lambs with curls class type jacket, individuals with small curls had thinner hide to middle curls congeners, 0.29 mm, or 13.3% ($P < 0.001$) and to curls congeners high - 0.47 mm, or 17.1% ($P < 0.001$). Among batchs of different type of curls lambs, lambs tended curls a cost thicker hide over other types. The thin hide of solo lambs was recorded in individuals with type kaukazian small curls (2.10 ± 0.06 mm). The thick hide curls was recorded in lambs than kaukazian type (2.88 ± 0.07 mm). The same picture is manifested and twin lambs. The coefficient of variation (Cv) of hide thickness measured by cutimeter, up to a maximum of 25% and 12 – 15% on the average.

Our research performed on histological preparations of raw hide samples collected from the evaluation marks lamb rump, have shown that the total thickness hide Karakul lambs depends on the age of mothers at birth (Table 6).

Table 6. Hide thickness (measured using histological preparates) of Moldovan Karakul lambs depending of mother age, $x \pm s_x$ (mkm)

The age of ewes-mother when calvin	n	Total hide thickness	The thicknes of the layer		
			epidermis	papillary	reticulary
13-14 months	15	1910±39	15,9±0,7	1145±32	717±36
2,0-2,2 years	30	2100±43	17,2±0,4	1223±23	830±25
>3years adults	10	2828±104	36,0±1,2	1921±86	854±24

The thin hide was registered in lambs obtained from sheep seeded at an early age (8 - 9 months) and calved at age 13-14 months. The total thickness of the hide in these lambs was 1910 ± 39 mkm. The thick hide was observed in lambs obtained from adult ewes (over 3 years) was 2828 ± 104 and mkm.

Primiparous sheep, which were seeded at 18-20 months calved medium thick-skinned descendants - 2100 ± 43 mkm. Lambs born to ewes calved mothers at an early age (13-14 months) had thin hide mkm 190 or 9.1% ($P < 0.001$) compared to peers born from primiparous sheep calved at age 23-25 months, with 918 mkm or 32.5 % ($P < 0.001$) compared to peers born from adult ewes older than 3 years.

Epidermal layer of the hide is the thinnest, representing only 0.8-1.2% of the total thickness, and has great importance to the Karakul skins. The thick layer of hide is important *papillary layer*, which is 1145-1921 mkm, or 58-68% of the total thickness of the hide. In this layer fibers are plunged their hair follicles, sebaceous and sweat glands, blood vessels and nerve fibers. *Papillary layer*, specific histological structure is responsible for organizing the groups and the rows of hair fibers, the fibers structure, therefore, the

quality of the curls coating and roots as a whole. *Reticulary layer* is the second layer upon thickness and inferior to the papillary layer via hypodermic link to the animal. The thickness at Karakul lambs is about 717 - 854 mkm, or 30 - 39% of the total thickness of the hide. The structure and arrangement of cells reticular dermis hide resistance depends on the processing and exploitation. The thickness of the hide and its layers ranges at different regions having different values of hide. If the region rump hide thickness is 100%, then the back is 117.4%, the withers - 104.1%, and the sides- 92.9% (Закиров, 1987). This is explained by the difference in terms of the formation of substrates hair in these areas.

Density hide Karakul lambs is determined inherited and conditioned by many factors such as hide thickness, type of curls, type constitution etc. After Иванов, 1964, thin hide, dense and elastic produce the most valuable curls, although fine and durable; thin and loose hide (sponge) generates rare fibers, thin, long and scattered curls; thick curls and loose fibers causes thick, rare and curls overgrown, loose, sandy and normal elasticity, forming curls annular, peas, corkscrew.

Our research showed that the density of Karakul lambs hide is directly related to its thickness (Table 7).

Table 7. Relation between hide thickness and density of Moldovan Karakul lambs

Hide thickness	n	Hide density, %			
		Very dense	Fit	Low	Loose
Thin	129	67.2	32.1	0.7	-
Medium	304	12.8	83.8	3.4	-
Thickened	172	5.9	40.9	51.1	2.1
Thick	21	-	7.7	53.8	38.5

The Moldovan Karakul lambs, thin hide is usually in 67.2% of cases, very dense and in 32.1% of cases - according dense. The hide is medium thick, mostly in 83.8% of cases, moderately dense.

The hide with a thickened density, the majority (51.1%) and reduced in 40.9% of cases. The thick hide is associated in most cases with low density (53.8%) and loose (sponge) - 38.5%. Once the hide is thickening of the degree to thickened hide decreases very dense weight lambs from 67.2% to 5.9%, or 61.3% ($P < 0.001$) and also increase the share of the lambs the low density of the hide, from 0.7% for those with thin hide, to 51.1% for individuals with thickened skin, and up to 53.8% in those with thick hide, or 50.4 and, respectively, 53.1% ($P < 0.001$). In this case, simultaneously increase the density lambs loose weight to 2.1% in individuals with thickened skin and to 38.5% in those with thick hide.

So, this relationship demonstrates that with lambs hide thickening, and its density decreases and, conversely, hide thinning increases its density. Thus, selecting lambs with thin hide - normal middle coach contributes indirectly to improving its density. Selection after these two qualities, is quite effective, because the correlation between them is quite high. Skins with dense dermis (right) and very dense are required by buyers because they are more resistant to industrial processing and exploitation of their clothing and, conversely, skins with loose dermis are vulnerable to exploitation and processing and therefore less demand on market outlets.

Karakul lamb hide density is related to type curls of the skin (Table 8).

Table 8. Hide density of Moldovan Karakul lambs depending of curls type

Curls type	n	Including hide density, %			
		Very dense	Fit	Low	Loose
Jacket	213	19.6	65.9	14.5	-
Coastal	178	28.3	55.6	14.4	1.7
Flat	101	20.8	62.4	16.8	-
Kaukazian	127	15.0	57.5	25.2	2.3
Bad	7	-	14.3	71.4	14.3

We have established that the densest lambs hide possesses curls type jacket, coastal and flat.

Among the thousand of these groups are 19.6 to 28.3% of individuals with very thick hide and from 55.6 to 65.9% - according to the dense hide. The loose hide was observed in lambs kaukazian and bad curls type. Share lambs with low density and loose hide in these batchs constitute 71.4 and, respectively, 14.3% and 25.2 bad lambs, respectively, 2.3% kaukazian type lambs. With the increasing amount curls type from the poor lambs (bad)

and worthless (kaukazian) to the most valuable (jacket), essentially increase the share of individuals with hide summary dense and dense right from 14.3% to 85.5% or 71.2% (P < 0.001), and decreased at the same time a summary of the individual weight of low density and the loose hide from 85.7% to 14.5%, of the same 71.2% (P < 0.001). Therefore, how curls type of lambs is more valuable, the hide is less dense and, conversely, how curls type of lambs is less valuable, the lower the density of their hide and loose. The positive correlation between these features allow the coach to improve hide density while performing selection by type curls lambs only.

Lambs curls density is addictive and their constitution (Table 9).

Table 9. The density of Moldovan Karakul lambs hide depending on their constitution

Constitution	n	Hide density, %							
		V. dense		Fit		Low		Loose	
		num	%	num	%	num	%	num	%
V.fine (bad)	2	1	50.0	1	50.0	-	-	-	-
Fine	167	124	74.2	35	21.0	8	4.8	-	-
Robust	806	464	57.6	204	25.3	138	17.1	-	-
Coarsely	7	-	-	1	14.3	2	28.6	4	57.1

We found that the densest lambs hide possesses a fine constitution. Lambs in this batch, the overwhelming majority of them have a very thick hide and dense right. Among them, the weight of lambs with very thick hide is 74.2%, while that of the right dense hide - 21.0%.

The lambs with a robust constitutionwere also very thick hide (57.6%) and under dense (25.3%). However, among this batch lambs is a minor proportion of individuals with low density of the hide, which is 17.1%. After the share of individuals with hide dense, fine constitution lambs surpassed the constitution robust 16.6% (P <0.001). In the batch of lambs with coarsely constitution, most individuals have loose hide density (57.1%) and low (28.6%). With the robustness constitution lambs from very fine to coarse drops summary weight of individuals with very thick hide and dense right from 100 % to 14.3%, or 85.7% (P < 0.001) and simultaneously increase the share of individuals with low density brief and loose hide from 4.8% in lambs with fine constitution, to 85.7% in lambs with coarsely constitution, or by 80.9% (P < 0.001) .

The reserve is a hereditary hide and conditioned by a number of factors, such as hide thickness, type of curls, hide density, constitution lamb, class etc. Reserve hide is correlative with multiple links caracters and features a string of lamb and hide. Reserve hide is closely related to its thickness (Table 10).

Table 10. Relation between hide's reserve and thickness of Moldovan Karakul lambs

Hide thicknes	n	Hide reserve, %			
		Folds	Free	Tight	Insuffi-cient
Thin	129	26.9	61.2	11.9	-
Middle	304	18.2	72.0	9.8	-
Thickned	172	12.9	55.4	31.2	0.5
Thick	21	-	46.1	46.2	7.7

Our research shows that most of Moldovan Karakul lambs hide isfree reserves (46.1 to 72.0%). The largest reserves of hide was recorded in lambs with thin hide and those with medium thick hide. The lambs examined, the highest share of lambs was registred reserve folds in batch lambs with thin hide. With thinning hide thickened lambs from grade to the thin folds increase the share of individuals with reserves from 12.9% to 26.9%, or 2.1- fold (P < 0.001), and vice versa, with thickening of the hide from the thin to the thick drops summary weight of lambs with free reserve and folds from 88.1% to 46.1%, or 42% (P < 0.001), and increasing the share of individuals with reserve summary large and insufficient hide from 11.9% to 53.9%, and the same 42% (P < 0.001). Therefore, as the hide is thinner, the reserve is higher and, conversely, the hide is thicker and thicker hide is less reserve. Lambs with hide folds and free reserves and flexibility have improved as a result skins surface is higher.

The reserve of hide is in direct relation with the type of curls of the lambs (Table 11).

In our research we found that most of Moldovian Karakul lambs hide free reserves (58.4 to 63.3%). The type of lambs curls of jacket and spare coastal tend hide higher than those with type kaukazian curls flat.

Table 11. Relation between Moldovan Karakul lambs hide reserve and curls types

Curls type	n	Hide reserve %			
		Folds	Free	Tight	Insuffi-cient
Jacket	213	25.2	63.3	11.2	-
Coastal	178	27.8	61.1	11.1	-
Flat	101	19.8	58.4	21.8	-
Kaukazian	127	12.6	61.4	25.2	0.8
Bad	7	-	57.1	14.3	28.6

The jacket and coastal type lambs were 25.2 and, respectively, 27.8% of lambs hide folds reserves against only 19.8 and, respectively, 12.6% in lambs with flat curls type kaukazian. The weakest reserve found in lambs hide type curls bad. Among these lambs were 28.6% with insufficient reserves and 14.3% with tight reserves. For comparison we report that according to data of Кошевой, 1975, most Asian Karakul lambs were also reserve free of hide approximately equal weight to all curls. On this basis, the author concludes that the Karakul lambs of any type curls, provided free hide is characteristic of this race.

The hide reserve is closely linked with its density (Table 12).

Table 12. Relation between Moldovan Karakul lamb hide reserves and density

Hide density	n	Hide reserve, %			
		Folds	Free	Tight	Insuffi-cient
V. dense	145	38.6	48.3	13.1	-
Fit	362	27.1	62.2	10.7	-
Low	116	17.3	43.1	37.9	1.7
Loosed	3	-	-	33.3	66.7

We found that lambs with very dense hide and dense fit are mostly reserve folds (27,1 - 38.6%) and free (48.3 to 62.2%). Among those batchs lambs are few individuals with hide tight reserve (10.7 to 13.1%) and those with insufficient reserves, absolutely lacking. In the batch of lambs with low hide density decreases and the weight of lambs with folds and free reserves, and also increases the weight of lambs with tight reserves (37.9%) and insufficient (1.7%), almost three times. The lambs with loosed hide density has usually a tight reserve (33.3%) and insufficient (66.7%). With the increasing density of the gradation lamb hide reduced to the very dense, essentially increases the weight of the hide of individuals with the proviso folds from 17.3% to 38.6%, or 2.2 - fold ($P < 0.001$) and, at the same time, decreases the weight of the summary of the individual with the reserve tight and insufficient hide from 39.6% to 13.1%, or 3.0 - fold ($P < 0.001$). Therefore, as lamb hide is thicker, the subject reserve thereof is greater, and conversely, the lamb hide has a density low or loose, so it is reserve less subject.

The hide reserve is related Karakul lambs and their constitution (Table 13).

Table 13. The hide reserve depanding on constitution of Modlovan Karakul lambs

Consti-tution	n	Hide reserve, %							
		Folds		Free		Tight		Insuffi-cient	
		num	%	num	%	num	%	num	%
Coarsely	4	-	-	2	50.0	1	25.0	1	25.0
Robust	809	238	29.4	446	55.1	125	15.5	-	-
Fine	163	61	37.4	90	55.2	12	7.4	-	-
V. fine	3	-	-	2	66.7	1	33.3	-	-

We found that most robust constitution lambs were provided free hide (55.1%), folds (29.4%) and less tight (15.5%). Most reserves have lambs hide with fine constitution. Among these are 37.4% of individuals with hide folds reserves, 55.2% - with free reserves and 7.4% of individuals with hide tight reserve.

As the number of lambs with coarsely and very fine constitution is very small, their hide reserve certain conclusions can not be made, but can only find that there is some tendency for lower reserve their hide to lambs with robust constitution and fine. This trend, in fact, is considered by coach to evaluation marks lambs.

The hides reserve is closely related to the general class of lamb (Table 14).

The data obtained in research is clearly observed that the lambs higher class (and elite class) reserves the hide is higher, and vice versa, the lambs hide of the lower classes reserve is limited.

Table 14. Hide reserve depending on the classes of Moldovan Karakul lambs

Lambs classe	n	Hide reserve, %			
		Folds	Free	Tight	Insufficient
Elite	160	40.6	52.5	6.9	-
Class I	315	24.8	60.0	15.2	-
Class II	144	12.9	57.8	28.6	0.7
Bad	7	-	42.8	42.9	14.3

Most reserves have lambs hide elite class, of which 40.6% have hide folds reserves, 52.5% were provided free and only 6.9 % have tight reserves hide. The smallest reserve lambs hide possesses bad. Most of them have tight reserves (42.9%) and insufficient (14.3%). With the increase in ranking lambs, lambs grow essentially share the book folds to 12.9% in batch II class lambs, up from 24.8% in the batch of class I and up to 40.6% in batch class lambs elite or 1.9 and, respectively, 3.1 times ($P < 0.001$). Along with this, decreases summary weight of lambs with low density and loose hide from lambs bad 57.2%, up from 15.2% in batch I and class lambs 6.9% in group lambs elite class, or 3.8, respectively, 8.3 times ($P <0.001$). Therefore, the higher the ranking is higher lambs, the hide is the largest book, and conversely, the ranking is lower lambs, and the reserve of their hide is less. Selecting permanent evaluation marks lambs reserve free hide folds can improve herd this important character.

Generalizing the results of research on the assessment of Karakul lambs hide features, in particular those of Moldovan type, we find that these and the conclusions drawn are in general consistent with the data of multiple researchers in the field (Adametz, 1927; Brădăţean et al., 2001; Kechawartz, 1958; Nicov, 1936; Taftă et al., 1997; Авсаджанов, 1968; Баратов et al., 1975; Диомидова, 1954; Дъячков, 1950; Иванов, 1964; Ильев, 1969; Кошевой, 1975; Рахматов, 1978; Юдин, 1964;et al.).

However, the above-mentioned peculiarities of Karakul lambs hide Moldovan qualities and their correlations with other features and characters of skin will help to guide and efficient selection for genetic improvement of populations of sheep hide after qualities.

CONCLUSIONS

The Moldovan Karakul lambs have a thicker hide compared with Asian Karakul lambs, the average skin thickness measured with cutimeter having the marks constituting 2.0 to 2.6 mm.

The features of lambs hide are correlative relation between each other and with a number of other characters, such as curls size, the type of curls, constitution of lamb, class of evaluation, age ewes-mothers at farrowing, etc.

The Moldovan Karaul lambs hide thickness have a positive phenotypic correlation with the size of their curls and age ewes-mothers at farrowing, and in negative correlation with hide density, hide reserve, twins, type of curls and general class of its own.

Moldovan Karakul lambs hide at the evaluation marks is suitable for dense (83.8% of individuals) and dense (12.8% of individuals), being in a positive phenotypic correlation with the type of curls and in negative correlation with thickness lamb hide and constitution.

The reserve of Karakul lambs hide at the evaluation, in the vast majority of free (from 46.1 to 72.0% of individuals) and folds (at 12.9 - 26.9% of lambs), being positive phenotypic correlation curls type, hide density and class of its own, and in negative correlation with the thickness of the hide and its own constitution.

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