RESEARCHES REGARDING THE IMPROVEMENT OF MILK PRODUCTION AT THE GOATS OF CARPATHIAN BREED

N. Cutova[1*], Camelia Zoia Zamfir[1], Alina Nicolescu[1], Daniela Jitariu[2], Ana Enciu[1], Maria Stanciu[1], Carmen Ana Pivodă[1]

[1]Institute of Research-Development for Sheep and Goats Breeding Palas-Constanţa, Romania
[2]University Ovidius Constanţa, Romania

Abstract

Due to the raise of interest for goat milk we have been concerned with the increase of milk production from the goats of Carpathian breed (ecotype of Dobrogea) by crosbreeding with Saanen beed and Anglo-Nubian breed. By crossbreeding with milk breeds it was obtained a substantial improvement of the milk production at the obtained half-bred (F1 Saanen x Carpathian and Anglo-Nubian x Carpathian). The milk production and the lactation period increased at the two lots of half-bred, producing a raise of the total quantity of milk, from 235.21± 6.7 liters, in 214 days of lactation, as it was the average production at the effective of goats of Carpathian breed, at a total average milk production of 286.27 ± 5.2 liters, în 229 days of lactation, at F1 half-breds of Saanen x Carpathian and 297.32± 6.2 liters in 231 days of lactation at the half-breds of Anglo-Nubian x Carpathian. The quality indicators of the milk at goats had a trend of raise to the end of the lactation period at all lots, the average values on the whole lactation period of the main components of the milk, fat and protein at the half-bred goat were bigger comparatively to those from Carpathian breed, with 8.49% at fat and 8.72% at protein at F1goats of Saanen x Carpathian and 6.79% at fat and 6.97% at protein at the F1 goats of Anglo-Nubian x Carpathian.

Key words: Carpathian breed, milk production, milk quality

INTRODUCTION

Europe is the geographical area that presents a special interest in goats breeding, especially for the milk production, being the May n consumer of dairy products of goat milk or mixture with cow or sheep milk [3,8].

The increasing requirements on the world market for dairy products prepared from goat milk impose the rapid reorganizing of Romania, to become competitive regarding the quality of such products and to raise their quantity.

The main purpose of breeding goats is their exploitation for the milk production, of course in a small measure, but with trends of increasing also for the meat production, by valorisation of kids. Due to the very beneficial pedo-climatic conditions from Romania, the goats breeding can be extended in all pedo-climatic areas.

The improvement of goats should take into account their genotype diversity, under the aspect of all features, but especially upon the production of milk and kids.

The improvement of the Carpathian breed is very important for the goat breeders, because if they obtain bigger productions they cover the maintenance and foddering expenses, helping them to obtain a bigger profit on the whole exploitation, assuring them a decent living and the opportunity to develop.

To increase the genetic value of the goats population of Carpathian breed it was made both mass selection from flocks and also a selection based on productive own performances of the ascendants and descendants, and also by crossbreeding of the local goats with imported improved breeds [3,8]. In this paper we aimed the improvement of the goats from the Carpathian breeds, ecotype of Dobrogea with Saanen and Anglo-Nubian breeds

*Corresponding author: icdoc@canals.ro
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MATERIAL AND METHOD

The researches were done at ICDCOC Palas on an effective of goats din Carpathian breed, ecotype of Dobrogea and half-bred of F1 Saanen x Carpathian and Anglo-Nubian x Carpathian. The animals were individually observed and data were registered regarding: control of milk production and qualitative determinations of the milk. The control of the milk production was done on the basis of the Romanian method (*Nica-Dermengi),* which is based on the proportion between the daily milk production and the quantity from a single milking from the same day and it can be applied to the whole duration of lactation, monthly or every two months, starting from the first week from dropping (after colostrum period, if the kids are developed sufficiently, to be able to survive to be separated from their mothers (10 -12 hours).

The maintenance of the goats was done in the stable for 150-160 days and 205-215 days in the pasture. Foddering during stable period was made with ratios made on basis of fibrous fodders: 32.5% hay, 32.5% gross fodders, warehouse 20% and 15% corn cobs. The goats grazed on the land parcels seeded with a mixture of 70-75% grain plants and 25-30% perennial leguminous, with high degree of consuming, of 94.12%, administering also, in this period, a mixture of 0.5-0.7 kg, consisting in chopped and concentrated hays [6, 8].

For the qualitative determinations of milk there were used: Gerber method for the fat percentage; Kjeldahl method for the protein percentage; thermosetting method for the percentage of dry substance.

To calculate and systematise the data, usual statistic methods were used.

RESULTS AND DISCUSSIONS

Aiming the increase of milk production at the goats of Carpathian breed it was done the crossbreeding with improved breeds, Saanen breed and Anglo-Nubian breed. By crossbreeding it was reached the improvement of the productive performances of the obtained products, associating the quality of two breeds, having the benefit of the effect of complementarity and the effect of heterosis.

At the lot of goats from the Carpathian breed and at the F1 half-bred of Saanen x Carpathian and Anglo-Nubian x Carpathian during the last two months of gestation, in the stable period it was assured a ratio of 1.70% SU, 1.63 UNL, 135 g PDIN, 148 PDIE, making a consumption of 0.95UNL/kg SU, 79.41g PDIN/kg SU and de 87.05 g PDIE/kg SU, and during grazing period a ratio of 1.49% SU, 1.45 UNL, 123 g PDIN, 135 PDIE, making a consumption of 0.97 UNL/kg SU, 82.55g PDIN/kg SU and of 90.60 g PDIE/kg SU.

At the goats of Carpathian breed during the first months of lactation, during the stable it was given a ratio with a nutritive content of 2.59 SU, 1.92 UNL; 169 g PDIN, 192 g PDIE, making a consumption of 0.74UNL/kg SU, 65.25g PDIN/kg SU and of 74.13 g PDIE/kg SU. During the grazing period it was given a ratio with nutritive content of 2.32 SU, 1.98 UNL; 247 g PDIN, 206g PDIE, making a consumption of 0.85UNL/kg SU, 106.46 g PDIN/kg SU and of 88.79 g PDIE/kg SU.

It was determined the total average milk production at goats by the twice a month control, after the method Nica-Dermengi (table 1). It was also determined the average production of milked milk and the duration of lactation.

At the goats of Carpathian breed the total milk production was of 235.21±6.7 litres, with an average production of milked milk of 174.15±3.8 litres, in a lactation which lasted for 214 days; at the F1 goats of Saanen x Carpathian the total production of milk was of 286.27±5.2 litres, with an average production of milked milk of 190.96±3.2 litres, in a lactation which lasted for 229 days. The total milk production at the goats of F1 Saanen x Carpathian was bigger with 22% comparatively to the production from the goats of Carpathian breed. At the goats of F1 Anglo-Nubian x Carpathian the total production was of 297.32±6.2 liters, with an average production of milked milk of 192.8 ± 4.5 liters, in a lactation which lasted for 231 days. The total milk production at the goats of F1Anglo-Nubian x Carpathian was bigger with 26% comparatively to the production from the goats of Carpathian breed.

Table 1 Milk production at the goats of Carpathian breed and at F1 half-bred (females at the 2nd lactation)

Breed of goats	n	Average production of total milk (litres/head)			Average production of milked milk (litres/head)			Period de lactation in days
		X	± s_x	V%	X	± s_x	V%	
Carpathian *(ecotype of Dobrogea)*	25	235.21	±6.7	14.24	174.15	±3.8	10.91	214
F1 Saanen x Carpathian	25	286.27	±5.2	9.08	190.96	±3.2	8.37	229
F1 Anglo-Nubian x Carpathian	16	297.32	±6.2	8.34	192.8	±4.5	11.67	231

There were determined the monthly values of the milk production, on the whole period of lactation (table 2). At the goats of Carpathian breed it is noted an increase of the milk production, since April until May, when the highest production of milk was obtained, 41.17±1.3 litres/month, being kept at similar values also in June, 40.81±2.1 litres/month, an then in July it started to decrease gradually, reaching 13.65±0.7 litres/month in October.

At the goats of F1 Saanen x Carpathian it is noted an increase of the milk production, since April until May, when the highest production of milk was obtained, 43.57±1.2 litres/month, being kept at similar values also in June, 43.01±1.1 litres/month in July, 42.61±1.5 litres/month, and then since August it started to decrease gradually, reaching 26.67±0.8 litres/month in October and 19.21±0.7 litres/month in, in only 18 days from this month. At the goats of F1 Anglo-Nubian x Carpathian it is noted an increase of the milk production, since April until May, when the highest production of milk was obtained, 46.57±1.3 litres/month, being kept at similar values also in June, 46.01±0.9 litres/month and July, 45.21±1.5 litres/month, and then since August it started to decrease gradually, reaching 25.32±0.9 litres/month in October and 23.59±0.8 litres/month in November, in only 20 days of lactation in this month.

Table 2 Monthly values of the milk production during lactation

Months	Carpathian *(ecotype of Dobrogea)*			*F1 Saanen x Carpathian*			*F1 Anglo-Nubian x Carpathian*		
	n	Quantity of milk Calculated in the basis of twice-a-month controls (litres)	Days	n	Quantity of milk Calculated in the basis of twice-a-month controls (litres)	Days	n	Quantity of milk Calculated in the basis of twice-a-month controls (litres)	Days
April	25	37.58±1.1 14.63	30	25	36.95±1.1 14.88	27	16	38.37±1.2 12.51	27
May	25	41.17±1.3 15.78	31	25	43.57±1.2 13.67	31	16	46.57±1.3 11.16	31
June	25	40.81±2.1 25.72	30	25	43.01±1.1 12.78	30	16	46.01±0.9 7.82	30
July	25	39.33±1.9 24.15	31	25	42.61±1.5 17.60	31	16	45.21±1.5 13.27	31
August	25	35.52±1.7 23.93	31	25	38.39±1.1 14.32	31	16	37.39±1.1 11.76	31
September	25	27.15±1.4 25.76	30	25	35.86±0.9 12.54	30	16	34.86±1.1 12.62	30
October	25	13.65±0.7 25.64	31	25	26.67±0.8 14.99	31	16	25.32±0.9 14.21	31
November		-	-	25	19.21±0.7 18.21	18	16	23.59±0.8 13.56	20
Total	25	235.21±6.7 14.24	214	25	286.27±5.2 9.08	229	16	297.32±6.2 8.34	231

It was made the laboratory analysis in order to establish the values of the components of milk. The chemical composition of the milk is a very important quality because it influences directly the quality of processed products from milk [1, 4, 5]. In many countries, in selection of goats, the content in proteins from milk is a very important factor.

It was made the appreciation of the milk quality (milk samples were taken once a month at the second monthly control, on the 25th day of the month, since April until October). In tables 3, 4 and 5 the results of the analysis of chemical composition are presented.

Table 3 Chemical composition of the goat milk from the goats of Carpathian breeds

Month of lactation	n	Dry Substance (%)		Fat (%)		Protein (%)	
		X ± s_x	V%	X ± s_x	V%	X ± s_x	V%
April	15	13.25 ± 0.35	10.23	3.43 ± 0.21	23.71	3.41 ± 0.22	24.98
May	15	13.24 ± 0.12	3.51	3.23 ± 0.45	53.96	3.22 ± 0.23	27.66
June	15	13.17 ± 0.13	3.73	3.17 ± 0.33	40.32	3.28 ± 0.19	22.43
July	15	13.22 ± 0.22	6.29	3.55 ±0.71	77.45	3.43 ± 0.21	23.71
August	15	13.29 ± 0.41	11.67	3.65 ± 0.93	41.38	3.49 ± 0.19	21.08
September	15	13.35 ± 0.37	10.73	3.73 ± 0.38	39.46	3.55 ± 0.21	22.91
October	15	13.38 ± 0.42	12.16	3.92 ± 0.23	22.72	3.67 ± 0.22	23.32
Average	15	13.27 ± 0.29	8.46	3.53 ± 0.46	50.47	3.44 ± 0.18	20.26

At the goats of Carpathian breed it is noted a variation of the chemical composition of the goat milk, in close enough limits. In April, SU was of 13.25±0.35%, fat of 3.43±0.21%, protein of 3.41±0.22%. During the next months, in May and June it was a fair decrease of the value of SU, of the percent of fat and protein, and then these values increased progressively, and in October they were of 13.38±0.42% at SU, 3.92±0.23% at fat and 3.67±0.22% at protein. There were also calculated the average values of the main components of milk on the whole period of lactation. So, the fat was of 3.53±0.46% and the protein of 3.44±0.18%, at an average value of the dry substance of 13.27±0.29%.

Table 4 Chemical composition of the goat milk from the half-bred goats of F1 Saanen x Carpathian

Month of lactation	n	Dry Substance (%)		Fat (%)		Protein (%)	
		X ± s_x	V%	X ± s_x	V%	X ± s_x	V%
April	15	13.62 ± 0.53	15.07	3.62 ± 0.12	12.84	3.72 ±0.12	12.49
May	15	13.27 ± 0.82	23.93	3. 57 ± 0.21	22.78	3.55 ± 0.21	22.91
June	15	13.29 ± 0.41	11.67	3.68 ± 0.17	17.89	3.28 ± 0.19	22.43
July	15	13.32 ± 0.63	18.32	3.86 ± 0.37	37.12	3.65 ± 0.25	26.52
August	15	13.62 ± 0.53	15.07	3.92 ± 0.23	22.77	3.85 ± 0.47	47.28
September	15	14.02 ± 0.35	9.67	4.02 ± 0.24	23.12	3.97 ± 0.23	22.48
October	15	14.12 ± 0.47	12.89	4.17 ± 0.35	32.51	4.16 ± 0.28	26.07
Average	15	13.61 ± 0.53	15.08	3.83 ± 0.24	24.27	3.74 ± 0.21	21.74

At the goats of F1 Saanen x Carpathian it is noted a variation of the chemical composition of the goat milk, in close enough limits, but higher values comparatively to those determined at the Carpathian breed. In April, SU was of 13.62±0.53%, fat of 3.62±0.12%, protein of 3.72±0.12 %. During the next months, in May and June it was a fair decrease of the value of SU, of the percent of fat and protein, and then these values increased progressively, and in October they were of 14.12±0.47 % at SU, 4.17±0.35% at fat and 4.16±0.28% at protein. There were also calculated the average values of the main components of milk on the whole period of lactation. So, the fat was of 3.83±0.24%, protein of 3.74±0.21%, at an average value of the dry substance of 13.61±0.53%.

Table 5 Chemical composition of the goat milk from the half-bred goats of F1 Anglo-Nubian x Carpathian

Month of lactation	n	Dry Substance (%)		Fat (%)		Protein (%)	
		X ± s_x	V%	X ± s_x	V%	X ± s_x	V%
April	15	13.45 ± 0.31	8.93	3.57 ± 0.35	37.97	3.62 ±0.12	12.84
May	15	13.12 ± 0.22	6.49	3.43 ± 0.21	23.71	3.43 ± 0.14	12.55
June	15	13.38 ± 0.35	10.13	3.62 ± 0.12	12.84	3.55 ± 0.31	22.91
July	15	13.61 ± 0.27	7.68	3.72 ± 0.12	12.46	3.65 ± 0.29	30.77
August	15	13.93 ± 0.14	3.89	3.92 ± 0.23	22.77	3.67 ± 0.22	23.22
September	15	14.01 ± 0.19	5.25	4.02 ± 0.24	23.12	3.85 ± 0.21	21.13
October	15	14.07 ± 0.16	4.41	4.14 ±0.19	17.77	4.02 ±0.24	23.12
Average	15	13.65 ± 0.23	6.53	3.77 ±0.21	21. 57	3.68 ± 0.22	23.15

At the goats of F1 Anglo-Nubian x Carpathian it is noted a variation of the chemical composition of the goat milk, in close enough limits, but higher values comparatively to those determined at the Carpathian breed. In April, 13.45±0.31 %, fat of 3.57±0.35% and protein of 3.62±0.12%. During the next months, in May and June it was a fair decrease of the value of SU, of the percent of fat and protein, and then these values increased progressively, and in October they were of 14.07±0.16 % at SU, 4.14±0.19% at fat and 4.02±0.24% at protein. There were also calculated the average values of the main components of milk on the whole period of lactation. So, the fat was of 3.77±0.21% and the protein of 3.68±0.22%, at an average value of the dry substance of 13.65±0.23%.

The average values on the whole period of lactation of the main milk components, the fat and the protein at the half-bred goats were higher comparatively to those from the Carpathian breed, with 8.49% at fat and 8.72% at protein at the goats of F1 Saanen x Carpathian and 6.79% at fat and 6.97% at protein at the goats of F1 Anglo-Nubian x Carpathian.

CONCLUSIONS

1. It was made the crossbreeding of Carpathian breed with specialized breeds, Saanen breed and Anglo-Nubian breed, aiming the improvement of the productive performances of the obtained products.

2. The milk production and the period of lactation increased at the two lots of half-bred, producing a raise of the total quantity of milk, from 235.21±6.7 liters, in 214 days of lactation, as it was the average production at the effective of goats of Carpathian breed, lat a total average milk production of 286.27±5.2 liters, in 229 days of lactation, at the half-bred of F1 Saanen x Carpathian and 297.32±6.2 liters in 231 days of lactation at the half-bred of Anglo-Nubian x Carpathian.

3. The total milk production at the goats of F1 Saanen x Carpathian was bigger with 22% comparatively to the production of goats of Carpathian breed, and at the goats of F1 Anglo-Nubian x Carpathian was bigger with 26% comparatively to the production of goats from Carpathian breed.

4. There were determined the main chemical components of the milk, protein, fat and the content in dry substance at the milk of the goats from all lots and it was noted a trend of raising to the end of the lactation period.

5. The average values on the whole period of lactation of the main components of milk, fat and protein at the half-bred goats were bigger comparatively to those from Carpathian breed, with 8.49% at fat and 8.72% at protein at the goats of F1 Saanen x Carpathian and 6.79% at the fat 6.97% at protein at the goats F1Anglo-Nubian x Carpathian.

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