

RESEARCH ON BREASTFEEDING ABILITY OF MERINOS DE PALAS SHEEP - PERIENI ECOTYPE

C. Pascal^{1,2*}, L. Stancescu³

¹University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

²Agricultural Station of Research and Development for Sheep and Goat Growing Secuieni-Bacău, Romania

³Research and Development Centre for Soil Erosion Control, Perieni – Bârlad, Romania

Abstract

The Research works carried out had as main objective the ability lactogene and the influence the development of suckling lambs assets are breast-feeding. The biological material studied belongs to the breed Merinos of Palas - ecotype of Perieni reared in the Research and Development Center for Soil Erosion Control, Perieni - Barlad. Working methods used were those specific to this kind of determinations, and the results were statistically processed and centralized procedure using REML (restricted maximum likelihood - plausibility of the restricted maximum) which guarantee the achievement of expected in the normal parameters. In order to evaluate the real lactogen capacity specific to the examined population, the nucleus of sheep reproduction was grouped depending on their livestock generation. Regarding birth weight lambs, the research carried out show the fact that the sheep on the sixth season of calving (generation 2001) produce the heavier lambs (4.915 ± 0.110 kg), and the most easily accessed by primipare. Weight difference between these two lots were separately significant for $p > 1\%$.

As in the first part of the evolution of life increase the growth of lambs is based almost exclusively on consumption and breast milk intake, the mean specific growth of the total and daily average was determined by two distinct periods: birth - 20 days respectively for the 28 days and 85 days.

In the first period examined (0-28 days) growth average absolute growth of lambs was 5.954 ± 0.181 kg, the average values over the population is made of sheep lambs produced at the first, fifth and sixth calving. This shows that after calving, the dynamic weight is more related to the production of individual milk than milk production feature race.

In the second analysed interval (28 – 85 days) statistical average absolute increase of growth recorded for the whole population is at 11.116 kg. Compared to this value, lambs produced from ewes mothers who belonged to generations in 2009, achieved a total average growth increase of 10.77% lower. Average daily growth analysis performed for the same period of time for each lot and for the total population, confirming the very good rate of growth, which has the ecotype Perieni of the breed Merinos of Palas.

Based on surveys and estimates made, it was found that the average milk yield achieved at the population of sheep taken in study is in the first 85 days of 74.234 l. The good level of average milk production confirms a very good lactogen capacity specific to the Perieni sheep ecotype, and as a result of this, lambs have enough milk to grow during the period of lactation. On the basis of obtaining good yields of milk, the sheep belonging to all generations analyzed, is the state of maintenance and the optimal diet, provided a constant throughout the year.

In the first part, the coefficient of correlation between the amount of milk consumed and the rate of growth of lambs values are higher, r_p : 0.84 for the 0-15 days and r_p respectively: 0.79 for the 16-28 days. During the second lactation, the connection between the quantity of milk and the growth increase of lambs drops to r_p : 0.46 for the 43-55 days and r_p : 0.24 for the lactation period between 71 and 85 days.

Key words: Merinos of Palas, nursing capacity, lambs, milk sheep

INTRODUCTION

It is know en the fact that in any region on the globe sheep from fine wool

morphoproductive type are raised with priority for their uniform wool. In the actual condition, in Romania, a distinct role of importance in the exploitation of these species is occured and in the milk production. A great importance is given to this production, when is more than ever the

*Corresponding author: pascalc61@yahoo.com

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question of economic efficiency in the operation of sheep, derived from milk beneficial influence on future production of meat and the quantity of milk used in the form of various types of cheese.

In thèses conditions, is necessary to intensify the actions that must be granted to increase the capacity of the main lactogen types and breeds of sheep in Romania and the including of the major aspects that stand at the base of showing the milk production in the grupe of the main improvement objectives even at the sheep with fine wool. This option is justified by the fact that in Romania approximately 40% of the total number of breeds are of uniform wool.

The present paper has had as a main objective the knowledge and the showing of the lactogen ability of sheep with uniform wool in growth and operating in the north-east of Romania. The main researched sheep are those from the Merinos of Palas breed – ecotype of Perieni, raised in the conditions of the Research and Development Centre for Soil Erosion Control, Perieni - Barlad.

MATERIAL AND METHOD

The carried out researches have been made on the core stock of sheep existing in the sheep sector of the specified unit. The biological material taken in the study was the sheep that forms the core of the breeding and descendants of both sexes, obtained in the bringing forth season in December 2006 - February 2007.

The mount activity took place in the season July-August 2006, the animals being kept in a good state of maintenance during the period of gestation and suckling lambs. The number of lambs obtained was divided into lots, according to the generation livestock sheep moms. The determination of the suckling lambs' body weight was done by weighing them at birth, at 28 days, and at the age of 85 days, the time of weaning. The data obtained served to increase appreciation of the dynamics of lambs in that period, being determined the average values of absolute growth, and the average daily growth for the birth-weaning period, and the amount of milk consumed by lambs.

To determine the lactogen capacity of sheep mothers, it was used the indirect method of control based on analysis of the evolution of growth in weight of lambs during the period of

lactation. For the 28 days birth interval, because the influence of the mother's milk is more predominant, the value of the correction coefficient which has been used in assessing the lactogen capacity was 5 and was reduced to 4 for the growth of lambs at 28 days - weaning. These values (5 and 4 respectively) are widely accepted at international level in making this kind of determination (Ricordi-Boccard quoted by Taftă V, 1997), and represent the average quantity of milk, expressed in kg, necessary to achieve a growth of the youth sheep found in suckling.

The achieved result has been input into a data base, used to run statistical analyses with REML algorithm (REstricted Maximum Likelihood), which provides the achievements of the statistical estimators within the normal parametric range.

RESULTS AND DISCUSSIONS

1. The dynamic of lambs' weight during the lactation period was a primary objective of this research, being appreciated by the average weight at birth, at 28 days and at weaning. The weight at birth is an important indicator, because it expresses the developed of the lamb during the period of gestation, and is considered an index of prenatal growth (Mochnac M, 1978). The weight of product at birth and especially its vitality depends very much of how is the mother sheep ready for the gestation period, and the quantity and quality of food consumed during this period. In the various studies that consider this issue, to obtaine fair value it is specified that the birth weight should be determined in the first 12 hours after parturition. To argue this statement we must specify that in the special literature there are datas showing that in the first 36 hours postpartum changes occur in the evolution of weight lambs, primarily due to the decline of the live weight as a result of the drying coating pilose (about 260 g). Another reduction by about 20 grams per hour of weight at birth is due to the metabolic activity in the course of adaptation to the new conditions (Pascal C., 2008, Gîlcă I., 2008). Alternatively, if the lambs had sucked immediately, their weight may increase by about 90 g every 12 hours of life (Alexander R., quoted by Mochnac M 1978).

Within these studies, the body weight was performed for each batch separately according to the sheep moms generation. The statistical processing of data's shows that even in case of assuring the same maintenance conditions between batches appear weight differences. Throughout the actually obtained lambs the average body weight determined immediately after bringing forth (n = 246) was 4.276 ± 0.185 kg, value that can be considered normal and within the biological possibilities of the breed.

The analysis performed at each batch reveals that the live weight at birth has caused the greatest amount of 4.915 ± 0.110 kg and was recorded at the lambs obtained from sheep belonging to the generation in 2001 on the sixth season of reproduction. The lower body weight determined immediately after bringing forth was found to be performed by the lambs obtained from primary sheep of 2006 generation. The weight difference between the two batches was distinctly significant for $p > 1\%$. We must specify that the sheep belonging to the 2006 generation were at the first reproductive season and were used to mount at the age of 10 months, in their first year of life.

Regarding the influence of parental weight on the weight of the lambs at birth,

the obtained data shows that at a population level they owned 7.6% of the average weight of their parents. Between groups there were differences of value, the highest share was recorded at lambs obtained from the 2007 and 2008 sheep generations, at which the resulted products had 7.8% and respectively 7.9% from the weight of the parents. In case of lambs from the first bringing forth the average weight from birth was situated in the population average, confirming the fact that using at reproduction of females with care, the corporal development of lambs during their intrauterine life is not affected.

In general, the average values lambs determined for weight at birth confirm that the age of sheep represents a factor of influence. At the parturition time between the batches of lambs there were observed some differentiations in terms of their format. Live weight and the higher format specific to the lambs resulted from ewes with multiple births, is still distinguishable on the entire period of lactation and almost disappears at weaning time. This means that the effect of the age of sheep mothers is one motherly that is lost gradually. Recent studies show that the deviation between batches at weaning are situated around the value of 5% and at the age of one year of the lamb can hardly be put in evidence (Pascal C 2008 Gilcă I., 2008).

Table 1. Corporal weight evolution at lambs in the lactation period (kg)

Batch	Mother ewe generation	Obtained products (n)	Average weight at birth			Average weight at weaning		
			% from parent weight	$\bar{X} \pm s \bar{X}$	s	$\bar{X} \pm s \bar{X}$	s	
1.	2007	20	7.8	4.915 ± 0.110	0.154	22.641 ± 0.205	0.143	
2.	2008	41	7.9	4.648 ± 0.088	0.143	22.208 ± 0.176	0.162	
3.	2009	68	7.5	4.507 ± 0.121	0.128	19.865 ± 0.318	0.185	
4.	2010	19	7.3	4.170 ± 0.108	0.156	21.165 ± 0.210	0.173	
5.	2011	77	7.7	4.241 ± 0.122	0.149	20.899 ± 0.150	0.169	
6.	2013	21	7.6	3.178 ± 0.162	0.220	21.475 ± 0.255	0.188	
Total and average		246	7.6	4.276 ± 0.185	0.198	21.375 ± 0.521	0.207	

Table 2. Difference of wight between batches registered at bringing fort hand at weaning an dits semnification (kg)

	Tukey Test	L1	L2	L3	L4	L5	L6	
Weight at birth	L6 (2001)	1,737**	1,470*	1,329*	0,992 n.s.	1,063*		Weight at weaning
	L5 (2002)	0,674 n.s.	0,407 n.s.	0,266 n.s.	0,071 n.s.	-	0,476 n.s.	
	L4 (2003)	0,745 n.s.	0,478 n.s.	0,337 n.s.	-	0,266 n.s.	0,310 n.s.	
	L3 (2004)	0,408 n.s.	0,141 n.s.	-	1,300*	1,034*	1,610*	
	L2 (2005)	1,470*	-	2,343**	1,043*	1,309*	0,733 n.s.	
	L1 (2006)	-	0,433 n.s.	2,776**	1,476*	0,742 n.s.	1,166*	

For birth weight

*Significant at the 0.05 level (w = 1.017)

**Significant at the 0.01 level (w = 1.660)

n.s.: not significant

For weight at 85 days

*Significant at the 0.05 level (w = 0.976)

**Significant at the 0.01 level (w = 1.960)

n.s.: not significant

Throughout the lactation, in the first part, the evolution of the body weight of lambs was influenced primarily by the ability of nursing of mothers sheep. In what concerns the body weight average of lambs at weaning, between the batches there were found differences with a different degree of statistical significance. Table 2 shows the differences between batches at birth and at weaning. At the age of 85 days, when lambs were totally separated from the mother sheep, the most pronounced differences and which were significant for $p > 1\%$ were recorded between batches L1 and L3 and respectively L2 and L3. Recent studies conducted by Cardellino RA, and Benson ME, 2002, shows that the greatest differences in the ability of lactation and suckling intensity growing lambs were found in early lactation. The same group of authors showed that between the age of sheep and the lactation ability there is a positive correlation.

2. Dynamics of growth achieved by lambs during the lactation period. The growth increase recorded during this interval is due to a large extent of the contribution made by eating maternal milk, although lambs gradually began to use other sources of food (supplementary feeding) being used to them after the first ten days of birth. As in the first part of the evolution of life the increase growth of lambs is based almost exclusively on the consumption of maternal milk, the mean specific growth of the total and daily

average was determined by two distinct periods: birth - 20 days respectively for the 28 days and 85 days. The results obtained from processing statistical data are presented in Table 3.

In the first examined period (0-28 days) growth average absolute increase of lambs was 5.954 ± 0.181 kg with values above average, made by lambs produced by ewes at the first, fifth and sixth bring forth. Under these conditions, the values determined for the daily average growth of gaining weight were higher in all these batches. In terms of average daily growth, the average values were situated between the minimum of 174 g that was recorded at the group of lambs obtained from sheep belonging to generation 2003, and up to 209 g / day achieved by lambs obtained from the first bring forth. The existence of differences between the total average and the daily average shows that after bringing forth, the evolution of these indicators is more related to the production of individual milk than milk production characteristic of the breed. Although, at first glance they seem very good growth increases, all these values are lower compared with other data cited in various literature sources. Thus, in an experience performed in Poland was established that the lambs obtained from crossing Polish Mountain Sheep \times Friesian, the daily average increase was of 325 g, this way allowing that at the date of weaning (44 days) the total average body weight to be 19.5 kg (Drozd, A. 2002).

Table 3. The increase evolution of lambs in the suckling period

Batch	Mother ewe generation	Obtained products (n)	Growth increase from the interval 0-28 days		Growth increase from the interval 28-85 days	
			Total growth increase (kg)	Average daily increase (g)	Total growth increase (kg)	Average daily increase (g)
			$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$
1.	2001	20	6.440 ± 0.110	230 ± 0.281	11.286 ± 0.274	198 ± 0.154
2.	2002	41	6.160 ± 0.088	220 ± 0.215	11.400 ± 0.258	200 ± 0.201
3.	2003	68	5.460 ± 0.121	195 ± 0.122	9.918 ± 0.234	174 ± 0.213
4.	2004	19	5.880 ± 0.108	210 ± 0.211	11.115 ± 0.301	195 ± 0.111
5.	2005	77	5.600 ± 0.122	200 ± 0.185	11.058 ± 0.220	194 ± 0.231
6.	2006	21	6.384 ± 0.162	228 ± 0.141	11.913 ± 0.305	209 ± 0.132
Total and average		246	5.954 ± 0.181	215 ± 0.510	11.116 ± 0.297	179 ± 0.275

In the second period analyzed (28 - 85 days) the mean absolute increase statistical growth recorded for the whole population is at 11.116 kg. Compared to this value, lambs

produced from ewes mothers who belonged to generation 2003, achieved a total average growth increase of 10.77% lower. The daily average growth analysis performed for the

same period of time for each batch and for the total population, confirming the very good rate of growth that has the ecotype Perieni of the Merinos of Palas breed.

3. The suckling capacities is a very important indicator in evaluating the various populations of sheep. The biological importance of this particular production is due to the fact that the lambs' weight at birth and the evolution of development in the first periods after birth depends on the genetic ability of the lamb to develop antenatal instinct. In other words, the ability of the products' development is regarded as a genetic ability, which is combined with milk production of the sheep mother and the mothers' instinct of care.

Since it was found that the ability of suckling is influenced on one hand of the potential of sheep to produce milk, on the other hand, the potential of use by the lamb, since 1966 More ER W, quoted by Mocnacs

M, 1978, has studied the relative importance of these two factors and concluded that the effect of the lambs' genotype is more important is more than the mother sheep. However milk production should not be neglected in the selection of sheep whereas the level and ability to fulfill daily requirements of lamb depend on the secondary folliculitis development that especially erupt in the first periods after bringing forth. The role and importance of the suckling ability is direct linked to the special interest for the production of meat which during the first phases of growth is closely related to milk production. This makes the indirect estimates of milk production to remain a method that links many hopes. In this regard we have made researches conducted to assess the lactogen ability of sheep Merinos of Palas of the Perieni ecotype.

Table 4. Estimation of the amount of milk consumed by lambs during lactation (kg)

Batch	Mother ewe generation	Obtained products (n)	Estimated milk quantity		
			Period birth-28 days	Period 28-85 days	Total lactation period
			$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$
1.	2001	20	32.200 ± 0.232	45.144 ± 0.225	77.344 ± 0.229
2.	2002	41	30.800 ± 0.125	45.600 ± 0.125	76.400 ± 0.250
3.	2003	68	27.300 ± 0.122	39.672 ± 0.128	67.062 ± 0.289
4.	2004	19	29.400 ± 0.159	44.460 ± 0.285	73.860 ± 0.221
5.	2005	77	28.000 ± 0.122	44.232 ± 0.183	72.232 ± 0.281
6.	2006	21	38.300 ± 0.117	47.652 ± 0.114	75.952 ± 0.108
Total and average		246	29.770 ± 0.151	44.464 ± 0.210	74.234 ± 0.207

For the Merinos of Palas breed, the most recent studies performed in Romania by Taft V, Radu R, Vicovan G. and Pascal C, show that the average milk yield characteristic of the breed is of 80 l of which over 60% is consumed by lambs during lactation. Compared to this value in the research, it was based on the estimates that the average milk yield achieved during the first 85 days is 74.234 l. The good level of the average milk production confirm a very good lactogen capacity specific to the Perieni ecotype sheep, a result of long selection applied to

this production. To achieve the best production of milk for the sheep belonging to all generations analyzed is the maintenance state and the optimal conditions provided in the diet constantly and throughout the year.

The link between the quantity of milk sucked and the lambs' growth speed depends on the period in which this link is determined (table 5). However, the expression of the lactogen capacity is usually more objective only for the first month of life. Therefore, in these determinations, the weighing of lambs in the first 28 days must not miss.

Table 5. Correlation between the amount of milk consumed and the rate of growth

Lambs' age (days)	Corrélations (r)
0-15	0.84
16-28	0.79
29-40	0.50
43-55	0.46
55-70	0.38
71-85	0.24

In the first part the correlation coefficient values are high, r_p : 0.84 for the period 0-15 days, respectively and r_p : 0.79 for the 16-28 days period. In the second lactation interval, the intensity of the connection between the quantity of milk and speed increase of lambs drops to r_p : 0.46 for the 43-55 days period and r_p : 0.24 for the lactation period between 71 and 85 days. These values are close and converge to the effect for the mountain sheep in England. Other data cited in the special literature reveals the existence of positive and significant correlation ($p < 5\%$) until the age of 56 days between milk production and the intensity growth of lambs (Snowder glimpse GD and HA 1991). Further studies on F1 lambs obtained from crossing Polish Merino x Friesian do not confirm the existence of a correlation between the age and intensity of sheep growth achieved by the age of 56 days Meile (S. Mroczkowski, B. Borys and D. Pwicz S, 2002).

Considering all these values, we can say that mainly by weaning, the weight of lambs is dependent on the ability of nursing of the sheep mothers. However, although the intensity of the link between the amount of milk consumed by the lamb and the rate of growth determined after 55 days of age is lower, the lamb body weight is determined by the sucking milk in the preceding weeks. Besides the quantity and quality of milk, it influences the rate of growth of lambs, but there are not known papers that can demonstrate this aspect.

It can be admitted that the increase in weight of lambs, up to a certain age, is dependent on the milk production of mothers. However, very little is known about the magnitude and variation of converting milk in meat and particular, which is the value of coefficient of conversion to be admitted at different times, in different breeds. Through

the conducted research, we I tried to give several answers to a current problem that is not fully elucidated.

CONCLUSIONS

1. The growth of lambs was different in the batches in both analyzed periods, being directly influenced by the ability of different sheep suckling mothers.

2. To improve the lactogen capacity it is necessary to intensify the category selection of sheep mothers, particularly those producing rams for breeding, by their lactogen ability.

3. Since the ability of suckling of the investigated sheep has presented as variation source both the individual and the age to improve the performance of Merinos of Palas sheep of Perieni ecotype, it is necessary to apply a progressive directional selection.

4. In the first part, the coefficient of correlation between the amount of milk and the intensity of growth has high values and in the second period of lactation the intensity connection decreases as weaning time approaches.

5. As a future target for further research is necessary for milk production the expanding of production in the control of all sheep breeds, and this action must be formalized.

REFERENCES

- [1]. Cardellino R. A., Benson M. E. - 2002, Lactation curves of commercial ewes rearing lambs. Journal of Animal Science, Vol 80, Issue 1 p 23-27;
- [2]. Drozd, A., 2002 - Influence of ewe mating time on efficiency of milk lamb production in the mountains. Instytut Zootechniki, Zakad Hodowli Owiec i Kóz, 32-083 Balice k. Krakowa, Poland;
- [3]. Gilcă I., Pascal C., Ivancia M., Creangă S., Păsărin B., 2011 - Comparison of milk yield and reproductive indicies between the Romanian sheep breeds. 12th Annual Conference of the European Society for Domestic Animal Reproduction, p 97;

- [4]. Gilcă I., Pascal C., Ivancia M., Pasărin B., 2008 - Researches concerning the comparison of milk yield and the main reproduction indexes between the Romanian sheep breeds – Tzigaie and Tzurcana. International Symposium on Agricultural and Rural Development "Safe Food-Plant and Animal Production, Management, Market" 18 – 20 september, Bydgoszcz-Torun, Polonia, p 35;
- [5]. Mroczkowski S., Borys B., and Piwczy S., 2002 - Correlation between results of lamb weaning and milk productivity in the F1 East Friesian and Polish Merino hybrid milking ewes
- [6]. Marsh R., Chestnutt D.M.B., 1976 - Effect of supplementary concentrates on performance of early-weaned lambs at pasture. Agricultural Research Institute of Northern Ireland and Queen's University, Belfast;
- [7]. Mochnacs, M., Vintilă I., Taftă V., 1978 - Genetica și ameliorarea ovinelor. Editura Ceres, București.
- [8]. Pascal C., Ivancia M., Gherasim N., 2010 - The influence of some factors on the reproductive function of Romanian local sheep. 12th Annual Conference of the European Society for Domestic Animal Reproduction, p 99;
- [9]. Pascal C., Ivancia M., Gilcă I., Nacu G., Maciuc V., 2008 - Researches regarding the meat quality in young sheep from the Romanian local breed. International Symposium on Agricultural and Rural Development, Bydgoszcz-Torun, Polonia, p 58.
- [10]. Radu R, 2006 - Direcții prioritare în creșterea ovinelor și caprinelor în România în condițiile integrării în Uniunea Europeană;
- [11]. Snowden G. D., Glimp H. A., 1991 - Journal of Animal Science, vol 69, Issue 3, p 923-930;
- [12]. Taftă, V. 1997 - Producția, Reproducția și Ameliorarea ovinelor. Editura Ceres București;
- [13]. Vicovan G.P, 2006 - Istoria genetică a raselor Merinos in Romania. Lucrări Științifice, Seria Zootehnie, USAMV Iași, p 634-640;