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Meat Productivity Of Sheep Of The Grozny Breed Depending On The Type Of Their Skin Folding.

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ABSTRACT

The aim of this work is to determine the feasibility of the selection of newborn lambs of Grozny breed on the type of skin folding. In this regard, the task of our research was to study the relationship of the type of skin folding with subsequent meat productivity. Studies were conducted in the period from 2014 to 2017 in the Limited Liability Company "Breeding Factory"ChervlennyeBuruny" in Nogai district of Dagestan. Three groups were formed to study the meat productivity of the Grozny breed castrated sheep, each groups included 10 heads, depending on the folding of their skin: the first group included sheep of the "C -" type (animals without folds), that is, animals with an insufficient supply of skin, characterized by the absence of folds on the neck, on the trunk and at the root of the tail. Poorly developed "Burda" - longitudinal fold at the bottom of the neck was allowed; to the second group - animals of type "C"-(normally folded) with a satisfactory supply of skin, which was characterized by the presence of two or three large full or incomplete transverse folds on the neck, up to 7-8 small folds on the barrel and a medium-sized "rosette" at the root of their tail. Folds on the sacrum and thighs were allowed only in the form of wrinkles, the third group – type "C+" (multi-fold animals) was characterized by an increased supply of skin, forming large densely located folds on the neck, barrel, sacrum, thigh and at the root of the tail. The total number of folds on the body was on average 15-16, and on the neck 7-8. Meat qualities of animals were studied by slaughtering animals at 9 and 18 months of age by 5 heads from each experimental group. The Slaughtering of animals was carried out on a slaughtering ground. The Slaughtering preparation and the slaughtering itself were carried out according to the method of Agricultural Sciences. It is established that the main indicator of meat productivity, slaughtering yield, exceeded that of peers in castrated sheep of the non-folded type. So, the slaughtering yield in 9-month-old rolls type "C" at 2.37 and type "+" - 5,37% was lower than coevals without folds. At the age of 18 months, this indicator was lower in individuals of types "C" and "C+" than in "C-" by 1.58 and 2.75%, respectively.

Keywords: skin folding, meat productivity, slaughter weight, slaughter yield, morphological composition of carcasses, chemical composition of pulp.

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INTRODUCTION

The leading role in the production of sheep breeding belongs to the North Caucasus, because the main breeding herds of sheep are concentrated here, they have a great influence on the improvement of sheep in many regions of Russia. However, after 1990, due to objective reasons, the production of sheep products became unprofitable and it caused a sharp reduction in the number of sheep. In this regard, it is important to increase its competitiveness in the global market and in the new conditions, which can be achieved by accelerating the selection and technological methods of improving the industry. In our opinion, the most effective step in this direction is the early diagnosis of sheep productivity, which significantly reduces the interval between generations and increases the intensity of the breeding process [1].

Numerous studies conducted on the meat productivity of sheep, show that it is influenced by a number of factors, but the most important of them is the breed. The breed has a great influence on fatness, weight of the animal carcasses and slaughtering yield, morphological and varietal composition of carcasses, chemical composition of muscle and fat tissues and organoleptic properties of meat as well [2,3,4,5,6].

In agricultural enterprises of the Russian Federation 39 breeds of sheep are bred, including 14 with thin wool, the number of which in 2013 was 2 million 372,1 thousand., 12 with semi-thin wool - (225,7 thousand sheep.), 2 with semi-rough wool (35.5 thousand sheep.) 11 with rough wool (one million, 283 thousand sheep.) [7].

In the practice of sheep breeding abroad, much attention is paid to the type of sheep. The division of sheep into types is based on the development of the skin and on the body, primarily, on the number and size of the front folds, taking into account the presence of possible folds on the back of the animal's body. The folds on the front of the body are more prominent than on the other parts, especially this is clearly shown on the shorn sheep. For this reason, as well as due to the correlation between the folds on the different parts of the body, the front folds can be used as a criterion for the classification of Merino sheep [8,9].
The aim of this work is to determine the feasibility of the selection of newborn lambs of Grozny breed on the type of skin folding.

In this regard, the task of our research was to study the correlation of the type of skin folding with subsequent meat productivity.

MATERIAL AND RESEARCH METHODS

Studies were conducted in the period from 2014 to 2017 in the Limited Liability Company "Plemzavod "ChervlennyeBuruny" in Nogai district of Dagestan.

To study the meat productivity of the Grozny breed castrated sheep, three groups were formed each group was divided into 10 heads, depending on the skin folding: the first group included castrated sheep of the "C -" type (animals without folds), that is, animals with an insufficient supply of skin, characterized by the absence of folds on the neck, on the trunk and at the root of the tail. Poorly developed fold "Burda" was allowed – it is a longitudinal fold at the bottom of the neck; to the second group - animals such as "C" - (normally-folded animals) that is, with a satisfactory supply of skin, which was characterized by the presence of two or three large full or incomplete transverse folds on the neck, up to 7-8 small folds on the barrel and a medium-sized "rosette" at the root of the tail. Folds on the sacrum and thighs were allowed only in the form of wrinkles and the third group – type "C+" (multi-folded animals), characterized by an increased supply of skin, forming large densely located folds on the neck, barrel, sacrum, thigh and at the root of the tail. The total number of folds on the body was on average 15-16, and on the neck it was 7-8.

Meat qualities of animals were studied by slaughtering animals at the ageof 9 and 18 months by 5 heads from each experimental group. Slaughtering of animals was carried out on a slaughtering ground. Preparation to slaughter and the slaughtering itself was carried out according to the method of Agricultural Sciences [10].

While slaughtering, the following indicators were taken into account: live weight of sheep before and after keeping hungry; the weight and fatness of carcasses, the weight of internal fat; the mass of internal

organs - heart, diaphragm, lungs, esophagus, spleen, liver, weight of a kidney and the kidney fat, weight of spilled blood; the mass of the gastrointestinal tract with content and without content; weight and length in the large and small intestine; the mass of the head and of the feet; the mass of the sheepskin and its area. Along with the records of the output of slaughtering products we considered the mass of flesh and bones, that's why the varietal deboning of carcasses was produced. The Fatness of carcasses was determined according to GOST standard -31777-2012 [11]. Cutting of carcasses into varieties was carried out according to GOST standard R 54367-2011 [12], followed by deboning of carcasses to study the ratio of muscle and bone tissue.

To study the diameter of muscle fibers during slaughtering, we took samples from the longest muscle of the back (in the area of the penultimate rib), which were fixed in 10% formalin solution. Measuring the thickness of muscular fibres was carried out on the manometer at a magnification of 500 times, after a preliminary maceration in 50% nitric acid solution.

To determine the chemical composition of meat during the slaughtering of the animals with the longest back muscles we took samples weighing 20-25 grams, which are fresh and investigated for moisture, protein, fat and ash.

We measured the area of the "muscle eye" during the slaughtering in the area of the penultimate thoracic vertebra, the area of the "muscle eye" was determined using a planimeter.

THE RESULTS OF RESEARCH AND THEIR DISCUSSION

Sheep skin is closely related to the constitution, and follows the criterion of assessing the direction of animal productivity, the skin performs a protective function, plays an important role in thermoregulation and participates in metabolism [13-16].

As a result of the research, it is clear that young sheep with different types of skin folding grow and develop differently, but the above indicators do not fully characterize the changes that occur in the body due to the different degree of skin folding. To fill this issue, we have produced control slaughtering of castrated sheep of different types of skin folding at the age of 9 and 18 months.

Table 1 shows the data of control slaughtering, which show that the castrated sheep of type "C -" both at the age of 9 and 18 months had the best performance in absolute carcass weight, slaughtering weight, in comparison with the other groups. They surpassed their peers by the weight of the carcass at the age of 9 months multi-type by 4.45% and by slaughtering yield by 5.17%. At the age of 18 months, this difference was respectively 2.17 and 2.75%, type "C " castrated sheep on this indicator occupied an intermediate position.

Table 1: The Carcass Quality of Experimental Castrated Sheep

Ageofslaughtering, months	FoldingType											
	C-				C				C+			
	Pre-slaughtering weight	Carcass weight from pre-slaughtering weight		Slaughtering output, %	Pre-slaughtering weight	Carcass weight from pre-slaughtering weight		Saughteringoutput, %	Pre-slaughtering weight	Carcass weight from pre-slaughtering Weight		Slaughtering output, %
	kg	kg	%		kg	kg	%		kg	kg	%	

9	31,8	12,89	40,53	41,86	29,6	11,34	38,31	39,49	27,8	10,03	36,08	36,69
18	38,1	16,21	42,53	45,20	34,8	14,58	41,32	43,62	34,0	13,73	40,38	42,45

One of the main methods of determining the quality of animal's meat is the study of the morphological composition of carcasses with the establishment of the relative mass in the carcass of flesh and bones. For this purpose we have produced high-quality deboning of carcasses of slaughtered animals.

The data of table 2 shows that the mass of the pulp part of the animals of the non-folded type at the age of 9 months exceeded the animals of the multi-folded type by 4.5%, and at the age of 18 months - by 3.07%, while the difference is statistically significant.

Our data on varietal carcass cutting, showed that there is a significant difference in the output of meat of different varieties in animals of certain types of skin folding. So, at the age of 18 months the output of meat first varieties in animals of type "C -" on 2,34 kg was more than in animals of type "C+", the difference is significant.

Animals without folds on this measure exceeded the normally-folded animals, and poly-folded animals, but the difference in both cases is not reliable.

As it was mentioned above, we also carried out the deboning of carcasses after varietal cutting and determined the yield of meat and bones in each variety. The obtained materials showed that on this basis the animals were superior to their peers, in addition, they had an advantage in the output of pulp.

It should be noted that the mass ratio of the young animals without folds to the mass of bones in carcasses was higher than in their peers. This suggests that the animals of the "C -" type differ in their biological characteristics from their peers of the "C+" type and "C" type in their ability to produce more meat. It was found that in newborn lambs relative weight of the backbone is 17.2, in 21-day - 13.5, and in seven-month-10.2%, that is, with age, the relative weight of the backbone decreases.

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Table 2: Morphological Composition of Carcasses and Its Varieties in Experimental Castrated Sheep

FoldingType	Age, months	Indicators											
		CarcassWeight	The Mass of the Pulp		BoneMass		Variety						
							I			II			
		kg	kg	%	kg	%	Pulp in % to the I sort	Bonesin % to the I sort	The mass of the I sort to the mass of thecarcass	Pulp in % to the I sort	Bones in % to the I sort	The mass of the II sort to the mass of the carcass
C-	9	12,89	9,95	77,19	2,94	22,81	79,27	20,73	71,36	63,48	36,52	28,64
	18	16,21	12,63	77,91	3,58	22,09	79,29	20,71	82,98	60,53	39,47	17,02
C	9	11,34	8,34	73,54	3,00	26,46	75,34	24,66	70,82	62,47	37,53	29,18
	18	14,38	11,03	76,70	3,35	23,30	78,03	21,97	82,74	59,64	40,36	17,26
C+	9	10,03	7,28	72,58	2,75	27,42	75,49	24,51	71,09	59,63	40,37	28,91
	18	13,73	10,31	75,09	3,42	24,91	76,38	23,62	81,26	58,90	41,10	18,74

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For qualitative evaluation of sheep meat of different types of folding, we have studied the samples from the longest back muscle, which were taken in the area of the penultimate thoracic vertebra.

Table 3 shows the results of chemical analysis of meat for moisture, fat, protein and ash content and meat caloric content. The table shows that the meat of animals of type "C-" contained less moisture and more fat than other types of animals. The difference in fat content than in other types of animals. The difference in the fat content at the age of 18 months, compared with the castrated sheep of type "C", was 0.67%, and compared with the animals of type "C-" 0.67%, and compared with the sheep of type "C+" - 1.44%, at the age of 9 months, the difference was respectively: 0.44 and 0.80%.

Table 3: The Chemical Composition and The Caloric Content of the Longest Muscle in Experimental Castrated Sheep

Type	Age	TheContentsin %				Caloriccontent
		Moisture	Fat	Protein	Ash	
C-	9 months	73,95	2,52	22,55	0,98	4852,1
	18 months	72,06	3,75	23,12	1,07	5429,0
C	9 months	75,17	2,08	21,79	0,96	4550,2
	18 months	72,70	3,08	23,11	1,11	5166,1
C+	9 months	75,52	1,72	21,85	0,93	4417,1
	18 months	73,04	2,31	23,55	1,10	4942,1

At the age of 9 and 18 months, the moisture content of meat in animals of type "C -" was 1.22 and 0.74% it is lower than in animals of type "C", and comparing with animals of type "C+" it is lower by 1.57 and 0.98%.

The total nutritional value of meat is estimated by its caloric content. Based on the chemical analysis of meat in our experience, we have determined the caloric content of 1 kg of meat of castrated sheep of different types of folding. The calculations took into account that 1 gram of protein in the body of the animal secretes is 4.1 kcal and 1 gram of fat is 9.3 kcal.

Data on caloric content of meat of experimental young sheep is given in table 3 which shows that without-folded sheep of type "C-" at the age of 9 and 18 months had the greatest caloric content of meat, and the lowest caloric content of meat was in multi-folded type "C+". Thus, at the age of 18 months, animals of type "C - "exceeded animals of type "C"by 5.1%, and, as well, animals of type "C+" - by 9.8%

Our data also show that the caloric content of meat increases with age, which is associated with an increase in intramuscular fat, as well as protein content with age.

Table 4: The Area of the "Muscle Eye" in Experimental Castrated Sheep

Age	Type	n	M ± m	σ	C
9 мес	C-	5	13,43 ± 1,62	3,23	24,1
	C	5	11.00 ± 0.99	1,98	18,0
	C+	5	8,80 ± 0.68	1,36	15,5
18 мес.	C-	5	13.48 ± 0.62	1,38	10,2
	C	5	12.17 ± 0.80	1,80	14,8
	C+	5	10.46 ± 0.40	0,90	8,6

In table 4 it is seen that the area of "muscle eye" at the age of 9 and 18 months was greater in animals without folds, but statistical processing showed that a significant difference existed only between animals without olds and in multi-folded types.

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The results of measuring the area of sheepskin of slaughtered animals are presented in table 5, from which it can be seen that the area of 9-month castrated sheep's skin of all three types is almost the same. At 18-month castrated sheep the largest area of sheepskin was in animals of multi-folded type, which are superior to normally-folded type at 4.30 and animals without folds – by 5.86%, but this difference turned out to be not statistically reliable.

Table 5: The Area of Sheepskin of the Experimental Castrated Sheep, dm2

Age	Type	n	M ± m	σ	c
9 months	C-	5	82,48 ± 2,5	5,6	6,8
	C	5	81,72 ± 1,1	2,4	2,9
	C+	5	82,04 ± 4,2	9,3	11,3
18 months	C-	5	85,23 ± 2,4	5,3	6,2
	C	5	86,59 ± 2,0	4,4	5,1
	C+	5	90,54 ± 2,8	6,4	7,1

While the weight of the animal increases from 9 to 18 months, the area of sheepskin increases as well, for example, in type "C+" it was 8.5, in type "C" it was 4.87 and in type "C-" it was2.75 dm2 or respectively -10.36, 6.00 and 3.33%.

We also studied the relationship between muscle fiber thickness and skin folding. The results of our studies on the relationship between the thickness of the muscle fibers of the longest back muscle with skin folding are presented in table 6, which shows that the thickness of the muscle fibers of the studied groups of animals at the age of 9 months did not show a significant difference. At the age of 18 months, there is a tendency to increase the thickness of muscle fibers according to the skin folding increases. The difference between the animals of type "C+" and "C-" was 5.2, and between the animals of types "C+" and "C" - 2.9 microns.

Table 6: The Average Thickness of Muscle Fibers of the Longest Back Muscle in Microns

Age	Type	n	M ± m	σ	C
9 months	C-	5	21,15 ± 0,72	1,43	6,8
	C	5	20,16 ± 1,05	2,09	10,4
	C+	5	21,08 ± 0,89	1,78	8,4
18 months	C-	5	34,74 ± 2,04	4,55	13,1
	C	5	37,04 ± 2,04	4,57	12,3
	C+	5	39,94 ± 2,44	5,45	13,6

Consequently, the castrated sheep without folds at the age of 18 months had a slightly smaller diameter of muscle fibers, which, apparently, indicates the best quality of their meat, compared with other types of animals.

The data of control slaughtering of castrated sheep of different types of folding allow us to draw the following conclusions:

-the main indicator of meat productivity of castrated sheep without folds and their slaughtering yield was higher than that of their peers. So, slaughtering yield in 9-month-old castrated sheep of type "C" with

2.37 and type "C+" with 5,37% was lower than that in their peers without folds. At the age of 18 months, this indicator was lower in individuals of types "C" and "C+" than in "C-" by 1.58 and 2.75%, respectively;

- the pulpy part in the carcasses of type "C -" castrated sheep at the age of 9 months was 77,18, "C"-73,56 and "C+"-72,68%, at the age of 18 months, respectively, 77,94, 76,68 and 75,10%. The greatest mass of bones in carcasses of 9 and 18 - month-old castrated sheep is observed in animals of type "C+" by 0.88-1.58, than in their peers of type "C" and by 2.84-4.50%, than in type "C-";

- chemical analysis of the longest back muscle showed that 9 and 18-month-old castrated sheep of type "C -" contain less moisture and more fat than their peers of type "C" and "C+". Thus, the moisture in the meat of 18-month castrated sheep of type "C -" contained by 0.64% less than that of their peers of type "C" and by 0.98% than that of type "C+", and fat is respectively greater, by 0.67 and 1.44%. On caloric content of meat on the first place we can see the castrated sheep of type "C -" on the second - "C "and on the last – "C+";

- the area of the "muscle eye" at the age of 9 and 18 months was larger in the castrated sheep of the non-folded type. In the diameter of the muscle fibers of the longest back muscle in 18-month-old castrated sheep there is a tendency to increase their thickness with increasing folding (the types were "C -" -34.74, "C"-37.04 and" C+ " - 39.94 MK), in 9-month such a pattern was not observed;

- in the area of sheepskin there was no significant difference in the castrated sheep at the age of 9-months of different types of folding and at the age of 18 months the largest area of sheepskin belonged to the multi-folded castrated sheep (90,54 dm^2), their peers of type "C" were in the second place (86,59 dm^2) and the last place was for the animals of type "C -" (85,23 dm^2).

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