MOTHER'S AGE AND LAMBING TYPE AS INFLUENCIAL FACTORS ON BODY GROWTH AND DEVELOPMENT OF YOUTH SHEEP

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Abstract

Through this paper the authors have proposed to reveal if and how maternal age and type of birth influences the growth and development of the offspring in sheep. To do this, have been studied a total of 130 sheep of different ages (between 3 and 6 years) together with their lambs, sheep breed belonging to Tigaia (Tzigai) breed, rusty variety. Working methods are commonly used for this type of research, namely: body measurements, weighing and statistical calculations. Following the evaluation of body weight, it was found that at birth, lambs had an average weight of 3.69 kg, at 28 days about 10 kg, and 90 days old lambs had a maximum weight of 16.21 kg, differences by gender and age of mothers. Average daily gain between 0-90 days was 200 g with an average consumption of 4 kg of milk/kg gain and an growth intensity of approximately 170% increase. After conducting statistical analysis, it was found that, in sheep population studied, lambs weight is not significantly affected ($p>0.05$) by maternal age or type of birth. The factor that influenced significantly ($p <0.01$) weight of lambs at birth (but not in other age), is lambs gender. In the case of Tigaia sheep, maternal age and type of birth has no significant influence on body development of offspring.

Key words: sheep, body development, factors of influence

INTRODUCTION

The diversity of products, particularly biological value, and efficiency of obtaining them, made the sheep to be highly valued, and also enjoying attention from breeders. The most common marketable product resulting from breeding occurs after weaning, when the effects of lambs and mother are separated. The final product is the lambs evaluated based on their total weight at weaning. Weight gain of lambs at weaning, for each sheep, is one of the most important economic contributions that genetics can make for an operating sheep system. An exception to this is the case of some countries, where the number of lambs weaned is more important than weaning weight [6].

Although contemporary literature recommends increasing the number of products at birth or at weaning as a single criterion to improve the efficiency of breeding [8] in recent years, the total weight of lamb weaned by a ewe, was a more interesting character of reproduction [1]. The lambs are increasing their weight in a shorter time and lower power, but with an intensity of high growth, their growth will be much more economical, and earnings will be higher. Weight gain of lambs, weaned per ewe, is a convenient biological measurement, depending on the overall reproductive capacity of sheep [7].

This paper aims to demonstrate whether and how certain factors (birth weight and type of sheep) influence the birth weight of lambs up to weaning. This has been highlighted following certain body measurements and weighing.

MATERIAL AND METHODS

The biological material studied was represented by two types of sheep: adult female and young sheep lambed in spring 2010. The number of sheep studied was 130 ewes and 127 lambs of different ages (0 - 6 months), belonging to Tigaia (Tzigai) breed, Variety rusty.

Assess the degree of body development, we used biometric method that was based on direct measurement of the different regions of animal and focused mainly on mass measurements. Measurements were made in good conditions, animals being brought into a sitting position level and placed.

The instruments used for making these determinations were: compass Wilkens, zoo-meter, ribbon and metric scales.

Data gathered through investigations conducted were processed with Ms Excel spreadsheet application. To test the statistical significance of differences between values studied, we used ANOVA Single Factor, algorithm included in the software package Ms Excel.

RESULTS AND DISCUSSION

Growth, is the body weight change, shape and anatomical and biochemical composition of animals, from conception until adult age. Usually hereditary factors through neurohormonal system, determines the limits and stages of ontogenetic development of the lamb, and environmental factors influence the morpho-productive characteristics. A decisive factor for health and strength of growth and development of lambs, is body weight at birth, vitality, the amount of sucking milk and care conditions.

Also, the maternal effect has a pronounced influence on the rate of growth, but it represents 18.5% of total variation at birth, and only 8.8% at weaning, which shows that it reduces with age. Highest maternal effect is linked to type of birth (80%), followed by body weight (13.5%) and age (6.5%) [9; 15].

Birth weight is an important indicator because it expresses how the lamb was developed during pregnancy, prenatal growth index is considered. Lamb weight was monitored from birth to weaning, depending on maternal age at birth (Table 1).

Table 1. Body weight of lambs acording to maternal age

Sheep age at birth	Lambs weight (kg)					
	Birth		28 days		90 days	
	$\bar{x} \pm s_{\bar{x}}$	V%	$\bar{x} \pm s_{\bar{x}}$	V%	$\bar{x} \pm s_{\bar{x}}$	V%
3 years	3.83 ± 0.08^{a}	12.5	10.24 ± 0.14^{a}	8.01	16.21 ± 0.16^{a}	5.94
4 years	3.67 ± 0.12^{a}	15.8	10.25 ± 0.21^{a}	9.94	16.08 ± 0.27^{a}	8.31
5 years	3.54 ± 0.15^{a}	17.3	9.97 ± 0.3^{a}	12.22	15.99 ± 0.26^{a}	6.52
6 years	3.73 ± 0.09^{a}	15.2	10.11 ± 0.16^{a}	10.07	16.12 ± 0.15^{a}	5.87

aa - differences statistically insignificant ($p>0.05$).

Sheep age influences birth weight of lambs, because it is closely related to the weight of sheep, so as the sheep weight is smaller, lambs will be even lower (especially in sheep observed that most often are not fully developed before birth), but as a maternal effect, it is lost in time until the age of one year [2; 4]. Weight of lambs at birth, it fluctuated between 3.54 kg and 3.83 kg, less weight of lambs was recorded in sheep aged five years, the heaviest lambs belonging to three years old sheep, but not significant differences. The coefficient of variability calculated for this age group was slightly higher than that calculated at 28 days and 90 days, this can be explained by the fact that the birth weight of lambs varied in wide limits, and then differences were decreased with lamb age, while reducing the coefficient of variability. If, at birth there were differences in terms of lamb birth weight at different ages of sheep, about 300 g, at 28 days this difference was reduced by 20 g and at 90 days the difference was reduced by 50 g. Maternal effect manifested at birth on lambs weight decreased with age. Lamb weight at 90 days was approximately 16 kg less than the value found in the literature [10;

11]. Growth and development of lambs more difficult, due to poor diet of females, both before birth and after, because they failed to make their body reserves, which can raise them after birth. The deficiency on feeding sheep, joined with the absence of a supplementary ration infant lambs.

Among the factors that influence lamb birth weight, type of birth, is considered the main factor of variation in lamb growth. In the case of sheep studied was observed that between males come from single births and twins, there has been a difference of 160 g at birth, with a coefficient of variation of approximately 13%. If for the males, who come from single calving were heavier in females, those of heavier births were twins, but wuth slightly higher variability. With age, the lambs coming from twin births have gained more weight do to sheep milk production. Thus, at weaning, male from single births had a weight of 16.14 kg, compared with the 16.21 kilograms of twin births [5; 7] (Table 2).

Table 2. Lamb weight at different ages depending on the lambing type and sex

Lambing type		n	Body weight of lambs (kg)					
			Birth		28 days		90 days	
			$\bar{x} \pm s_{\bar{x}}$	V%	$\bar{x} \pm s_{\bar{x}}$	V%	$\bar{x} \pm s_{\bar{x}}$	V%
Simple	M	67	3.86 ± 0.05^{c}	12.23	10.29 ± 0.10^{a}	8.48	16.14 ± 0.12^{a}	6.29
	F	38	3.52 ± 0.09^{a}	17.19	9.92 ± 0.19^{a}	11.89	16.03 ± 0.18^{a}	7.23
	Total	**105**	**3.82 ± 0.12^{a}**	**34.23**	**9.84 ± 0.21^{a}**	**22.13**	**16.04 ± 0.73^{a}**	**46.19**
Twins	M	11	3.7 ± 0.2^{a}	13.35	10.35 ± 0.28^{a}	6.74	16.21 ± 0.38^{a}	5.57
	F	11	3.55 ± 0.42^{a}	23.50	10.3 ± 0.30^{a}	5.8	16.52 ± 0.23^{a}	2.8
	Total	**22**	**3.64 ± 0.19^{a}**	**16.80**	**10.33 ± 0.20^{a}**	**6.08**	**16.34 ± 0.24^{a}**	**4.54**

M – male; F – female; n – number of heads;
aa - differences statistically insignificant ($p>0.05$);
ac - distinct significant differences ($p<0.01$).

Weight at birth is influenced by lamb sex. Thus, significant statistical differences were observed between the sexes separately in single births, where males were 340 g heavier than females. Between males and females of births twins, the difference was 150 g, about 60% less, and statistically speaking, there were no significant differences. At 28 days, females from twin births have recovered considerable difference in weight, reaching a weight about equal to males. In single births, the gender gap widened to 370 g. In the last month before weaning, female from simple birth, have a better growth rate and reduced the gender gap up to 110 g. Twin births females had lower weights, with 310 g compared with males coming from single births, a trend similar to that told by other authors [3; 16].

Findings lamb growth and development during suckling period, was achieved by determining the absolute rate of growth, i.e., weight gain and average daily gain. In the first year of growth of young sheep, the growth of the scale is something more intense in females compared to males. Of course, the growth rate may be higher or lower depending on the degree of precocity of the breed and feeding level. This, however, cannot change value over certain limits, proportional to each other body regions development, heredity being the determinant factor. Growth process change report of the body parts. The growth rate is lower at the beginning, later increases and decreases again towards the end, scoring an S-shaped curve, so-called logistic curve. Change uneven growth rate of different parts of the body, at certain times, entails a corresponding change of body proportions at different ages. Growth rate is expressed in absolute weight or size of the increases made in unit time, the difference between the growth achieved in a given period of time, and the amount of mass at the beginning of the period, compared to the period of time [12, 13; 14]. Growth rate of young sheep studied was assessed both growth periods, and according to sheep mother's age, as can be seen in Table 3.

Table 3. Growth rate of lambs on sucking period

Specification			Unit	Growth period		
				Birth – 28 days	28 days - weaning	Total period
Sheep age at birth	3 years	Weight gain	kg	6.41	5.97	12.38
		ADG	g/day	229	96	137
	4 years	Weight gain	kg	6.58	5.83	12.41
		ADG	g/day	235	95	138
	5 years	Weight gain	kg	6.43	6.02	12.45
		ADG	g/day	230	97	138
	6 years	Weight gain	kg	6.38	6.01	12.39
		ADG	g/day	229	97	138

ADG – average daily gain

The most significant increase in weight during birth - 28 days, was recorded in the lambs from the sheep in the age of 4 years. Between 28 days - weaning, the best growth rate was observed in lambs of ewes by 5 and 6 years of age. On the whole growth period lambs whose mothers had 4 and 5 years showed the strongest increase in weight (12.41 kg and 12.45 kg respectively).

Growth rate is given by the average daily gain of lambs studied. Thus, average daily gain recorded was between 229 g/day and 235 g/day, the highest value was found in young sheep during suckling period, whose mothers were aged 4 years. Weight gain recorded was very good value due to milk production of sheep, which at this age were able to show their full potential.

The milk production of sheep, along with individuality (feed conversion), are the most influential factors of growth rate variation. Intra-racial variation of the average weight gain is greater than the variance between races. This variability is due to the ability of sheep feeding. So, average daily gain after birth is much more tied to individual milk production, than the milk production of a particular breed. If, during the first month average daily gain was over 200 g/day, during 28 days - weaning period, average daily gain decreased to an average of 96 g/day. Lowest growth rate recorded in the second part of growth period is caused by the lower intensity of growth in this period.

Throughout the period from birth to weaning lambs studied in all age groups of mothers were an estimated 138 g/day, which shows that mater's age did not influence growth rate, even if at first there was little differentiation.

Intensity growth in body weight of lambs during the suckling period shows very well the feeding ability of sheep during birth - 28 days, and ability of lambs to feed during 28 days - weaning. Lactogen ability of mothers is reflected in the calculated intensity of growth of lambs studied. The intensity of growth for the same period of growth varied according to maternal age.

Calculated intensity of growth, joined the typical boundaries of race, in the case studied between 167% and 181% in the first month of suckling (Table 4).

Table 4. Intensity increase in body weight of lambs in suckling period

Specification		Period	Initial body weight (kg)	Weight gain (kg)	Intensity of growth (%)
Sheep age at birth	3 years	Birth – 28 days	3.83	6.41	167.4
		28 days - weaning	10.24	5.97	58.3
	4 years	Birth – 28 days	3.67	6.58	179.3
		28 days - weaning	10.25	5.83	56.9
	5 years	Birth – 28 days	3.54	6.43	181.6
		28 days - weaning	9.97	6.02	60.4
	6 years	Birth – 28 days	3.73	6.38	171
		28 days - weaning	10.11	6.01	59.5

With increasing age of the sheep, has increased the intensity of growth (up to 181%), this value corresponds to lambs lambed by sheep aged 5 years. Growth of lambs, whose mothers had six years, was less intense, 171% respectively, which shows that the intensity of growth follows the evolution of lactation curve. Quantitative production of sheep milk, according to the literature, increases until the age of 5-6 years when maximum production is recorded and followed by a slow decline.

If, during birth - 28 days, the intensity had increased to more than 150%, in the second part of the suckling period, the intensity growth dropped to a third. After the first month of life, lambs can eat solid foods gradually, in this case, recommended a very good quality hay and a concentrate feed ad libitum to complement energy-protein ratio.

In young sheep studied, it was given hay ad libitum, but no concentrated to fill the animal requirements. As a result, the intensity of growth in this case, was approximately 60% of all age groups of sheep. Differences recorded in the first month of age, in terms of increasing intensity were more significant (up to 14% between lambs obtained from females 3 years and the females of 5 years) compared with values obtained for the period 28 days - weaning, the percentages obtained were very close in value, which indicates that maternal effect has been gradually reduced in intensity and was replaced by individuality (especially feed conversion).

CONCLUSIONS

After conducting statistical analysis, it was found that, in sheep population studied, lambs weight is not significantly affected ($p>0.05$) by maternal age or type of birth.

The factor that influenced significantly ($p <0.01$) weight of lambs at birth (but not in other age), is lambs gender.

In the case of Tigaia sheep, maternal age and type of birth has no significant influence on body development of the offspring.

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