

## STUDY ON THE MILK YIELD APTITUDES OF THE TURCANA SHEEP RAISED IN THE NORTH-EAST SIDE OF THE COUNTRY

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### Abstract

The researches focused on the assessment of milking capacity of mother ewes on the growing rhythm of the own littered lambs. The biological material belonged to Turcana breed, structured on age periods as, reported to the generations. It resulted, after the researches were finished, that the average milk yield was of 94.234 l during the first 85 days of lactation, at the studied sheep population. The high performance achieved for milk yield confirmed the very good milking capacity of Turcana ewes with straight consequences on the lambs growing speed, right after parturition. The correlation coefficient for the following traits pair - suckled milk quantity and lambs growing speed presented higher values,  $r_p$ : 0.84 during the 0-15 days age period and  $r_p$ : 0.79, for the 16-28 days period. The strength of correlation between milk yield and growing speed decreased at  $r_p$ : 0.46 for the age period of 43-55 days, respectively at  $r_p$ : 0.24 for suckling period comprised between 71 and 85 days.

**Key words:** milk sheep, lambs, Turcana, correlations

### MATERIAL AND METHODS

The researches have been carried on during 2008-2009, within the S.C.D.C.O.C. Secuieni-Bacau, a research unit situated in the North-East of Romania. The biological material comprised 150 adult ewes from the reproduction flock and their lambs (both genders), yielded during 2009 lambing season. Mating has been organized during October-November 2008. The animals were kept in appropriate maintenance condition across the gestation and suckling periods.

The indirect control method has been used in order to assess the milking capacity of mother ewes, which supposed the measurement of body weight gain dynamics for the lambs, during suckling period. Therefore, weightings at parturition, at 28 days old and at weaning (85 days) have been effectuated. Basing on these results (dynamics of weight gain), the ewes milking capacity was calculated, after the appliance of a certain correction coefficient. This coefficient was equal to 5 during lambs age comprised between parturition and 28 days, knowing that maternal milk influence is more

significant; then it became 4 throughout the 28 days – weaning period. These values (5 and 4) are widely accepted within the international sheep breeders' community (Ricordeau-Boccard, quoted by Tafta V., 1997) and represent the average milk quantity (kg), required in order to gain 1 kg of body weight, by the sheep youth, during suckling period.

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

### RESULTS AND DISCUSSIONS

**1. Dynamics of lambs body weight during suckling period** represented a main goal of the researches we carried on, the results issuing from the lambs average weight at parturition, at 28 days old and at 85 days, when the weaning was realized. Lamb weight at parturition is an important trait, because it reveals the way in which the lamb developed

during gestation, therefore an ante-partum trait (Mocnacs M, 1978). The assessment of this trait also provides valuable clues on the preparation of the mother ewe for gestation or about the feed quality and quantity fed across gestation. The lamb at parturition was measured during the first 12 hours post partum, knowing that during the first 36 hours post partum, certain changes in body weight dynamics could occur, due to live weight decreasing (drying of the robe) (Snowder G. D, Vicovan G.P) (environ 260 g). Other decrease (environ 20 g/hour) could be due to the metabolic activity, which adapts the body to the new environment conditions

(Pascal C., 2008, Gilca I., 2008). Moreover, if lambs began to suck immediately after parturition, their body weight could increase 90 g each 12 hours (Alexander R., quoted by Mocnacs. M 1978).

Body weight measurement was done for every ewes group, in accordance with their generation. Statistical processing revealed that within the same husbandry conditions, certain differences between groups occurred. On the whole lambs flock, the average body weight after parturition (n = 164) reached  $4.142 \pm 0.109$  kg. This value could be considered as normal for the biological features of Țurcană breed.

Table 1 Dynamics of lambs body weight during suckling period (kg)

Group	Generation of mothers ewes	Yielded lambs (n)	Lambs body weight (kg)			
			At parturition		at 28 days postpartum	at weaning
			% from parents weight	$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$	$\bar{X} \pm s \bar{x}$
L 1.	2000	15	7.1	$3.844 \pm 0.098$	$9.845 \pm 0.089$	$20.701 \pm 0.105$
L 2.	2001	22	7.3	$4.915 \pm 0.110$	$10.115 \pm 0.110$	$22.308 \pm 0.176$
L 3.	2002	28	7.4	$4.231 \pm 0.108$	$10.118 \pm 0.108$	$22.245 \pm 0.318$
L 4.	2003	34	7.4	$3.971 \pm 0.115$	$9.978 \pm 0.115$	$19.108 \pm 0.045$
L 5.	2004	35	7.7	$3.944 \pm 0.097$	$10.244 \pm 0.097$	$22.269 \pm 0.150$
L 6.	2005	30	7.7	$3.978 \pm 0.121$	$10.378 \pm 0.121$	$22.175 \pm 0.255$
Total and average		164	7.4	$4.142 \pm 0.109$	$10.096 \pm 0.114$	$21.451 \pm 0.109$

Table 2. Weight difference between groups, recorded at lambing and at weaning and its significance

Weight at parturition (kg)	Tukey Test	L1	L2	L3	L4	L5	L6	Weight at weaning (kg)
	L6 (2000)	0.134 n.s.	0.937 n.s.	0.253 n.s.	0.007 n.s.	0.034 n.s.	-	
L5 (2001)	0.100 n.s.	0.971 n.s.	0.287 n.s.	0.027 n.s.	-	-	0.094 n.s.	
L4 (2002)	0.127 n.s.	0.944 n.s.	0.260 n.s.	-	-	3.161**	3.067 **	
L3 (2003)	0.387 n.s.	0.684 n.s.	-	3.137**	0.024 n.s.	0.070 n.s.	0.070 n.s.	
L2 (2004)	1.071*	-	0.063 n.s.	3.200 **	0.039 n.s.	0.133 n.s.	0.133 n.s.	
L1 (2005)	-	1.607*	1.544*	1.593*	1.568*	1.474*	1.474*	

For the weight at parturition

\*Significant at the 0.05 level (w = 1.011)

\*\*Significant at the 0.01 level (w = 1.360)

n.s: not significant

For the weight at 85 days old

\*Significant at the 0.05 level (w = 0.981)

\*\*Significant at the 0.01 level (w = 1.987)

n.s: not significant

Live weight after parturition presented higher values in those lambs issued from 2001 generation of mothers, which meant  $4.915 \pm 0.110$  kg. Thus, compared to other lambs groups, those ones presented 21.79% higher values (than the lambs issued from generation 2000 mothers), respectively 13.91% better results (than the lambs issued from generation 2002 mothers). Lower

average weight was also recorded at the lambs issued from ewes at their 1<sup>st</sup> parturition (generation 2006).

Statistical processing of data revealed that weight differences were significant for  $p > 1\%$  in L2 and L1 groups. It must be specified that the ewes from generation 2006 participated for the very first time at reproduction and have been mated at 10

months old. Overall, the average achieved values suggested that ewes age represents an influential factor of the lambs weight at parturition.

#### **Lambs body weight at 28 days old.**

Lambs live weight, throughout the suckling period is strongly influenced by ewes milking capacity. Moreover, the mothers individual traits highly influence weight dynamics. Therefore, intra-racial variation is even higher than the inter-racial one. Thus, the average daily gain, recoded post-partum, is mostly influenced by the individual milk yield than by the milk production of a certain breed. Basing on the studies effectuated by Hugo and Owen, quoted by M. Mochnacs (1978), Burris and Baugus, quoted by V. Taftă (1996) and Poly and Vidal, quoted by de C. Pascal (2007), it was found that during suckling period, correlations maintained at high levels ( $r_p = +0.7 \dots +0.9$ ), fact which proved the intense and positive relation between mother milk yield and the whole and average weight realized by the lamb.

The second moment of weighting was chosen at 28 days, knowing that growing capacity, as related to the sucked milk quantity is better expressed at that age (4 weeks). The gathered data could serve as selection criteria, when milking capacity is the goal. Data processing revealed certain differences between groups. Weighting was done in the morning, to better express the real body weight values. Average values and other statistical indexes are presented in table 1, while the differences and their significance could be found in table 2. The analysis of the achieved results showed that the average value of whole population reached  $10.096 \pm 0.114$  kg, higher values being measured in L6 group and lower in L1 lambs.

#### **Lambs body weight at weaning.**

According to the experimental design, the lambs were weaned when they turned 85 days old. At this moment, the individual

body weight has been measured and data have been statistically processed. Table 2 presents the differences between groups, at parturition and at weaning. At 85 days old, most pronounced differences for  $p > 5\%$  were recorded between groups L4 and L3, L4 and L2, L6 and L3, respectively L5 and L4. Recent studies, published by Cardellino R. A. and Benson M. E., 2002 revealed that highest differences related to milking capacity and growing intensity occurred at the beginning of suckling. Same authors observed positive correlation between ewe age and milking capacity.

**3. Suckling capacity** represents a main trait used in the evaluation of certain sheep populations. The biological relevance of this production is given by the genetic aptitude of the lamb to develop ante-partum, then to convert sucked milk in weight gain. Therefore, development capacity is a genetic trait, issued from a mixture between mother milk yield and its maternal instinct. Knowing that suckling capacity is influenced both by ewe milk yield and by lamb aptitude to use it, since 1966, More E.R.W., quoted by Mochnacs M., 1978, studied the relative importance of these two factors and concluded that the effect of lamb genotype is more important than the mother one. However, milk production should not be neglected during sheep selection, because its level influences the capacity to satisfy daily lamb requirements, related to the eruption of the secondary follicles of the wool, during the first post-partum periods. The role and the importance of milking capacity is straightly related to the interest on lamb meat production, which is strictly correlated to ewe milk yield, especially during the first growing periods. Thus, the indirect estimation of milk yield remains a hopeful method, our researches being conducted in order to assess the Țurcană ewes suckling capacity.

Table 3. Estimation of milk quantity consumed by milk during suckling period (kg)

Group	Generation of mothers ewes	Yielded lambs (n)	Estimated milk quantity	
			Lambing-28 days old	Whole suckling period
			$\bar{X} \pm S \bar{x}$	$\bar{X} \pm S \bar{x}$
1.	2001	20	49.225 ± 0.202	93.154 ± 0.209
2.	2002	41	50.575 ± 0.115	100.386 ± 0.210
3.	2003	68	50.590 ± 0.118	100.062 ± 0.289
4.	2004	19	49.890 ± 0.120	85.960 ± 0.221
5.	2005	77	51.220 ± 0.132	100.210 ± 0.231
6.	2006	21	51.890 ± 0.117	99.787 ± 0.128
Total and average		246	50.480 ± 0.131	96.214 ± 0.201

In Țurcană breed, most of the studies already run in Romania by Taftă V, Radu R, Vicovan G., Pascal C showed that the average milk yield of the breed reach 130 l, 60% of it being consumed by lambs during suckling. Compared to this value, our researches revealed that milk yield across the first 85 days reached 96.214 l. This good level confirms milk yielding capacity of Țurcană ewes, as a result of the long term selection on this trait. Ewes maintenance status and optimal feeding conditions also influenced flock performances throughout the whole year.

Intensity of the relation between sucked milk quantity and lamb growing speed is influenced by the period of assessment (table 4). Expression of milking capacity is more accurate if is assessed during the 1<sup>st</sup> month of lamb life. Thus, weighting of the lamb during the first 28 days of life should not be omitted from the conventional schedule in the farm.

Table 4. Correlation between sucked milk quantity and growing speed

Labs age (days)	Correlation (r)
0-15	0,84
16-28	0,79
29-40	0,52
43-55	0,46
55-70	0,38
71-85	0,24

During the first part, correlation coefficient presents high values,  $r_p$ : 0.84 for 0-15 days period, and  $r_p$ :0.79 during 16-28 days. During the 2<sup>nd</sup> lactation period, the intensity of relation between milk quantity and growing capacity decreases at  $r_p$ :0.46 for 43-55 days period and at  $r_p$ :0.24 for 71 - 85 days period. These values are close to those assessed in mountainous sheep populations

from England. Other data of the field revealed certain positive and significant correlations ( $p < 5\%$ ) till 56 days old, between ewes milk yield and lambs growing capacity (Snowder G. D. and Glimp H. A., 1991). Other studies, which focused on the F1 lambs issued from Friesian x Polish Merino crossing, did not confirm certain correlations between ewes age and lambs growing speed till 56 days old (Mroczkowski S., B. Borys and D. Piwczy S, 2002).

Considering these values, it could be stated that lambs weight depends on mother ewes milking capacity, at least till weaning. Even if the intensity of correlation between growing capacity (assessed at 55 days old) and sucked milk quantity become wicker, lamb body development is still influenced by the milk sucked during previous weeks. Milk quality also influences lambs development, although there are not many researches to prove this.

It could be admitted that lambs weight gain dynamics was influenced by their mothers milk yield, at least until a certain age. However, very few data is known, related to milk conversion toward meat (variation and amplitude) and especially to the value level of the transformation coefficient that should be accepted for certain breeds and periods. Though our researches, we tried to offer more answers to an actual problem, which is not enough elucidated.

## CONCLUSIONS

1. Growing trend of the lambs differently presented among groups, during both analyzed periods. It was thus influenced by ewes milking capacity and less of their age.

2. It is necessary to intensify selection in mother ewes category, in order to improve their milking capacity and especially of those that produce the future reproduction rams.

3. Knowing that both individual and age represented variation sources related to milking capacity, it is required to apply directional progressive selection, in order to improve Țurcană ewes performances.

4. During the 1<sup>st</sup> stage of lactation, high values of the correlation coefficient occurred for the sucked milk quantity and growing intensity, while during the 2<sup>nd</sup> period, the values decreased as weaning approached.

5. Therefore, it imposes to continue the researches related to milk yield and the extension of the control toward the ewes from all breeds, under certain official actions.

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