PRODUCTIVITY OF TYVA SHEEP WITH DIFFERENT FLEECE STRUCTURE

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Abstract: zootechnical perfomance, physical and mechanical wool qualities, meat and slaughter qualities and some particular biological features ofTwa short-fat tailed sheep breed with stapel-braid and braid fleece structure that are bred under all-vear-round pasture grazing conditions were studied.

Key words, fleece sructure, meat productivity ram lambs slaughter, interior, wool, fineness, length, tenacity.

Depending on the natural and economic conditions, as well as ethnic and other features more than 600 species and genetically isolated groups of sheep of different productivity directions are bred in the world [5]. In Russia the total number of sheep and goats on farms of all categories is more than 22 million heads. By 2020 it should reach 27 million heads, while the production of mutton in slaughter weight - 220 tons [1,2].

For many regions with severe climatic conditions (Zabaikalje, Altai, Tyva, Kalmykia, etc.) sheepbreeding is the social-important and vital sector [3].

Currently 30.8% of the existing coarse-wooled sheep population in the Russian Federation is bred in Tyva, where sheepbreeding is an integral part of traditional [4]. They are presented by Tyva short-fat tailed sheep breed.

The Republic of Tyva has a great spaces of mountain and steppe pastures. More than 60% of gross production of animal husbandry falls on the share of sheepbreeding [6].

Evaluation of productivity and biological features of aboriginal sheep breed depending on fleece structure is an actual task. Aim of our research: to study productivity and some biological features of sheep of Tyva short-fat tailed sheep breed with stapel-braid (fig. 1) and braid fleece (fig. 2) structure that are bred under all-year-round pasture grazing conditions.

Materials and methods

The experimental work was done in a unitary farm "Chalaaty" Ovyurskii region of Tyva. MUP "Chalaaty" is a genetic conservation farm breeding sheep of short-fat tailed Tyva breed.

Weight was defined by weighing of animals with accuracy to 0.1 kg at the birth, at 4 and 7 months age as well as by adult rams and ewes at 3,5 years age.

Slaughter qualities were defined at three animals from every group of 8 months old youngstock. The slaughter was carried out according to methods of All-Russian Animal Husbandry Research Institute (1978).

Wool production was measured at 12 months.

Fig-1- Ewes with stapel-braid fleece structure

Fig. 2. Ewes with braid fleece structure

Results and discussion

General description of animals with different fleece structure. Tyva short-fat tailed sheep are of middle size, well adopted to tebenevka (winter pasture grazing) in highlands. Most of sheep (75%) have white body colour and pigmented head.

Safety index in both groups was high and came up to 94-98% (table 1). Carried out accounting of youngstock safety up to 4 months age shows that mortality of lambs with braid fleece structure is 3 % and among equals in age with stapel-braid fleece structure - 6%. Difference in lambs with braid fleece structure shows that they are better adopted to local conditions than their age equals.

Sheep milk is the main nutrient source at first one and a half - two months of lambs' life. Level of milk producing ability of ewes with braid fleece was higher than by their age equals for 1,75 kg (10,9%).

Table 1

Zootechnical perfomance s and reproduction rates of animals

Parameter	Fleece structure	
	braid	stapel-braid
Liveweight, kg		
Age-sex group:		
rams	65,8	62,0
ewes	45,3	45,0
Wool production, kg		
Age-sex group:		
rams	2,0	2,3
ewes	1,2	1,3
Ewes reproduction rates:		
Quantity of lambing ewes, head	50	50
Obtained lambs, %	101	100
Mortality of lambs, %	3	6
Birth rate to weaning, %	98	94

Youngstock weight dynamics. Weight is one of the main features characterizing development of animal organism (table 2).

Table 2

Liveweight dinamics, kg

Fleece structure	Sex of lamb	Age, month				
		at birth	4	**8**	12	18
Braid	Ewe	3,2 ± 0,09	19,8 ± 1,12	30,8 ± 0,33	34,5 ± 1,17	39,6 ± 0,44
	Ram	3,7 ± 0,22	21,3 ± 1,06	33,4 ± 0,48	35,8 ± 0,92	40,7 ± 0,51
Stapel-braid	Ewe	3,4 ± 0,19	18,9 ± 0,5	29.6 ± 0,7	33,5 ± 0,6	39.5 ± 0,54
	Ram	3,9 ± 0,21	20,5 ± 0,85	31.6 ± 0,43	34,4 ± 0,71	40.6 ± 0,41

Ram and ewe lambs with stapel-braid fleece excel ram lambs with braid fleece at birth weight for 0,2 kg or 5,1%. Further braid fleeced ram lambs overgrow age equals with stapel-braid fleece: at age 4, 8, 12, 18 months difference is 0,8; 1,8; 1,4; 0,1, respectively, and by ewe lambs - 0,9; 1,2; 1,0; 0,1 kg (fig. 3, 4).

Its notable that at first period, from birth till weaning (till 4 months), great growth energy is observed by ram lambs with braid fleece, at the second period (from 4 till 8 months) also braid fleeced ram lambs grow more intensively than stapel-braid fleeced lambs. But beginning from 8 months growth and development equalize. At 12-18 month period fast growth starts by lambs with stapel-braid fleece structure.

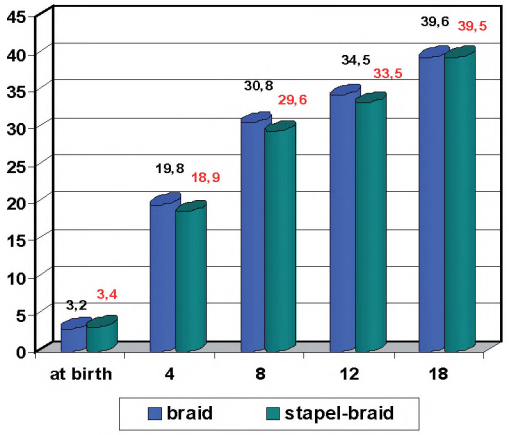

Fig. 3. Dynamics of ewes liveweight

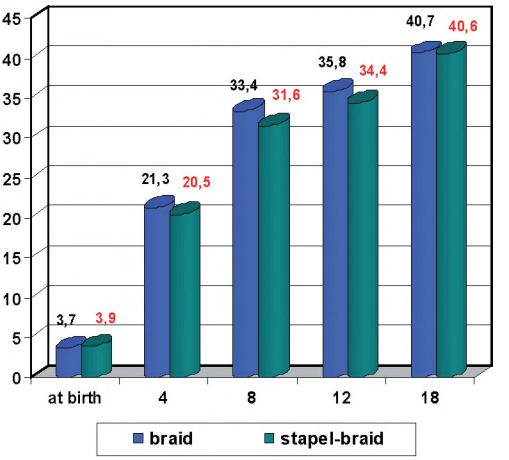

Fig. 4. Dynamics of rams liveweight

Slaughter and meat qualities. Meat productivity plays a critical role in sheepbreeding economy as it comes up to more than 90% of total production volume of branch (table 3).

Table 3

Slaughter qualities of 8-month aged rams

Parameter	Fleece structure					
	braid			stapel-braid		
	M±m	5	Cv, %	M±m	5	Cv, %
Preslaughter weight, kg	33,0±0,26	0,64	1,9	31,8±1,23	0,45	1,4
Hot weight, kg	13,9±0,42***	0,72	5,2	12,5±0,32	0,55	4,4
Weight of inner fat, kg	0,4±0,08	0,10	0,25	0,3±0,06	0,09	3,0
Slaughter weight without fat tail, kg	14,2±0,37	0,81	5,7	12,9±0,42	0,64	5,0
Slaughter weight with fat tail, kg	16,7±0,39	0,83	5,0	15,2±0,43	0,66	4,3
Slaughter yield, %	42,5±0,98	1,70	4,0	40,5±0,6	1,48	3,6
Slaughter yield, % (with fat tail)	50,6±1,0	1,73	3,4	47,8±0,9	1,52	3,2

According to the data from table 3 at 8 months age ram lambs with braid fleece excel their age equals with stapel-braid fleece by all slaughter features in absolute or relative terms.

Difference in preslaughter weight is 1,2 kg or 3,7%, at slaughter yield difference 2,8%. Hot weight difference between ram lambs with different fleece structure is 1,4 kg for braid fleeced ram lambs 's behalf. Assuming that difference in inner fat is slight and just 0,1 kg, difference in slaughter weight is 1,3 kg without fat tail and 1,5 kg with fat tail. Difference in fat tail weight is 0,20 kg.

Morphological carcass composition. Dissection results showed that meat content is higher in carcass of lambs with braid fleece for 0,3 kg, but at the same time they excel lambs with stapel-braid fleece also by bones content for 0,5 kg. Therefore meat yield by lambs with braid fleece is less for 2,7% (table 4).

Table 4

Morphological composition of 8-month aged ram's carcass

Fleece structure	Weight of, kg		Yield of, %		Fleshing index
	meat	bones	meat	bones	
Braid	7,6	3,1	71,0	28,9	2,45
Stapel-braid	7,3	2,6	73,7	26,3	2,08

Fleshing index defined by proportion of flesh weight to bones weight was the highest by braid fleeced ram lambs for 0,37%.

Chemical meat composition. Nutrient value of meat is defined in the great extent by its chemical composition and energy value (table 5).

Table 5

Chemical meat composition

Parameter		Fleece structure	
		braid	stapel-braid
Preslaughter weight, kg		33,0	31,8
Content of substances in the meat, %	water	69,67	71,67
	protein	16,10	16,97
	fat	13,23	10,73
	ash	1,0	0,63
Ratio	water-protein	4,3	4,2
	fat-protein	0,82	0,63
Caloric value, kcal		949,9	815,3

According to the 7 table data content of water in meat of rams with braid fleece structure is less then this parameter in another group, but the content of fat is higher, so the caloric value braid fleece rams is bigger at 16,5%.

Wool physical and mechanical properties of ewes with difference fleece structure. In its properties wool is one of the most difficult fibrous materials (table 6).

Table 6

The ratio of fibers different types, g

Age-sex group	Type of fiber	Fleece structure	
		braid	stapel-braid
Ewes	fur	0,19±0,02	0,26±0,05*
	coarse	0,15±0,01	0,15±0,01
	dead hair	0,04±0,01	0,01±0,004
Rams	fur	0,15±0,01	0,18±0,01
	coarse	0,14±0,01	0,13±0,01
	dead hair	0,02±0,03	0,01±0,004

a) b)

In fleece of ewes with staple-braid structure predominate for fibers, share amounted to - 61.9%, that is at 11.9% greater than that of ewes with braid fleece structure ($P < 0.05$). Whereas in wool of ewes with braid structure content of unwanted dead fibers allocated 10.5%, which is at 8.1% more than that of peers with a staple-braid structure of the fleece (fig. 5).

With the same content of coarse fiber in these two groups of animals - 0.15 g, the proportion of coarse fibers in wool samples of ewes with braid structure was 39.5% and exceeded the peers on this indicator is at 4.2%.

The content of fur fiber in wool samples of ram's with braid and staple-braid fleece structure was 48.4 and 56.2%, with a higher content at 7.8% in ram's with staple-braid fleece structure. The same trend was revealed, and the content of coarse fibers (4.6%). The share of dead hair varies from 6.4 and 3.1% in excess at 3.3% this parameter in wool of ewes with braid structure.

It should be noted that the content of dead hair in rams wool in general is somewhat less than 1.7% than ewes.

Length of wool fibers. In studying the natural length of wool in sheep with braid fleece structure at different topographical sites was found that rams had a greater length of the braids on all topographical areas, in average at 2.1 cm in fur fiber and 1.4 cm in coarse (table 7).

Analysis of the staple height of an adult animal with a different fleece structure shows that the wool length of rams exceeds this parameter of ewes' wool in all topographic parts

Table 7

Fiber length different age-sex groups of sheep, cm

Type of fiber	Topographic part of fleece	Age-sex group					
		ewes		rams		ewe-lambs	
		braid	stapel-braid	braid	stapel-braid	braid	stapel-braid
Fur	side	10,6±0,4	9,7±0,82	11,6±0,9	10,8±0,76	10,1 ±0,8	10,2±0,8
	back	7,2±0,6	8,8±0,65	10,8±0,7	9,7±0,80	9,9±0,6	9,9±0,5
	thigh	8,5±0,7	10,1 ±0,78	10,5±0,6	11,5±0,98	9,7±0,5	10,3±0,5
	average of fleece	8,8±0,6	9,6±0,75	10,9±0,7	10,7±0,85	9,9±0,62	10,1±0,6
Coarse	side	16,1±1,1	10,2±0,96	16,9±1,3	11,3±0,88	16,0±0,9	11,7±0,7
	back	11,7±0,7	9,2±1,00	14,5±0,9	10,5±1,20	15,8±0,9	10,3±0,9
	thigh	13,3±0,7	10,7±0,86	13,9±1,1	11,9±1,02	15,5±0,6	11,6±0,8
	average of fleece	13,7±0,8	10,0±0,94	15,1 ±1,1	11,2±1,03	15,8±0,8	11,2±0,8

of fleece. Length of fur fibers in the young with a different fleece structure is approximately equal.

The coarse fiber length of ewes with braid fleece structure exceeds this parameter of ewes with staple fleece structure at 4.5 cm. The maximum length of fur fibers was observed in the group of ewes with staple-braid fleece structure, the minimum - in the group of ewes with braid fleece structure.

Among the youngstock the maximum braid length (by coarse fiber) was observed in group of ewes with braid fleece structure (average of rune 15.8 cm), and the lowest - in group of ewes with staple-braid structure of fleece (11.2 cm), that is less than this parameter of ewe-lambs with braid fleece structure at 4.6 cm

Fineness of wool fiber. Starting with the appraisal of animal and ending with the elaboration of its finished products a lot of attention pay for fineness of wool (table 8).

Table 8

Fineness of wool fiber, microns

Fleece structure	Type of fiber	Ewes	Rams
Braid	fur	17,08±0,26	19,3±0,27
	coarse	59,4±0,56	67,6±0,6
Stapel-braid	fur	15,72±0,3	18,6±0,47*
	coarse	48,86±0,5	61,2±0,36***

* P<0,05, ***P<0,001

Ewes with a staple-braid fleece structure characterized by a thin fur and coarse fibers within the 15.72 microns and 48.86 microns respectively, compared with their peers who have had a fineness of fur fiber higher at 1.36 microns and of coarse fiber at 10.54 microns.

Fineness of wool fibers of rams with braid fleece structure is bigger than this parameter of their peers with staple-braid structure at 0.7 microns for the fur fibers and 6.4 microns for the coarce fibers, respectively, at $P < 0,05$ and $P < 0,001$.

Thus, the most coarse wool have sheep with braid fleece structure.

Strength of wool sheep with different fleece structure. Wool sheep of experimental groups has good strength in average staple, and he runes (table 9).

Table 9

Strength of wool fiber, cN / tex

Age-sex group	Type of fiber	Fleece structure	
		braid	stapel-braid
		M±m	M±m
Ewes	fur	8,4±0,18	7,2±0,11
	coarse	9,6±0,4	8,5±0,17
Rams	fur	10,6±0,1***	9,7±0,31
	coarse	11,6±0,1***	10,0±0,23

It was found that greater strength of wool is characterized ewes and rams with braid fleece structure and lower animals with the staple-braid fleece structure.

Fur and coarse fiber of sheep with braid fleece structure is stronger than these parameters of their peers with staple-braid fleece at 1.2 and 1.1 cN/tex for ewes, 0.9 and 1.6 cN/tex, respectively.

Conclusions

1. Tyva short-fat tailed rams and ewes with braid fleece structure reach the live weight of 65.8 kg; 45.3 kg, that is more than their peers with staple-braid structure of fleece at 3.8 and 0.3 kg respectively (5.8 and 0,6%). Whereas, the shearing of raw wool from sheep with braid fleece structure inferior peers at 0.3 and 0.1 kg (13 and 8%), respectively.

2. Under pasture grazing conditions in the period from birth to weaning the youngstock had the fastest growth rate. For this period the average daily weightgain of ram lambs with braid fleece was 145 g, and of ewe lambs - 136 g, that is for 3,6% and 4,4% more than average daily weightgain of their age equals with stapel-braid fleece. At the period from 4 to 8 months sharp growth energy slowdown in both groups till the level of 98-100 g was observed.

3. Ram lambs with braid fleece structure exceed their age equals with stapel-braid fleece structure by all slaughter features in absolute or relative terms.

6. The inhomogeneous coarse wool of Tyva short-fat tailed sheep with different fleece structure have distinctive features in quantitative and qualitative indicators.

a) In fleece of ewes and rams with staple-braid structure predominate fur fibers, share amounted to - 61.9%; the same parameter of coarse fibers is 39.5 and 45.2%, that is at 11.9; 7.8; and 4.2; 4.6% more than that of peers with braid structure of the fleece. Share amounted of dead hair in wool of ewes is vary from 2.4 to 10.5%, in wool of rams - from 3.1 to 6.4%, that is greater than in wool from sheep with braid fleece structure at 8.1 and 3.3% respectively.

b) natural length of wool in sheep with braid fleece structure at average of rune was in fur fiber 10.9 and 8.8 cm, in coarse fiber - 15.1 and 13.7 cm, that is at 0.2 and 0.8 cm; 3.9 and 3.7 cm higher than this parameter of their peers with staple-braid fleece structure. Among the youngstock the maximum braid length (by coarse fiber) was observed in group of ewes withbraid fleece structure (average of mne 15.8 cm), and the lowest - in group of ewes with staple-braid structure of fleece (11.2 cm), that is less than this parameter of ewe-lambs withbraid fleece structure at 4.6 cm.

c) Wool of ewes with staple-braid fleece structure is characterized with more fine fur and coarse fibers within the 15.72 microns and 48.86 microns respectively, compared with their peers who have had a fineness of fur fiber higher at 1.36 microns and of coarse fiber at 10.54 microns. Fineness of wool fibers of rams with braid fleece structure is bigger than this parameter of their peers with staple-braid structure at 0.7 microns for the fur fibers and 6.4 microns for the coarce fibers, respectively.

d) Wool of ewes and rams withbraid fleece structure is characterized by higher strength than wool of sheep with staple-braid fleece structure. Fur and coarse fiber strength of sheep with braid structure of fleece was 8.4-10.6 cN/tex and 9.6-11.6 cN/tex, respectively, that is stronger than these parameters of their peers with staple-braid fleece structure at 1.2 and 1.1 cN/tex for ewes, 0.9 and 1.6 cN/tex, respectively.

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ПРОДУКТИВНОСТЬ ТУВИНСКИХ ОВЕЦ С РАЗНЫМ СТРОЕНИЕМ РУНА

Аннотация: изучены зоотехнические показатели, физико-механические свойства шерсти, убойные и мясные качества и некоторые биологические особенности овец тувинской короткожирнохвостой породы со штапельно-косичным и костным строением руна, разводимых в условиях круглогодового пастбищного содержания.

Ключевые слова: строение руна, мясная продуктивность, убой баранчиков, интерьер, шерсть, тонина, длина, прочность.

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