

## EVALUATION OF LACTOGEN POTENTIAL CHARACTERISTIC TO GOATS MAINTAINED IN DIFFERENT TECHNOLOGICAL SYSTEMS

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### Abstract

The main objectives of the research were represented by evaluating the influence factors in expressing the lactogen potential of goats from the Carpatina breed in Romania. In this regard were formed two groups of goats with similar characteristics in terms of the number of lactation, season of calving, age. Two lots were established that have benefited from the same nutritional requirements but one was maintained permanently in stabulation and the other was maintained on pasture. In order to assess production potential were planned control actions placed at 50, 100, 150, 200 and 225 days from the time of parturition. The method used to determine the quantity of milk milking each day of control, was based on the recommendations made by the International Committee for Animal Recording, method AT4 and for weighing was used an instrument with an accuracy of  $\pm 5$  g. The estimation of the average total production of milk was carried out using the method described by Fleischmann and the testing differences was done using Tukey Test. The obtained results show that in the case of the batch maintained permanent indoors the milk production was higher with 12.32% and on the interval of the first 150 days of lactation produce over 70% of the average quantity of lactation. On the basis of the results obtained it is concluded that stabulation maintenance positively influences performance levels.

**Key words:** Carpatina goat, goat milk, yield milk

### INTRODUCTION

Goats represent in this moment the species that developed most in Romania. In accordance with the total number of goats, Romania is expected to lie at the end of 2014, fourth among European States, after Greece, Spain and Russia. Regarding the evolution of the total effective of goats, it had a sinuous evolution from 460 thousand in 2003 [3] at 1313 thousands by the end of 2014 (FAOSTAT, 2016). According to the same sources, at the top at the European countries producing goat's milk is located, to the year 2013, France with over 581 thousand tonnes, followed by Spain, with 472 thousand tonnes and of Greece, with over 340 thousand tons. So, though it had the fourth place after the overall population, Romania no longer lies

on to the top of the ranking when we look at the total quantity of milk produced. This might be due to the fact that mostly the herds of goats belong at the rate of over 74% to a population mostly semi-tardive, namely the Carpatina breed [7]. Based on this situation and trends showing a development in the goat sector and in the coming period in Romania shall be initiated, financed and supported financially and materially some activities which have as their main objective the identification of ways to improve the herds of goats.

### MATERIAL AND METHODS

Biological material belonged to the local breed Carpatina situated in the growth and exploitation at the Research and Development Station in Sheep and Goats Husbandry in Secuieni-Bacau. To evaluate the expression of lactogen potential and to identify some of the peculiarities of the lactation curve due to technological factors

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the goats included in the experimental protocol were divided into two batches. The difference between experimental treatments applied to the studied batches was represented by technological peculiarities applied during the same lactation. So, a batch has been maintained throughout the entire lactation in stabulation and the second batch was maintained on pasture in the intervening period. Each of the two groups was made up of 25 adult lactating female.

Performance evaluation for milk production was based on the application of successive productive controls placed at 50, 100, 150, 200 and 225 days of the onset of

lactation. At each control interval the used method was AT4 respecting the technical specifications specified by the International Committee for Animal Recording and described by Tangorra et al., in 2008 [10].

For the first control, because the goats were in lactation, they were separated from their kids from the previous evening. Then, at each milking, the milk control applied was determined by weighing using instrumentation with an accuracy of  $\pm 5$  g, and estimating the total average production of milk was carried out using the method described by Fleischmann.

$$\text{Milk yield [kg]} = L_1 \cdot \text{int}_1 + \sum_{i=2}^n \left( \frac{L_i + L_{i-1}}{2} \cdot \text{int}_i \right) + L_n \cdot 14$$

where:

$L_1$  = milk yield of the 1<sup>st</sup> monthly test;

$L_i$  = milk yield of the  $i^{\text{th}}$  monthly test ( $i = 1, \dots, n$ );

$L_n$  = milk yield of the last test;

$\text{int}_1$  = number of days from kidding to 1<sup>st</sup> monthly test;

$\text{int}_i$  = number of days between monthly tests ( $i-1$ ) and  $i$  ( $i = 1, \dots, n$ );

$n$  = total number of monthly test for a specific animal.

The data obtained were statistically processed and evaluated using the algorithm of REML (REstricted Maximum Likelihood), which allows the analysis of statistical parameters in normal range.

## RESULTS AND DISCUSSION

The research had as main objective the analysis of the influence of technological factors in the expression of the lactogen potential of local goats which are bred and exploited in the specific conditions of the central basin located in the North-East of Romania. Necessity of conducting such research activities have as technical support continued development of the sector represented by breeding goat and the interest of breeders towards the Carpatina breed which compared to other breeds of import supports very well the conditions of the area where the research was held. In addition, research is necessary and due to increasing requirements and consumer interest in relation to specific goat productions, in particular in relation to the milk.

The conditions under which were selected the goats included in the two experimental batches were referred at:

- belonging to the Carpatina breed;
- to be minimum at the second lactation and maximum at the fourth lactation;
- between the time of the parturition from the same season, the differences must be under five days;
- nutritional requirements were assured at the same level.

Option for inclusion in the two batches only the goats which were at the second, third and respectively fourth lactation was to eliminate the influence of age as a factor of influence on the production of goat milk. The role of this factor was analysed and presented in many publications [1]. Age influences the productive capacity for the purposes of reducing milk production as the goats are more than 4-5 years. Also, the milk from younger goats has a better quality because it has a higher fat content compared to the harvested milk from goats with an older aged [4, 5, 9].

After fulfilling these requirements, the goats were maintained, with their kids, in appropriate spaces until the onset of the period of grazing. On the interval from calving and time of grazing both batches have benefited from the same conditions of maintenance and feeding. Then the lot maintained in stabulation was fed with a mixture composed of unique green mass, fibrous and concentrate. Batch 2 was removed from pasture and received an additional quantity of 300 g of concentrated grown/head/day to have assured the same nutritional requirements.

**Evaluation of milk production** was done at moments determined by experimental protocol. The first control was placed at the 50-day fulfilment from calving. To avoid the influence of kids on the lactogen secretion in

the evening leading up to the control they were separated and the control milking was planned in the morning. For the other planned controls because the kids were weaned this treatment was no longer necessary.

In table 1 is a summary of the data obtained from the tests carried out. From analysis it becomes apparent the differences between batches in relation to the time when is recorded the highest level of milk secretion. Thus, at the batch L1 which was maintained in permanent stabulation it is observed that for the first two control intervals the average milk production was relatively equal, with just a small differences of 1.12 kg for the third interval. This difference was insignificant for the statistical thresholds taken into consideration.

Table 1 Dynamic of milk production on control intervals

Control interval	L 1 (stabulation)		L 2 (pasture)			
	$\bar{X} \pm s_{\bar{X}}$	% from total	$\bar{X} \pm s_{\bar{X}}$	% from total		
Control at 50 days of lactation	40.12 ± 1.47	21.13	43.16 ± 1.74	25.93		
Control at 100 days of lactation	46.01 ± 1.24	24.23	42.08 ± 0.87	25.30		
Control at 150 days of lactation	47.13 ± 1.05	24.82	30.15 ± 1.38	18.12		
Control at 200 days of lactation	30.08 ± 0.98	15.85	28.16 ± 1.05	16.92		
Control at 225 days of lactation	26.55 ± 0.77	13.97	22.85 ± 1.21	13.73		
<b>Total</b>	189.89	100.0	166.40	100.0		
<b>Differences and the significance of differences between batches</b>						
Tukey Test		L 2				
		C5	C4	C3	C2	C1
L 1	C1	17.27*	11.96*	9.97*	1.96 <sup>n.s</sup>	
	C2	23.16*	17.85*	15.86*		
	C3	24.28*	18.97*			
	C4	7.23*				
	C5					
*Significant at the 0.05 level (w = 3.574);						
**Significant at the 0.01 level (w = 2.740);						
<sup>n.s.</sup> : not significant						

Between the two batches significant differences are found for the statistical threshold of 5%, except for the difference between the recorded average yield determined at the second interval for L1 and the one from the first interval for L2 which was not significant.

Interesting is also the analysis of total production of milk produced during the whole controlled lactation. Thus, although the criteria imposed on the choice of females was considered limiting the influence of such

factors as age, season of lactation, the number of lactation, the time of parturition and the provided nutritional requirements per head/day, processing of data obtained from productive controls applied indicates that the lot maintained in loose housing had a higher average total production with 23.49 kg milk, respectively 12.37% compared to the performance level recorded by the batch that was maintained on pasture.

On the basis of data obtained from the five productive controls was realised the lactation

curve for the two batches of goats (fig. 1). The analysis of figure highlights differences between the two groups relating to when it reaches the maximum amplitude and maintenance duration at the same level of average production of milk.

In the case of assessments made for the batch maintained in stabulation (L1) it is

observed that the maximum peak is reached at the third control interval and represents a continuation of the curve described and at the previous checks. Basically, based on estimates made, it can be said that on the interval of the first 150 days of the onset of lactation is obtained about 70% of the total quantity of milk produced in this lactation.

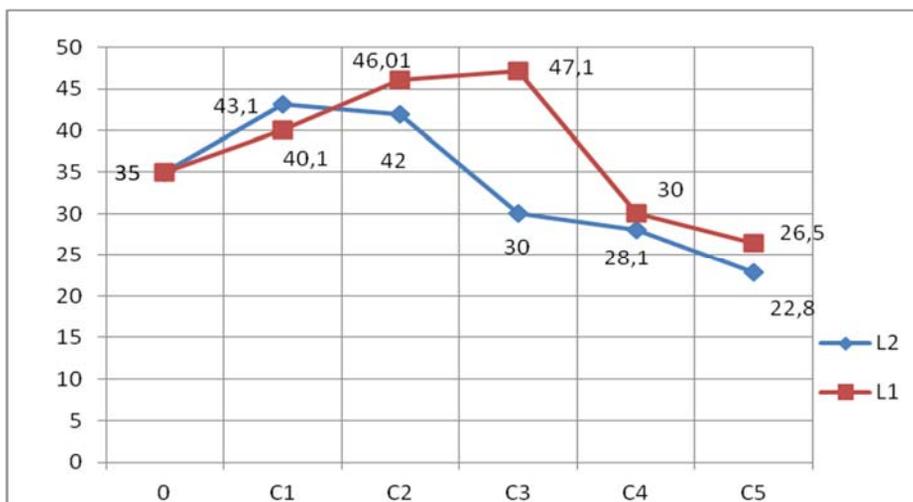


Fig. 1 Lactation curve for the two batches

At the batch maintained on pasture it is found that the maximum amplitude of the curve of lactation is achieved after a period of 50 days after calving, after which remains in the phase of the plateau on the interval of the following 50 days, the decrease being more evident in the last part. Compared to L1 at L2 on the ascending phase and the plateau of the curve is obtained only about 69% of the average total production.

Starting from this finding it may indicate that at goats in the first 150 days of lactation is obtained about 70% of the total quantity of a specific lactation. Also another important aspect relates to the fact that although in the speciality literature from our country most of the authors [2, 8, 11] indicate, for the Carpatina breed, average milk yields of less than 150 kg. The data obtained indicate the values close to 200 kg of milk in the variant maintenance of stabulation. Also, through the results obtained is confirmed that by optimizing some influence factors it exerts a

positive action on the level of the total average production of milk from goats.

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#### CONCLUSIONS

1. At the batch L1 which was maintained permanently in loose housing is found that in the first two periods of control is obtained an average production of milk higher with only 1.12 kg, a difference that has not had any statistical significance.

2. Between the level of output obtained from the other control intervals are found significant differences for the statistical threshold of 5%.

2.1. Except for the difference between the recorded average yields determined at the second control interval for L1 and the one

from the first interval for L2 which was not significant.

3. The batch maintained in loose housing had a higher average total production with 23.49 kg of milk respectively 12.37%, compared to the performance level recorded by the batch that has been maintained on pasture.

4. On the basis of made determinations it can be said that at both batches, on the interval of the first 150 days of the onset of lactation was obtained about 70% of the total quantity of milk in this lactation.

5. At the batch maintained on pasture it is found that the maximum amplitude of the curve of lactation is achieved after a period of 50 days after calving, after which remains in the phase of the plateau on the interval of the following 50 days, the decrease being more evident in the last part

6. For the batch maintained on the pasture, on the ascending phase and the plateau of the curve is obtained only about 69% of the average total production.

7. In the case of stabulation maintenance, by the fact that the goats benefit from optimal conditions and make a small effort to move, milk productions are higher with over 10% in relation to the maintenance technology based on pasture maintenance.

## REFERENCES

[1]. Alderson, P., Pollak, E.J., 1980, Age - season adjustment factors for milk and fat of dairy goats. *J. Dairy Sci.* Vol. 63: pp. 148 – 151.  
 [2]. Călin I., Răducuță I., Dărăban S., Vlad I., Priseceanu H.I., Pascal C., Pădeanu I. 2015, Research on Quantitative Skills in Meat Production Direction at Youth Goats from Carpathian Breed in Relation with the Rearing System, *Agriculture and Agricultural Science Procedia*, Volume 6, 2015,

Pages 191–196, Conference Agriculture for Life, Life for Agriculture, ISSN: 2210-7843 doi:10.1016/j.aaspro.2015.08.058

[3]. Dubeuf J.P., Zamfirescu S., 2003, Pastoralisme et production laitière et fromagère ovine et caprine en Roumanie. *Tintenna*, 28, p 7-8.

[4]. Gall, C., 1996, *Goat Breeds of the World*. Technical Centre for Agricultural and Rural Cooperation, Wageningen, The Netherlands, 186 pp.

[5]. Pascal C., 2012, The main diseases of sheep and goats, specific to the cold season. International congress of Hungarian Association for Buiatrics, ISBN978-963-87942-5-3. Budapest-Hungary, p 188-198

[6]. Pascal C., 2014, Researches on milk production level characteristic to half breed goat obtained by crossbreeding of Saanen bucks with Carpatina breed femals. Proceeding p 102-108, European regional conference on goats Debrecen-Oradea.

[7]. Pascal C., Nechifor I., Costica C. 2015b, The use of methods and technologies to improve the performances of reproduction and production in goats. *Magyar Allatorvosok Lapja*, ISSN 0025-004X. Vol. 137, p 383-391

[8]. Pascal C., 2015b, Treaty of breeding sheep and goats, Editura Ion Ionescu de la Brad Iași. ISBN 978-973-147-196-9

[9]. Pearl, S.L., Downey, H.F., Lepper, T.L., 1973, Intramammary pressure and mammary blood flow in lactating goats. *J. Dairy Science*. Vol. 56: pp. 1319 – 1323.

[10]. Tangorra F.M., Zaninelli M., Bruni G., Zanatta G., Mercandino L., 2008, Comparison among actual and estimated milk yields in dairy goats. International Conference: September 15-17, 2008 Ragusa - Italy “Innovation Technology to Empower Safety, Health and Welfare in Agriculture and Agro-food Systems”

[11]. Taftă, V., Machidon, N., 2006, Comparative researches regarding the fattening of goats and sheep youth in industrial system. Proceeding of the International Symposium „Goat Farming in Central and Eastern European Countries: Present and Future”. Constanța, Romania.