

RESEARCHES REGARDING WEIGHT EVOLUTION CONSIDERING THE YOUNG FEMALE MATING'S AGE

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Abstract

In the researches carried out, several aspects were followed through which an objective analysis of the possibilities of early use for reproduction of the young sheep of the Karakul breed from Botoșani was pursued. In this sense, three batches were formed of young females who had an average age of 9 months (L1), 15 months (L2) and 20 months (L3). In order to eliminate the influence of external factors, all batches benefited from the same experimental treatment for three successive reproduction cycles. Finding the young ewes that were in heat was done with the help of testers rams and the fertilization was made in the autumn season, respecting the mating list. The data show that the early use of females of this breed did not affect the rate of body development at later ages. Thus, if at the time of the first reproduction season the average weight was only 72.38% of the adult weight, it increases to 87.99% in the second season and stands at 99.25% in the third season. Based on the data statistically processed, it is found that at the beginning of the third mating season an equalization of the data specific to the average live weight takes place in all experimental batches. Interestingly, at L1 it is found that early use in reproduction does not in any way affect the live weight in subsequent mating seasons. This batch had, after the third season of use in reproduction, a live weight greater with 0.25 kg compared to the batch who had at first mating season the age of 453.33 days and lower by 0.82 kg compared to the batch that had in the first season an average age of 20 months. At batch L2 the average body weight was 41.78± 0.87 kg, reaching the following season at 49.16± 0.25 kg which represented about 91% of the weight of adult sheep. By the fact that at the end of the third season the average body weight was 52.84± 0.38 kg it stated that this indicator reached 98.78% of the sheep weight that were over three years old.

Key words: young sheep, Karakul of Botoșani, precocity, sheep body development.

INTRODUCTION

The optimum age and weight for reproduction use of young sheep, for the first time, has a wide variability between breeds, being influenced, in particular, by the degree of their characteristic precocity.

Dyrmundson (1981), Sandu (1993), Pascal et al. (2010), studying the effect due to the use for breeding at different ages of young sheep, indicates for some breeds the age between 6 and 8 months, but also mentions situations in which the lambs from early lambing can conceive from the first autumn, even at the age of 4-7 months. For the autochthonous races, slightly differentiated values are found in the specialized literature, the cause being their different precocity. For example, the Merinos of Palas lambs used early for breeding, when they had an average age of 308 days and a weight of 41 kg, had a fertility of 55-66% and the wool

production was not negatively affected (Taftă et al., 1997; Mochnacs et al., 1978; Pascal et al., 1995).

Regarding body maturity, expressed by the weight in the reproduction season, in many publications it is specified that in the Merinos breeds the reproduction can be carried out without further negative effects if the weight, at the time of reproduction, represents at least 60-70% of the adult sheep (Moise et al., 2012; Sandu, 1993; Stăncescu, 2009; Pascal et al., 2005).

On the prolific breeds and in the English meat breeds, the early use in reproduction has no subsequent negative effects if at the time of fertilization the weight of the lambs represents 50-60% of the live weight of the adult sheep (Sandu, 1993; Pascal, 2006). Females from twin foetuses tend to reach puberty at an older age and at a lower body weight (Pascal et al., 2008; Pascal et al., 2006).

MATERIALS AND METHODS

The biological material was represented by the Karakul of Botoșani females breed at the Research and Development Station for Sheep and Goat Breeding Popăuți-Botoșani.

To test the possibilities of early use at reproduction of young sheep, several experimental batches were set up that benefited of same experimental treatment.

The entire youth population used at mating was divided into three batches differentiated by age. At the date of mating, the females constituting batch 1 (L1) were 9 months old, those in batch 2 (L2) were 15 months old, and those in the third experimental batch (L3) were 20 months old.

The young sheep that were nine months old at the time of mating came from the early lambing of that year and the females in the other two batches came from the late lambing of the reproduction season of the previous year. The entire sheep population that was included in the three batches benefited from similar conditions of feeding, maintenance.

Finding the sheep in heat was done with the help of testers rams and the mating was done in the autumn season, respecting the mating list.

The collected data were processed using the MsExcel 2007 spreadsheet application. Thus, the database was prepared with the corresponding variation strings, each being coded according to the specific parameters studied.

To test the statistical significance of the differences between the average values of the studied parameters, as well as the correlations between them, the variable analysis algorithm (ANOVA Single Factor) and Pearson Correlation were used, both included in the MsExcel 2007 software package.

RESULTS AND DISCUSSIONS

For using at reproduction, as earlier as possible, of the female youth, without affecting further corporal development, a special attention must be paid to the applied rearing technologies for youth so, puberty to be installed as soon as possible, knowing the fact that those one occurs at the age at which reproduction is possible for the first time, being realisable when are fulfilled the following conditions: ovulation to be

presented, ovules to be fecund, the conception product to be able to reach the term.

At Karakul of Botoșani breed after phenotype selection applied in the first neo-natal days and after establishing of the destination for the obtained lambs in each calving season, in the case of the ones kept for reproduction follows the growing period. During growing process the number of lambs initially kept could suffer also other modifications from numerically point of view function of growing rhythm and the way in which corporal development took place. So, till the age of 9-10 months if it is observed an improperly growing rhythm they could be redirected to capitalization for meat even if they have a valuable ascendance and recorded a high level of the score resulted after evaluation of production performances.

After this age, of 10 months, follow a new selection stage before youth to be introduced into the base flock. Function of corporal development at the age of 11-12 months females will be kept or will be eliminated from the flock destined for reproduction, being eliminated the weak and devoid of vividness ones, those which have deviations from the desired constitutional type, as well as the ones which have the corporal format with overhung and obvious bony angles. Research conducted on the breed of Karakul of Botoșani female confirms, through the obtained results, that the early use in breeding can be a solution to obtain better results in the breeding and exploitation of this breed. This statement is based on the data obtained from the weighing of young females that were used on mating when they were 9 months, 15 months and 20 months. To verify how early use in reproduction had a certain influence on subsequent body development; all young females were weighed for two consecutive breeding seasons.

In the case of the batch consisting of females who had at the beginning reproduction cycle the age of only 272.20 days it was observed that this experimental treatment did not have a negative influence on the rate of body development at different ages. Thus, if we analyze the data from table 1 it is observed that at the time of the first mating the average weight was only 72.38% of the weight of adults, it increases to 87.99% in the second season and is very close to the live weight of the adult sheep in third reproduction

season. Basically, very early use in reproduction did not affect the rate of body development.

In the case of the batch consisting of females who had in the first mating season an average age of 15 months (L2), the average body weight represented 78.1%, increases to 91.90% and stands at 98.78% after the third cycle.

In the batch consisting of females with an average age of 20 months (L3), it is found that if in the first season it achieved only 85.45% of the average live weight of the adult sheep, in the following season it reaches an average living weight equivalent to about 94% and exceeds the body weight of adult sheep after the third breeding cycle.

Based on statistically processed data, it is found that at the beginning of the third mating season, an equalization of the data specific to the average live weight takes place in all the batches consisting of young females. It is interesting that in the first batch, that is, the one with an average age of nine months in the first breeding season; it is found that the early use in reproduction does not in any way affect the live weight in the subsequent mating seasons.

This batch had, after the third season of use in reproduction, a live weight greater with 0.25 kg compared to batch that had in the initial breeding season the age of 453.33 days and lower by 0.82 kg compared to the batch that had in the first season an average age of 20 months.

Statistical data processing confirms that these differences did not have any statistical significance for $P < 0.01$ and $P < 0.05$, which

means that the use for reproduction of lambs, even from their first year of life, can be used upstream and will be an efficient solution and will contribute not only to reduce the lambing interval, but also to increasing the total number of lambs obtained each season and the total productive life of each female in the livestock. In the case of the batches formed by the females that at the time of the first season were 15 and 20 months old, the same tendency is observed in the evolution of the live weight and during the other seasons analysed. If in the batch consisting of females that had initially 15 months the average weight was 41.78 ± 0.87 kg in the following season it reached 49.16 ± 0.25 kg which represented about 91% of the weight of the adult sheep. The fact that at the end of the third season the average body mass was 52.84 ± 0.38 kg it was found that this indicator reached 98.78% of the sheep weight that were over three years old.

Research show that in case of batch of females that had an average age of 20 months when they were used for the first time for mating, after the end of the three consecutive breeding cycles, it is found that they exceeded by about 0.8% the live weight determined in sheep older than three years (Figure 1).

In order to have a complete picture of the data obtained from each batch used for the reproduction carried out in the three consecutive seasons, we determined the cumulative values resulted at the end of each season.

Table 1. Ewes age and weight considering the mating season (n = 35)

Batch	Body weight in the first mating season (kg)		Body weight in the second mating season (kg)		Body weight in the third mating season (kg)	
	$\bar{x} \pm s \bar{x}$	% of adult sheep weight	$\bar{x} \pm s \bar{x}$	% of adult sheep weight	$\bar{x} \pm s \bar{x}$	% of adult sheep weight
L1 (272.2 days age)	38.72 ± 0.31^{dc}	72.38	47.07 ± 0.4^{cd}	87.99	53.09 ± 0.38^{ns}	99.25
L2 (453.3 days age)	41.78 ± 0.87^{ab}	78.10	49.16 ± 0.25^{ns}	91.90	52.84 ± 0.38^{ns}	98.78
L3 (606.2 days age)	45.71 ± 0.31^{ns}	85.45	50.12 ± 0.11	93.96	53.91 ± 0.44^{ns}	100.78
Adults sheep age > 3 years	53.49 ± 0.33					

Note: a, b, c, d – environments with different symbols show significantly different values ($P < 0.05$); ns – non-statistically significant differences ($P > 0.05$); * – statistically significant differences ($P < 0.05$); *** – statistically significant differences ($P < 0.001$).

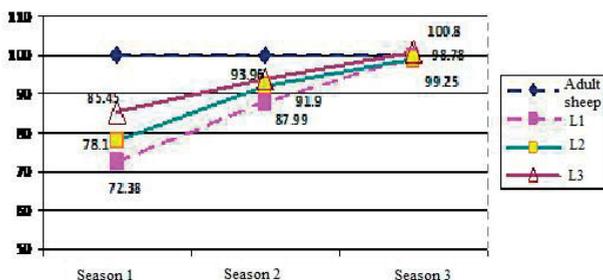


Figure 1. Body weight dynamics in young females used for mating considering sheep specific weight over three years age (%)

It was observed that at L1, out of the total of 35 females used for breeding, only in the first season was two that did not manifested heat and in the other seasons all were in heat and after mating became pregnant and produced at least a lamb (Table 2).

In L2 and L3 batches it is observed that, although, the number of females assigned for mating and those who manifested heat was identical, at the end of the three seasons the females from L3 produce 1.92% more lambs. This aspect is due to the fact that in this batch the females with twin lambs were higher.

The reproductive activity efficiency depends on many specific elements. For example, in England the efficiency of sheep breeding is based on determining a synthetic indicator represented by the number of products that enter the productive and reproductive circuit from each female in the livestock (Pascal, 2015). Therefore, we considered appropriate to carry out an analysis regarding the number of lambs

obtained from each batch in each year of life from the respective females based on dividing the number of lambs obtained from the three seasons to the average age of the mother sheep after the end of the third breeding cycle.

The efficiency of the early use for reproduction is also sustained by the fact that by dividing the total number of lambs obtained at the average age (expressed in years) recorded at the time of the third season, it results that from the same number of females for three reproductive cycles is obtained a different lamb number.

According to the analysis, it is observed that in the batch of females used early for breeding, during the three seasons the proportion of those who showed heat and the total number of lambs obtained had lower values (Table 2).

However, by comparing the total number of lambs obtained from this batch to the average age, expressed in years, recorded at the time of the third season, it turns out that every year of life 30.79 lambs are obtained (Table 3).

Table 2. Statistic of sexual heat manifest in young ewes and the number of obtained lambs

Batch	No.	First season		Second season		Third season		Total	
		Sheep in heat	Obtained lambs						
L1	35	33	24	35	36	35	37	103	97
L2	35	34	31	35	36	35	35	104	102
L3	35	35	33	35	37	34	34	104	104
Total	105	102	88	105	109	104	106	311	303

In contrast, on the other two batches the total average number of lambs obtained per year of life was 27.94 and 25.61, being with 1.05 lambs less compared to the average lambs per year on life of L2 and with 5.18 lambs compared to L3. The practical importance of these data is very great because it shows us that when applying a

breeding technology based on the early use of females, that is, from their first year of life, the total number of lambs obtained each year increases by 9.25% compared with the use at the age of 15 months and 18.62% if the time of entry into the productive circuit is delayed until the age of 20 months.

This aspect is important for breeding and production because in the first three years three generations of lambs are obtained, the effects being positive and quantifiable during the economic growth period of each generation of young females that is introduced into the breeding nucleus.

In other research effectuated on Merinos de Palas breed was observed that batch formed by, which

had a mean age at their first mating of 292.21 ± 1.91 days, those ones had a corporal mass of 42.070 ± 0.379 kg, which represented 75.5% from live weight specific for batch formed by adult sheep.

After utilization at first reproduction cycle fecundity was 100% and prolificacy was 107% (Pascal et al., 2005).

Table 3. The ration between the total lambs and the average age after three reproductive seasons

Average age at first breeding season (days)	Average duration of the three breeding seasons (days)	Average age at the lambing from third breeding season		Born lambs/total average age from third season (no./years)
		days	years	
272.21±2.45 (L1 - around 9 months)	879.58±2.08	1151.79±3.58	3.15±0.87	30.79
453.36±1.97 (L2 - around 15 months)	880.26±2.78	1333.62±2.95	3.65±0.66	27.94
606.20±3.47 (L3 - around 20 months)	875.98±1.98	1482.18±2.77	4.06±0.51	25.61

Those values show the fact that when are assured optimal conditions for growing of young females, those ones could enter into the reproductive circuit starting with their first year of life, without being recorded negative effects on further corporal development or on the main indicators of reproduction function.

CONCLUSIONS

In the batch consisting of females who had at the beginning of the experiments the average age of 272.20 days it is observed that they had an average weight of only 72.38% of the adult weight, it increases to 87.99% in the second season and is situated close to the live weight of the adult sheep in the third mating season.

In the case of the batch consisting of females who had in the first mating season an average age of 15 months (L2) the average body weight represented 78.1%, increases to 91.90% and stands at 98.78% after the third cycle.

In the batch of females with the average age of 20 months (L3) it is found that if in the first season it achieved only 85.45% of the average live weight of the adult sheep, in the following season it reaches an average live weight equivalent to about 94% and exceeds the body weight of adult sheep after the third breeding cycle.

In the batch of females that had an average age of 20 months when they were used for the first

time at mating, after the end of the three consecutive breeding cycles, it is found that they exceeded by about 0.8% the live weight determined in the ewes over three years old.

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