

RESEARCH REGARDING MILK POTENTIAL SPECIFIC TO GOATS FROM NEAMȚ AREA

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Abstract

The purpose of the research was to study the milk potential specific to goats reared in north-eastern part of Romania, biological material taken in the study being a nucleus of adult goat growing in area of Neamt County. To properly assess the characters which depends milk potential, on the goats studied was determine the milk production and the main elements of which depend its quality. In order to assess the milk ability has been apply the monthly checks method and milk quality was determined on milk samples obtained after milking. Following the production controls, it was found that in the interval from May to July, the average yield achieved was 62.19% of total milk produced in that lactation. Regarding the main components of milk, were differences between values determined at the beginning and end of lactation. Thus, fat content had an inverse trend compared with the amount of milk, the mean increased from $3.619 \pm 0.118\%$ in May to $5.999 \pm 0.141\%$ in October. Total lactose in milk increased from an average value of $4.039 \pm 0.051\%$ in May, to $4.262 \pm 0.046\%$ in the last month of lactation. The data obtained are important and can be used to improve milk production from local goats.

Key words: goat, milk, quantity, quality

INTRODUCTION

In the past 20 years, a new and growing interest for goat milk and goat milk products occurred worldwide [1]. According to FAO, world production of goat milk has reached 12.5 million tons in 2001, most (95%) being used in households or families (self-consumption), sold locally or used for feeding kids. These systems are generally outside the market economy, but they have an important social role to the poor people in rural areas. Low investment required to maintain them, is an asset and a reason for their development. Goats require financial and industrial investments lower than in cattle, for example. They are probably among the systems responsible for the recent increase in the number of goats in the world [3]. Despite a low level of training of farmers and low productivity of animals, these systems often use very intensive land, is probably the reason why were taken governmental and non-governmental initiatives to support the growth of this species. Overall, goat milk is clearly

positioned on quality dairy products and is addressed to consumers with quite large income [2].

MATERIAL AND METHODS

Biological material taken in research was represented by 150 adult goats belonging to the Carpatina race breeding in the county of Neamt. The research was conducted during lactation in 2009, and lasted from May to October inclusive. The working methods applied in research were adequate to research of this kind. Quantitative control of milk production was performed according to the official methodology adopted in our country and the European Union and was based on the control applied to milking in the evening and the morning of the day fixed for this purpose (Method A4). The amount of milk was determined individually for all animals and was measured using graduated cylinder. In order to obtain information and data as conclusive, were taken from each control one of 48 samples (24 pm and 24 am) which served to determine the main components of

which depend on milk quality, with direct reference to fat, protein and lactose. Determining quality of milk was made by Milko-scan device, belonging OARZ, Iasi. The data obtained were tabulated and statistically processed using Microsoft Excel.

RESULTS OBTAINED

The investigations undertaken, it was found that in terms of quantity and quality goat milk involves a number of peculiarities caused by month, season, age, personality and many other factors. In order to determine the main features of which depend on the quantity and quality of milk were taken in study a total of 150 in lactating goats and structured into five age groups according to generation which belongs. In line with the

objectives set in each month of lactation were sampled, which then were subjected to chemical laboratory determinations. Research has shown that the lactation period considered (from May to October), daily milk production has exceeded 600 ml in May, June and July, following the late lactation to register less than half this value. This show higher milk potential, that it has Carpatina goats in the area, but quite high values of coefficient of variability, indicating a strong heterogeneity of that character (Table 1). The case of this situation is primarily an unsupported selection for milk production and secondly, high variability, is also the result of applying various techniques of feeding and maintenance.

Table1. Dynamics of monthly amount of milk from goats breed in Neamt area (ml)

Month	Milking	$\bar{X} \pm s_{\bar{x}}$	V%	Min.	Max.
May	Morning	616.667 \pm 55.844	44.37	220	1130
	Evening	590.833 \pm 49.035	40.67	200	1060
	Average/day	603.750 \pm 36.807	42.25	200	1130
	Total month (l)	37.43	-	-	-
June	Morning	696.750 \pm 54.328	38.21	340	1260
	Evening	643.333 \pm 46.036	35.06	220	1150
	Average/day	670.042 \pm 35.437	36.65	220	1260
	Total month (l)	40.20	-	-	-
July	Morning	642.083 \pm 48.779	37.23	320	1240
	Evening	615.000 \pm 41.846	33.34	260	1100
	Average/day	628.542 \pm 31.851	35.12	260	1240
	Total month (l)	38.97	-	-	-
August	Morning	497.083 \pm 36.668	36.15	180	920
	Evening	469.167 \pm 38.393	40.10	170	930
	Average/day	483.125 \pm 26.339	37.87	170	930
	Total month (l)	29.95	-	-	-
September	Morning	404.167 \pm 31.793	38.54	160	750
	Evening	392.917 \pm 27.588	34.40	150	700
	Average/day	398.542 \pm 20.848	36.25	150	750
	Total month (l)	23.94	-	-	-
October	Morning	292.083 \pm 23.662	39.70	120	550
	Evening	255.833 \pm 23.198	44.43	100	490
	Average/day	273.958 \pm 16.602	41.00	100	550
	Total month (l)	16.99	-	-	-
Total lactation (May – October)		187.48 liter (dairy goods)			

In the interval the same lactation, quantity of milk analysis shows that the highest production obtained was 696.750 ± 54.328 ml, and was obtained from the morning milking of day control, applied in June, the lowest value

of this character was recorded in October, the evening milking (255.833 ± 23.198 ml). After calculating the monthly production of milk, could be drawn and annual lactation curve, highlighted in Figure 1.

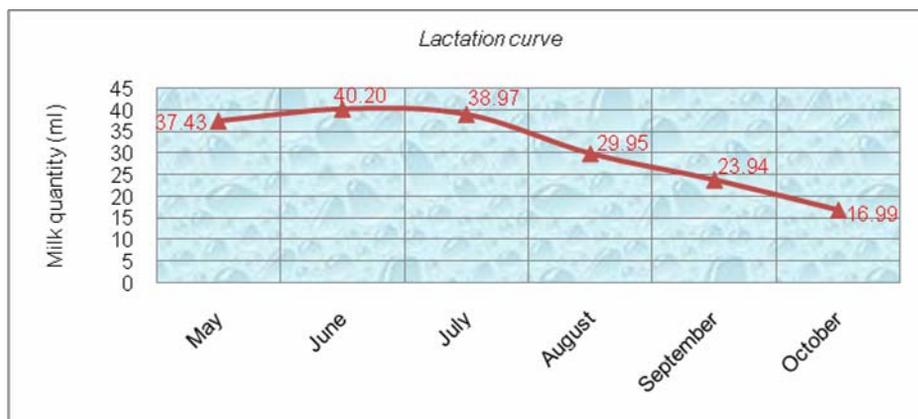


Fig.1. Lactation curve in Carpatina goats bred (l)

Analyzing the lactation curve, it may be noted that the peak was recorded in the months from June to July, followed the normal path, descending towards the end of lactation.

Comparison of total monthly production of milk produced over the interval from May to October, you can see that in May, June and July were obtained 19.96%, 21.44% and 20.79%, which means that together encompassing more than 62% of the total recorded in this period (Fig. 2).

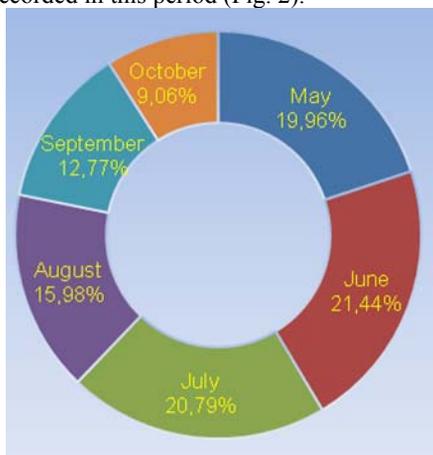


Fig.2. Share of monthly milk production per total range recorded in the Carpatina goats

Goat milk has a high content of albumin and globulin and advanced dispersion of fat cells, which enhances a long digestibility. The chemical composition of milk is an extremely important indicator of quality is directly influencing the quality of products derived from milk processing. Moreover, in countries like France, Italy, Spain and Greece, the selection of goat milk protein content is an extremely important indicator [5]. Laboratory examinations conducted to establish the basic value of milk components, show that while lactose remains the same range of lactates at around 4%, the percentage of protein and fat in milk is upward trend, reaching highest values in October. The research conducted, the chemical composition of milk was determined on samples collected from milk from the day of control. Statistical processing of data obtained show that, in goats farmed in Neamt, milk contains an average of 86.84% water, and 13.16% dry matter respectively. Proportion and monthly variation of the basic components of milk is reproduced in Tables 2, 3 and 4.

Table2. Dynamics of monthly milk fat percentage character (%)

Month	Milking	$\bar{X} \pm s_{\bar{x}}$	V%	Min.	Max.
May	Morning	3.703 ± 0.185	18.01	2.33	4.66
	Evening	3.535 ± 0.151	15.39	2.84	4.24
	Average/day	3.619 ± 0.118	16.63	2.33	4.66
June	Morning	4.072 ± 0.150	13.26	2.98	4.92
	Evening	4.042 ± 0.158	14.15	3.00	4.84
	Average/day	4.057 ± 0.107	13.43	2.98	4.92
July	Morning	4.122 ± 0.132	11.60	3.54	4.96
	Evening	4.079 ± 0.170	15.03	2.96	4.95
	Average/day	4.100 ± 0.106	13.15	2.96	4.96
August	Morning	4.445 ± 0.158	12.85	3.29	5.65
	Evening	4.612 ± 0.167	13.10	2.95	5.64
	Average/day	4.529 ± 0.118	13.34	2.95	5.65
September	Morning	4.688 ± 0.217	16.70	3.48	6.45
	Evening	5.045 ± 0.239	17.09	3.70	6.71
	Average/day	4.867 ± 0.162	16.99	3.48	6.71
October	Morning	5.862 ± 0.200	12.33	4.03	6.91
	Evening	6.135 ± 0.141	11.61	4.63	7.31
	Average/day	5.999 ± 0.141	11.95	4.03	7.31

The data presented in Table 2, it may be noted that fat content had an inverse trend compared with the amount of milk. Thus, during the onset of lactation, when the quantity of milk was higher, fat content have median values of $3.619 \pm 0.118\%$ in May, rising gradually to $5.999 \pm 0.141\%$ in October. As the percentage of fat and protein had an upward trend, confirming the positive

correlation is established between the quantity of milk and the protein which they contain, which is highlighted by other studies in other populations by Pascal in 2006 [6] and Taft in 2004 [7]. In May, when individual average amount was 37.43 liters, milk protein content was $2.997 \pm 0.058\%$, increased to $3.284 \pm 0.057\%$ in August and reached $4.257 \pm 0.086\%$ in October (Table 3).

Table3. Dynamics of monthly milk protein percentage character (%)

Month	Milking	$\bar{X} \pm s_{\bar{x}}$	V%	Min.	Max.
May	Morning	2.932 ± 0.088	10.85	2.39	3.37
	Evening	3.062 ± 0.076	8.92	2.47	3.46
	Average/day	2.997 ± 0.058	9.94	2.39	3.46
June	Morning	3.067 ± 0.099	11.61	2.42	3.47
	Evening	3.172 ± 0.101	11.51	2.48	3.55
	Average/day	3.119 ± 0.070	11.48	2.42	3.55
July	Morning	3.185 ± 0.100	11.30	2.55	3.67
	Evening	3.175 ± 0.063	7.18	2.88	3.65
	Average/day	3.180 ± 0.058	9.28	2.55	3.67
August	Morning	3.297 ± 0.080	8.77	2.81	3.78
	Evening	3.272 ± 0.084	9.29	2.93	3.85
	Average/day	3.284 ± 0.057	8.86	2.81	3.85
September	Morning	3.988 ± 0.147	13.31	3.06	5.23
	Evening	4.063 ± 0.138	12.26	3.22	5.22
	Average/day	4.026 ± 0.099	12.57	3.06	5.23
October	Morning	4.178 ± 0.123	10.60	3.62	5.43
	Evening	4.335 ± 0.122	10.17	3.92	5.32
	Average/day	4.257 ± 0.086	10.34	3.62	5.43

Lactose, or milk sugar, gives the sweet taste of fresh milk milking. Sweetness is almost four times lower than sucrose. It is secreted by the mammary gland and is found in nature only in milk. Research conducted

so far shows that, unlike other ingredients, lactose kept constant evolution, not influenced by the dynamics of milk production (Table 4).

Table 4. Dynamics of monthly milk lactose percentage character (%)

Month	Milking	$\bar{X} \pm s_{\bar{x}}$	V%	Min.	Max.
May	Morning	4.090 ± 0.068	5.97	3.58	4.38
	Evening	3.988 ± 0.076	6.87	3.58	4.41
	Average/day	4.039 ± 0.051	6.41	3.58	4.41
June	Morning	4.168 ± 0.067	5.83	3.65	4.45
	Evening	4.082 ± 0.053	4.68	3.78	4.36
	Average/day	4.125 ± 0.043	5.28	3.65	4.45
July	Morning	4.177 ± 0.058	5.03	3.88	4.59
	Evening	4.090 ± 0.074	6.55	3.69	4.62
	Average/day	4.133 ± 0.047	5.81	3.69	4.62
August	Morning	4.198 ± 0.043	3.68	3.99	4.47
	Evening	4.141 ± 0.051	4.42	3.84	4.53
	Average/day	4.169 ± 0.033	4.03	3.84	4.53
September	Morning	4.255 ± 0.073	6.18	3.87	4.65
	Evening	4.227 ± 0.061	5.18	3.87	4.63
	Average/day	4.241 ± 0.046	5.59	3.87	4.65
October	Morning	4.280 ± 0.065	5.49	3.99	4.68
	Evening	4.244 ± 0.069	5.84	3.89	4.74
	Average/day	4.262 ± 0.046	5.56	3.89	4.74

The data presented in Table 4, we can state that the percentage of lactose in milk analyzed records, however, slightly increasing values towards the end of lactation, with a rate of $4.039 \pm 0.051\%$ in May, so that in October this component to find the a rate of $4.262 \pm 0.046\%$. It also can be observed that the average variability of this character was very small values, like the other two main components of milk (fat and protein), which again shows a relatively high degree of relatedness between individuals of the population taken in the study.

CONCLUSIONS

Following the investigations undertaken major conclusions stemming are:

1. The absence of major concern regarding the work of selection and how different maintenance, goat population studied is characterized by strong heterogeneity in terms of milk potential, with reference to whether the quantity of milk production;

2. Evolution of monthly milk production, show a progressively increased in the months from May to June, stay at a relative plateau in the period from June to July, then decrease gradually until the end of lactation (late October);

3. Following qualitative parameters of milk by the end of lactation has been an increase with different values of the three components of milk (higher in fat and protein), with highs in the last two months of lactation;

4. Following research in the population studied were identified and individuals with high milk production, which makes possible the creation of core selection to improve the character in the future.

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