

RESEARCH ON MORPHO-PRODUCTIVE APTITUDES OF A GOAT'S POPULATION OF CARPATHIAN BREED FROM ARGEȘ AREA

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Abstract

The purpose of this paper is to investigate the evolution and situation of Carpathian goat breed population from Argeș County. Carpathian breed is the oldest, most widespread, primitive, rustic, resistant and very heterogeneous breed in terms of morphological characteristics. The biologic material is represented by 25 females and 6 males belonging to Carpathian breed. The livestock presents the following morphological characteristics: live weight (39.03±0.52 kg females and 51.42±0.91 kg males), whiter height (61.11±0.76 cm females and 68.23±0.45 cm males), trunk length (65.57±0.66 cm females and 77.94±0.65 cm males), thoracic width (15.05±0.35 cm females and 18.64±0.4 cm males), thoracic perimeter (66.30±0.57 cm females and 76.82±0.42 cm males), shin-bone perimeter (6.83±0.09 cm females and 8.08±0.15 cm males), resulting a dolicomorphe body type. The average production of milked milk per month is 31.68 kg during May-October and the chemical composition of the goat milk reveals a dry matter content of 13.58%, (fat 4.41%, protein 3.57%), which represents a qualitative goat milk, especially when is taken into account that is a local and rustic breed.

Key words: Carpathian breed, body measurements, body weight, goat milk.

INTRODUCTION

Goat breeding is in our country a traditional activity taken into account the large area of natural grassland, spread in all landforms that cannot be operated more efficiently than through sheep and goats breeding.

Goats are animals that are using very well the cheap feed such as grass, roughage and woody plants, are implying relatively low costs compared with other species, and are providing valuable foods for human consumption.

In Romania, goats were considered „the poor's cow”, being also a survival niche of the poor families.

Carpathian goat breed is a natural breed that has her origins in the Carpathians Mountains as a descendent of *Capra Prisca*, being a very robust breed and is spread in the South or Eastern Europe (Mason, 1996).

This breed represents 90% of the entire goat livestock from Romania, being encountered in all the rural areas of the country. From a morphological and productive point of view, the breed shows a great variability, mainly due to the different rearing conditions and the low

level of genetically improvement of the populations (Vlad et al., 2009).

The breed is adapted to the local climate, management system and to our type of vegetation with a quite facile and profitable rearing. Carpathian breed can be exploited both for the milk and meat production.

The milk production is small towards medium compared to other breeds, 200-250 litres obtained over a lactation period of 196 days; being a fat milk, with a concentration of 4.5-6.5% fat and in some situations reaching 10%.

The meat has an important nutritional value, being similar to the sheep meat. Goat skin is used in the manufacture of footwear, clothing and leather goods. Through the wide range of products supplied (milk, meat, hides, hair production etc.) goats bring their contribution in covering the needs of the population in terms of high quality animal products and with an affordable price (Taftă, 2010).

MATERIALS AND METHODS

The purpose of this paper was to investigate the main characteristics of the Carpathian breed in

a population represented by 25 females and 6 males, belonging to a private farm from Argeş County.

The main measurements were aimed to highlight the morphological characteristics and productive parameters of this breed. Observations were focused on conformation aspects and primary milk production, especially in terms of quantity and quality.

As regards the body measurements, the focus was on the back height, the oblique body length, thoracic width, thoracic perimeter and shin bone perimeter. The females and males belonging to this population were also weighted.

The following measurements were carried out on our animals:

- The individual weighting of the males and females was carried out with a mechanical weighing machine (precision of ± 1 kg);
- Measurements of length and height were made with the zoometry machine;
- The measurements of width were made with the compass;
- The measurements of the perimeters were made with the tailor's ribbon;
- The thoracic perimeter was measured with the ribbon immediately on the back of the shoulders;
- The perimeter of shinbone was measured with the ribbon at the right anterior leg in the middle of the shinbone;

The following body indexes were used (Furtunescu, 1958):

Index of lateral body format (I_L):

$$I_L = \frac{\text{Oblique trunk length}}{\text{Whiter height}} \times 100$$

Index of transversal body format (I_{BF}):

$$I_{BF} = \frac{\text{Thoracic width}}{\text{Whiter height}} \times 100$$

Index of bone system (I_{BS}):

$$I_{BS} = \frac{\text{Shinbone perimeter}}{\text{Thoracic perimeter}} \times 100$$

Indicator of massiveness (I_M):

$$I_M = \frac{\text{Thoracic perimeter}}{\text{Whiter length}} \times 100$$

For milk production, the research was based on the information's obtained from the official control of production (OCP). The fat and protein content were analyzed, using the LACTOSCOPE equipment with infrared technology.

RESULTS AND DISCUSSIONS

The biologic material is represented by 25 females and 6 males belonging to Carpathian goat breed. It was analysed throughout productive performances in the actual condition of exploitation.

Body weight. The research results are as follows: the average females weight 39.03 ± 0.52 kg and the average males weight 51.42 ± 0.91 kg are values that are common for this breed and within the range of values reported by other authors for this breed (Taftă, 2002) (Table 1).

Table 1. Body weight of Carpathian goat breed population

Gender Category	n	$X \pm s_x$	S	V%
Females	25	39.03 ± 0.52	2.62	6.71
Males	6	51.42 ± 0.91	2.22	4.32

Somatometric measurements. The aim of the body size measurements, was to highlight the corporal conformation both for females and males: whiter height 61.11 ± 0.76 cm for females and 68.23 ± 0.45 cm for males; oblique trunk length 65.58 ± 0.69 cm for females and 77.93 ± 0.65 cm for males; thoracic width 15.76 ± 0.35 cm for females and 18.64 ± 0.43 cm for males; thoracic perimeter $66.30 \pm 0,57$ cm for females and 76.82 ± 0.42 cm for males; shinbone perimeter $7.03 \pm 0,04$ cm for females and 8.08 ± 0.15 cm for males.

All this measurements are the most important characters, with a large grade of variability, representing the morphological body type and offers us the opportunity to calculate some important indexes.

The body measurement results show that the analysed animals belong to a low-medium size category of this breed, more suited for the milk production.

The values are almost similar with those from other authors Priseceanu H. et al., 2015.

In order to assess the proportionality and the development harmony of the different body regions or parts, as well as of the productive capabilities assessment, based on the body measurements performed, some body indexes have been calculated, which represent the ratio between two dimensions morpho-physiologically correlated (Table 2).

The lateral body format index values, expressed by the trunk length value reported to the wither height and the transversal body format index, obtained by reporting the thoracic width to the whiter width, show that the animals fall into the dolichomorpe body type, which is body suited for milk production (Călin, 2004).

Also, the bone system index, with a value greater than 10%, indicates a population with well-developed bones, belonging to the morpho-productive type for milk.

The massiveness index shows that these animals have a body development characteristic to the milk production type, with a relatively low massiveness (Table 2).

Table 2. Body indexes

Crt. no.	Specification	Value (%)
Females		
1.	Index of lateral body format	107.30
2.	Index of transversal body format	25.78
3.	Index of bone system	10,06
4.	Index of massiveness	124.83
Males		
1.	Index of lateral body format	114.23
2.	Index of transversal body format	27.31
3.	Index of bone system	10.52
4.	Index of massiveness	112.59

Milk production. According to the classical principles the milking is executed using normal milking technique, taking into account more or less the hygienic principles.

The average milk production was 31.68 kg per month. During May-October period, the average milk production was amounting to 190.12 kg, as it is shown in Table 3.

Table 3. The milk production

Crt. no.	Lactation month	Argeş Farm	
		kg	% by total
1.	May	38.94	20.48
2.	June	41.63	21.89
3.	July	38.07	20.02
4.	August	30.65	16.12
5.	September	25.39	13.35
6.	October	15.44	8.14
7.	Total milked production	190.12	
8.	Total milk/lactation/simple parturition (kg)	220.87	
9.	Total milk/lactation/twin parturition (kg)	238.28	
10.	Average milked milk production /month (kg)	31.68	
11.	Lactation period (days)	196.27	

It has to be taken into consideration that the milk consumed by kids, obtained both from single or twin parturition, was not included and it is shown separately (Table 4).

Table 4. The amount of milk in suckling period depending on the type of birth

Crt no.	Specification	MU	Parturition type	Argeş Farm
1.	Milk consumed by kids in the 0-28 days period	kg	Simple	14.23
			Twin	21.37
2.	Milk consumed by kids in the 28 days - 2 months period	kg	Simple	16.52
			Twin	26.79
3.	Total milk consumed by kids from simple parturition 0-2 months	kg	-	30.75
4.	Total milk consumed by kids from twin parturition 0-2 months	kg	-	48.16

The lactation curve, in the case of this breed, must decrease slowly, after the sixth or seventh month of lactation (Figure 1).

As it can be observed in Figure 1, the lactation reveals the medium potential of this population as regards the milk production, which can be caused by a poor management or a lack of knowledge in dairy goat exploitation and a poor nutrition.

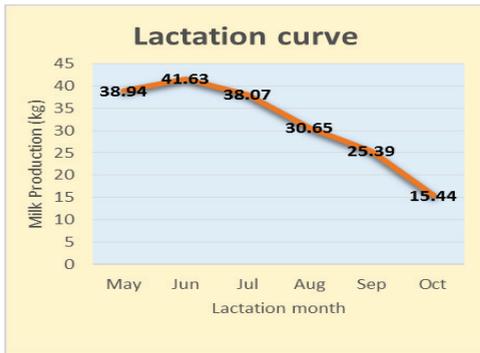


Figure 1. Lactation curve

The chemical composition during the lactation period is represented as follows: dry matter 13.58%, out of which: fat 4.41% and protein 3.57%, representing a qualitative production (Table 5).

Table 5. Chemical composition of milk

Specification	Argeş Farm
Water (%)	86.42
Dry matter (%)	13.58
Fat (%)	4.41
Protein (%)	3.57
Lactose (%)	4.69
Minerals (%)	0.91

From the analyses which has been carried out it is evident that the composition of milk fat in the cow milk and the one from goat milk are not significantly different, with the exception of the last month of lactation when the fat content has increased considerably (Table 6).

According to our data, it can be observed that compared to the milk production, which is decreasing, the fat and protein content are increasing until the last month of lactation.

Table 6. Evolution of milk fat content

Crt. no.	Lactation month	Argeş Farm	
		%	kg fat/month
1.	May	3.47	1.35
2.	June	3.69	1.53
3.	July	3.84	1.46
4.	August	4.56	1.40
5.	September	4.83	1.23
6.	October	6.08	0.94
7.	Average	4.41	7.91

Our research reveals a normal curve for the fat content during the 6 months of milking that is increasing in each month of the lactation (Figure 2).



Figure 2. Fat content evolution

The same principle can be applied also for the protein content regarding the increasing trend and with values that are similar to the ones reported by other authors for this breed (Vlad I. et al., 2009) (Table 7).

Table 7. Evolution of protein content

Crt. no.	Lactation month	Argeş Farm	
		%	kg protein/month
1.	May	2.96	1.15
2.	June	3.26	1.36
3.	July	3.36	1.28
4.	August	3.58	1.10
5.	September	3.96	1.01
6.	October	4.29	0.66
7.	Average	3.57	6.56

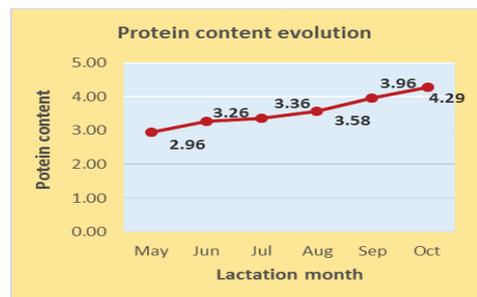


Figure 3. Protein content evolution

Pădeanu (2002), suggested that compared to sheep milk which has a higher dry matter content, goat milk has less dry mater and a lower protein and fat percentage.

CONCLUSIONS

The lateral body format index values, expressed by the trunk length value reported to the wither height and the transversal body format index, obtained by reporting the thoracic width to the whiter width, show that the animals fall into the dolichomorphe body type, which is a body suited for milk production.

The bone system index, with a value greater than 10%, indicates a population with well-developed bones, belonging to the morpho-productive type for milk. The massiveness index shows that these animals have a body development characteristic to the milk production type, with a relatively low massiveness.

The morphological values are common for this breed and within the range of values reported by other authors for these breeds.

The average production of milked milk, without the milk used for kids, is 190.12 kg, which reveals the medium potential of this population as regards milk production. As regards the fat and protein content, the research shows a normal curve during the 6 months of milking that are increasing in each month, until the end of lactation.

As a final conclusion it can be concluded that the values from this research are almost similar to those reported by other authors for the Carpathian breed.

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