

A COMPARATIVE ANALYSIS OF THE EXTERIOR IN LOCAL GOAT BREEDS FROM SOUTHWEST BULGARIA

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Abstract

In the last 15 -20 years there has been a higher interest in the skins of the Kalofer longhaired goats, used for making mummer's costumes, typical for Southwest Bulgaria. As a result, very valuable animals from this indigenous goat breed were brought from its typical habitat (Kalofer region); some of them were killed for their skin, and others left for breeding, mainly in Southwest Bulgaria (Blagoevgrad region). This region (Blagoevgrad region), however, is a natural habitat of another local breed – the Bulgarian Screw-horned long-haired goat. Coexistence and breeding in purebred status of these two indigenous goat breeds, requires clearly distinguished breed types of both of them. For this purpose, we traced typical specimens, with a clearly expressed breed type of Kalofer long-haired and Bulgarian screw-horned goats, reared in herds in Southwest Bulgaria. Full exterior measurements of 100 goats (50 of each breed) and 40 bucks (20 of each breed) were made. The Kalofer long-haired goat is larger than the Bulgarian Screw-horned long-haired goat - the height at the withers in the females, was - 70.76 cm and 66.9 cm, respectively. The height at the withers in the bucks was - 82.2 cm and 73.4 cm, respectively. The differences expressed a high degree of probability. The Bulgarian Screw-horned goat has a light stretched format (bucks' stretchability index was 106.3), while the Kalofer long-haired goat has a square format (bucks' stretchability index was 100.3). The Kalofer long-haired goat has more massive bones (index for the development of bones was 12.99) than the Bulgarian Screw-horned goat (index for the development of bones - 12.12). The differences expressed a high degree of probability.

Key words: *Goat breeding, Autochthonous breeds, local goat breeds, exterior measurements, exterior indices*

Introduction

The local goat breeds in Bulgaria are poorly investigated and fully detailed data about their exterior and productive qualities are scarce. A number of authors who studied local goats in the past described them as low-productive and of heterogeneous exterior. The investigations were initiated mainly because of the opportunity for crossbreeding with highly productive introduced breeds (Kadijski 1958, Balevska and Tjankov 1981, Solomonov, Kadijski and Lazarov 1984, Tjankov et al. 1996, Krastanov, 2003). In most of the papers the different local goat populations are mentioned under the collective term autochthonous goats. However, surviving populations are still to be found in some regions of the country, possessing characteristic and steadily transferred exterior traits. That fact calls for their separate study and description. (Vuchkov et al. 2011). The local Kalofer long-haired goat breed is threatened with extinction. Typical mountain breed. Natural area of the breed are the southern slopes of the Central Stara Planina mountain, near the town of Kalofer (Sedefchev et al. 2011; Vuchkov et al. 2011). In the last 15 -20 years there has been a higher interest in the skins of the Kalofer longhaired goats, used for making mummer's costumes, typical for Southwest Bulgaria. As a result, very valuable animals from this indigenous goat breed were brought from its typical habitat (Kalofer region); some of them were killed for their skin, and others left for breeding, mainly in Southwest Bulgaria (Blagoevgrad region). This region (Blagoevgrad region), however, is a natural habitat of another local breed – the

Bulgarian Screw-horned long-haired goat (Sedefchev et al. 2011; Vuchkov and Dimov 2012). Coexistence and breeding in purebred status of these two indigenous goat breeds, requires clearly distinguished breed types of both of them. For this purpose, we traced typical specimens, with a clearly expressed breed type of Kalofer long-haired and Bulgarian screw-horned goats, reared in herds in Southwest Bulgaria.

The aim of this study was to perform exterior measurements of typical specimens of local goat breeds reared in Southwest Bulgaria - Kalofer long-haired goat (KLg) and Bulgarian Screw-horned long-haired goat (BSg), and to perform a comparative analysis of the exterior features of both breeds. To achieve that aim the following tasks were set:

- to trace purebred specimens with expressed breed type, reared in flocks of Southwest Bulgaria;
- carry out thorough body measurements of fully grown-up bucks and does;
- to calculate some exterior indices in goats and bucks;
- to establish accuracy in the differences in the values of the exterior parameters in both breeds;

Material and methods

For this study were selected 50 goats and 20 bucks of both breeds with clearly expressed breed type in the autumn of 2014 year,. It was formed sample of 100 goats and 40 bucks, reared in 6 herds in the mountainous regions of Southwest Bulgaria. Goats are kept under similar conditions - traditional pastoral technology, with additional feeding of concentrated fodder and meadow hay in winter. In order to perform the body measurements the following tools were used: cane of Lidtin, compasses of Wilckens and a measuring band. The results are processed statistical variation.

Results and discussion

The results shows that the Kalofer Long-haired goats (KLg) are relatively higher at the withers, than the Bulgarian Srew-horned goats (BSg) - 70.76 cm and 66.9 cm respectively. The differences expressed a high degree of probability (Tabl.1.). In comparison with some dairy breeds, the Kalofer Long-haired and has a lower height at withers. According to data from the Ylmaz et al. (2016), the average requirements for Saanen goat height at withers is 73.94 cm, but the height varies from 62.0 cm to 85.0 cm. The height at withers in Shami (a Damascus goat raised in Egypt) females is 69.2 cm and in bucks – 83.1 cm (Helal, 2009). Similar results obtained and Mason (1996) in Valais goats. When compared with the height at withers (68.8 cm) established by earlier authors in other local goats in Bulgaria (Kadijski, 1958; Balevska and Tjankov, 1971) it is clear that the Kalofer Long-haired goats have higher figures for that feature. The measurements of the height at rump and compared with the height at the withers of both breeds, it is clear that Kalofer Long-haired goats (KLg) has higher height at rump, while in the Bulgarian Screw-horned goat (BSg), the height at rump is almost equal to the height at the withers (figs.2,3.). The differences expressed a high degree of probability. It is noteworthy that the KLg has proven broader and deeper chest than the BSg. The coat of the both breeds is long and straight. The quality of the hair while is different - in the BSg hair is dry, harder and slightly wavy. The hair in the KLg is softer and with silky shine.

Table.1. Body measurements of does of the Kalofer Long-haired goat (KLg) breed (n=50), and the Bulgarian Screw-horned long-haired goat (BSg) breed (n=50), reared in Southwest Bulgaria

Body measurements	Height of withers	Height of rump	Diagonal body length	Shoulder width	Chest depth	Width of rump	Rump length	Right back length	Coat length at rump	Coat length at withers	Shin-bone girth	Heart girth
KL s n	50	50	50	50	50	50	50	50	50	50	50	50
X	70,7 6	72,8 2	73,0 8	19,2 8	34,2 2	16,8 6	23,6 8	70,1 6	29,0 6	24,3 4	9,1 7	88,4
SE	0,70	0,52	0,72	0,27	0,39	0,20	0,28	0,62	0,60	0,75	0,0 9	0,79
min	58	62	62	16	28	14	18	61	15	16	8	77
max	79	78	81	24	37	19	26	78	35	32	10	100
BSg -n	50	50	50	50	50	50	50	50	50	50	50	50
X	66,9	66,5 8	70,5 6	17,9 8	30,5 4	15,9 2	21,2 2	63,8 4	23,4 4	17,0 6	8,1 1	82,4 2
SE	0,32	0,32	0,53	0,23	0,32	0,21	0,16	0,49	0,70	0,44	0,0 8	0,54
min	61	60	64	13	21	12	19	54	15	12	7	77
max	71	71	77	23	34	19	23	71	35	25	9	98
P	***	***	**	***	***	**	***	***	***	***	***	***

Table.2. Body measurements of bucks of the Kalofer Long-haired goat (KLg) breed (n=20), and the Bulgarian Screw-horned long-haired goat (BSg) breed (n=20), reared in Southwest Bulgaria

Body measurements	Height of withers	Height of rump	Diagonal body length	Shoulder width	Chest depth	Width of rump	Rump length	Right back length	Coat length at rump	Coat length at withers	Shin-bone girth	Heart girth
KLg - n	20	20	20	20	20	20	20	20	20	20	20	20
X	82,2	83,1	82,42	23,07	39,35	19,5	27,2	81,25	35,45	32,9	11,425	102,87
SE	0,68	0,80	1,16	0,43	0,43	0,26	0,58	1,33	0,95	1,28	0,13	1,23
min	75	76	74	20,5	33,5	17	22	69	26	21	10,5	95
max	88	90	93	27	48	23	31	95	49	42	12,5	112
BSg - n	20	20	20	20	20	20	20	20	20	20	20	20
X	73,4	72,45	78	20,45	34,25	16,25	24,1	69,05	29,25	25,85	9,55	92,4
Se	0,79	0,92	0,90	0,53	0,60	0,22	0,52	0,85	0,76	1,11	0,21	1,31
min	69	68	70	17	30	15	20	63	24	18	8	80
max	83	83	85	24	38	18	28	75	35	32	11	100
P	***	***	**	***	***	***	***	***	***	***	***	***

We recognize the significant superiority of the KLg on the sign length of the hair. The average values of the length of the hair at the rump was 29.06 cm, and the length of the hair at the withers was 24.34 cm. In the BSg values of these signs are with considerably lower values, respectively - 23.44 cm and 17.06 cm. The differences expressed a high degree of probability. The bucks of both breeds has significantly longer hair in compared with the goats (table 2.). The differences between males of both breeds in the signs length hair at the withers, and at the croup expressed a high degree of probability. A clear difference can be seen in the exterior feature shin-bone girth in the bucks (fig.3). The bucks from KLg breed has markedly more massive bones, than the bucks from BSg breed. The shin-bone girth in the bucks from KLg breed was 11.42 cm. In the bucks from BVg breed was 9.55 cm. The difference was demonstrated with a high degree of probability.

Table.3. Measurements of the head in does from Kalofer longhaired (KLg) and Bulgarian Screw-horned goat (BSg) breeds reared in Southwest Bulgaria.

Measurements of the head	Head width	Head length	Ear length	Ear width
KL _g - n	50	50	50	50
X	13,56	19,97	16,2	7,2
SE	0,16	0,18	0,24	0,09
Max	12	18	13	5,5
Min	18	25	19	8
Bsg - n	50	50	50	50
X	12,76	18,32	14	6,06
SE	0,12	0,15	0,16	0,05
min	11	16	12	5
max	14	21	16	7
P	***	***	***	***

Table.4. Measurements of the head in bucks from Kalofer longhaired (KLg) and Bulgarian Screw-horned goat (BSg) breeds reared in Southwest Bulgaria.

Measurements of the head	Head width	Head length	Ear length	Ear width	Distance between peaks of the horns, cm
KL _g -n	20	20	20	20	20
X	14,85	22,2	15,9	7,25	74,72
SE	0,28	0,32	0,48	0,18	4,49
Max	13	20	13	6	47
Min	17	25	20	8,5	108
BSg -n	20	20	20	20	20
X	14	19,5	13,8	6,12	54,2
SE	0,28	0,19	0,15	0,07	2,30
min	12	18	12	6	39
max	16	21	15	7	68
P	*	***	***	***	***

Our results from exterior measurements of the head in both breeds shows that the KLg has broader and longer head, than BSg (Tabl.3,4). The width of the head in KLg was 13.56 cm, and length - 19.97 cm. The width of the head in the BSg was 12.76 cm, and the length is 18.32 cm. The differences are proven with a high degree of probability.

Table.5. Exterior indices in does from Kalofer longhaired (KLg) and Bulgarian Screw-horned goat (BSg) breeds reared in Southwest Bulgaria.

indices	Long leg ndex	Stretchability index	Index of massiveness	Index of bone development
KLg -n	50	50	50	50
X	51,61	103,33	125,20	12,99
SE	0,34	0,47	1,05	0,14
min	48,27	100	113,69	11,42
max	61,64	111,42	139,68	15,51
BSg -n	50	50	50	50
X	54,31	105,47	123,22	12,12
SE	0,49	0,64	0,66	0,12
min	48,48	95,52	116,66	10,29
max	68,65	116,66	140	13,63
P	***	**		***

Table.6. Exterior indices in bucks from Kalofer longhaired (KLg) and Bulgarian Screw-horned goat (BSg) breeds reared in Southwest Bulgaria.

indices	Long leg ndex	Stretchability index	Index of massiveness	Index of bone development
KLg-n	20	20	20	20
X	52,18	100,28	125,26	13,91
SE	0,30	1,31	1,04	0,16
min	44,30	90,85	115,66	12,80
max	59,52	110,12	139,13	15,52
BSg -n	20	20	20	20
X	53,24	106,31	126,00	13,02
SE	0,95	0,93	1,73	0,29
min	45,71	100	108,10	11,26
max	59,45	112,5	133,78	15,94
P		***		*



Fig.1. Heads of the Kalofer long-haired goats (KLg) and Bulgarian Screw-horned long-haired goats (BSg) – does.



Fig.2. Does from the Kalofer Long-haired (KLg) and Bulgarian Screw-horned long-haired (BSg) breeds



Fig.3. Bucks from from the Kalofer Long-haired (KLg) and Bulgarian Screw-horned long-haired (BSg) breeds

Head in BSgt is revatively smaller, triangular in shape, and slightly concave profile. The ears in KLg are large and dropping (fig.1.). The length of the ear was 16.2 cm, width - 7.2 cm. The ears in BSg is a shorter and protruding. The length of the ear was 14.0 cm, width - 6.06 cm width. The differences expressed a high degree of probability.

Conclusions

Coexistence and breeding in purebred status of these two indigenous goat breeds, requires clearly distinguished breed types of both of them. The Kalofer long-haired goat is larger than the Bulgarian Screw-horned long-haired goat - the height at the withers in the females, was - 70.76 cm and 66.9 cm, respectively. The height at the withers in the bucks was - 82.2 cm and 73.4 cm, respectively. The differences expressed a high degree of probability.

The Bulgarian Screw-horned goat has a light stretched format (buck's stretchability index was 106.3), while the Kalofer long-haired goat has a square format (bucks' stretchability index was 100.3). The Kalofer long-haired goat has proven more massive bones (index for the development of the bones was 12.99) than the Bulgarian Screw-horned goat (index for the development of bones - 12.12). The differences expressed a high degree of probability.

Kalofer long-haired goat has broader and longer head. The width of the head in the Kalofer goats was 13.56 cm, and length - 19.97 cm. The width of the head in the Bulgarian Screw-horned goat was 12.76 cm, and the length was 18.32 cm. The differences expressed a high degree of probability.

The Kalofer long-haired goats has large and dropping ears. The length of the ears was 16.2 cm, width - 7.2 cm. The Bulgarian Screw-horned goat has a shorter and protruding ears. The length of the ears was 14.0 cm, width - 6.06 cm. The differences expressed a high degree of probability.

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