The Influence of Various Factors on the Fertility of Multiparous Kyrgyz Sheep

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Abstract
The fertility of multiparous Kyrgyz sheep was studied in this work. It was revealed that the values of young stock actual accretion per 100 lambed ewes might vary greatly with age. Its value was increasing gradually up to the 4-year-old age of ewes. It was found that with the increase in ewes' live weight to a certain limit, fertility also increased, and the further increase in live weight was associated with the increase in fertility. Ewes with the live weight of 50.0-54.9 kg had the highest fertility (170.4%). Ewes' fertility in relation to age was in the range of 146.0-168.0%. The highest fertility was observed at the age of 4 years (168.0%). Revenues from sales of sheep products were 12,628 som from hybrid animals, including 7,284 som from meat (mutton), 334 som from sheep pelt, and 5,010 som from animal yield. The total receipts from local hair sheep amounted to 10,194 som, including 6,900 som from meat, 54 som from sheep pelt, and 3,240 som from animal yield or, in comparison with hybrid animals, 2,434 (19.3%) som less.
Keywords: live weight, age, ewe, fertility, lambs dropped, multiparous, economic effectiveness.

INTRODUCTION

Live weight is one of the main selection traits in sheep breeding. This trait, which characterizes the whole body, is closely related to many properties of animals. Its quantitative index characterizes the total mass of all organs and other body components [1, 2].

Animals of different breeds, sex, age, living in different economic conditions, have their own optimal live weight. Deviations from it, both in the direction of decrease and increase, indicate violations of individual development, leading not only to the decrease in their viability and adaptiveness, but also to the manifestation of other productive qualities. For example, underdevelopment of animals is expressed in the loss of economic value, decrease in fertility and quality of animal yield. However, excessively large animals are not always the best because they consume a lot of feed and give relatively less useful production [3, 4].

So, it means that the selection of animals by live weight should be combined with the main feature of the breed productivity.

In this regard, it can be noted that the selection of sheep by live weight leads to a significant change in other production characters. It is so due to the presence of the appropriate phenotypic correlations between live weight and such signs as meat and wool production, the yield of lambs dropped, etc.

MATERIALS AND METHODS

The materials of the research were Kyrgyz sheep of the multiparous type raised by cross breeding of local hair sheep with stud rams of the Romanov breed. Live weight was determined individually by weighing of stud rams and ewes before insemination, and of young stock – after birth, when weaning, in the 1-year and 18-month-old age with accuracy up to 0.1 kg, followed by the calculation of the average daily growth and growth rate.

The economic effectiveness was determined by comparing the production characters of different genotypes. The calculation was created on the basis of comparable prices in 2017.

All digital material was processed by the method of variation statistics with the use of modern software and hardware [5].

RESULTS AND DISCUSSION

The data characterizing the indices of reproduction of Kyrgyz multiparous ewes in relation to their live weight before mating are given in Table 1.

According to Table 1, the highest fertilization, as a result of insemination, was observed among ewes of the group III, with live weight of 50.0 to 55.0 kg. In this group, fertilization amounted to 170.4% and exceeded fertilization of sheep of the group I by 11.5%, sheep of the group II – by 1.9%. The incidence of still-born and abortive lambs was among ewes from the group I, the live weight of which ranged from 40.0 to 45.0 kg.

Table 1 The fertility of ewes in correlation to live weight.

Indicators	Group		
		I	II
Live weight of ewes, kg	40.0-44.9	45.0-49.9	50.0-54.9
Bred, animal units	56	54	27
Lambed, total, animal units	55	54	27
incl. twins	30	31	15
triples	2	3	2
still-born	-	1	-
Abortive, animal units	1	-	-
Stay open, animal units	1	-	-
Live lambs, animal units	88	91	46
Live lambs per 100 mated ewes, %	157.1	168.5	170.4
Live lambs per 100 lambed ewes, %	160.0	168.5	170.4
Average number of lambs dropped per 100 lambed ewes, %	166.3		

In general, it was revealed that the number of lambs dropped per 100 lambed ewes with the increase in their live weight increased as well, and reached its maximum at live weight from 50.0 up to 55.0 kg.

In the conditions of year-round driving-pasture system, the manifestation of genotypic signs of the body is directly dependent on the impact of phenotypic factors. In this regard, to confirm the results obtained in the first year of research, the experiment was repeated.

The results of the second year of research, in general, confirmed the data of the first series of the experiment. For example, the highest fertilization was among sheep in the groups II and III. According to the values of lambs dropped per 100 ewes and the safety of young stock before weaning, the observed data were similar to the 1st series, but in relatively large expressions.

Thus, it can be concluded that as the live weight of Kyrgyz multiparous sheep increases, their fertility also increases.

Our results are consistent with the scientific data by V.M. Turinsky, Sh.T. Rakhimov and others [6, 7].

The effect of age on sheep multiparity must be considered with regard to the breed of animals. Numerous observations show that early maturing breeds have the highest percentage of twins and triples at the age of 3-4 years, while late maturing sheep are characterized by the highest fertility at the age of 6 and even 7 years [7].

It is known that in connection with age, a number of complex metabolic processes occur in the body of animals that have certain impact on the performance of their reproduction. In zootechnics, it is considered that animals at a young age (1.5-2.5 years) are characterized by not very high rates of both productivity and reproductive qualities. In this case, preference is given to mature animals – 3.5-5.5 years because further on the aging process begins. However, due to the biological diversity of the breed itself, the relationship between the age of ewes and reproduction may be different. Sheep of early maturing breeds usually bring the biggest number of twins at the age of 3-4 years, and late maturing – at the age of 6-7 years.

V.M. Turinsky analyzing the indicators of fertility of multiparous Karakul ewes in the age aspect notes that its value with each subsequent lambing increases and reaches a maximum at the age of 6-7 years (174.8-177.5%) [6]. At the same time, the multiparity of animals older than this age is maintained at a fairly high level (141.6-163.2%), not inferior to the first-time lambed ewes (145.3%). Therefore, Karakul breeders successfully use this feature of Ascanian sheep to get more astrakhan production.

In this regard, it is necessary to remember that the study of the influence of ewes' age on the subsequent indicators of their reproduction, characterized by high fertility, has some practical significance.

The data indicating the influence of the age of Kyrgyz multiparous ewes on their subsequent reproduction rates are given in Table 2.

As shown in Table 2, the indicators of fertilization, fertility, and twinning are closely connected with the age of ewes. In particular, the increase in ewes' age leads to the increase in fertilization.

It was found that ewes, inseminated at the age of 1.5 years, gave, at average, 52% of twins, 2.5-year-old – 56%, 3.5-year-old – 60%, triplets – 2; 4 and 4%, there were no quadruplets at the age of 1.5, while at 2.5 and 3.5-years-old there were only 2%.

Analysis of the empirical data in the group of 14-16-year-old participants revealed the following. Compared to the control group, gifted adolescents showed higher level of development of the abilities to set goals, plan and evaluate the final result of the activity. In other words, gifted adolescents were more precise then the control group in stating the goal of the activity, developing the program of executive actions for its achievement and evaluating its results. The data revealed no significant differences between gifted students and students of the control group in the "modelling" scale in the age group of 14-16-year-old adolescents. This suggests that the differences in the regulation of one's own activity diminish with age, and therefore, the abilities to evaluate objective and subjective conditions of activity execution manifest at approximately the same level in all adolescents. In order to improve the regulatory ability to evaluate the conditions and model various ways to execute the activity, gifted adolescents need the assistance of a mentor (teacher or parent) and special training of this ability.

It is necessary to note that some regulatory skills in the group of gifted adolescents have a tendency of decreasing. The ability to plan their activity according to the goal ("planning" scale) had lower scores in 14-16-year-old gifted adolescents compared to the gifted adolescents of 12-13 years of age. We see the reason for this in the fact that the potential of a gifted adolescent, not being required, diminishes, and the regulatory skill does not develop at the same rate. Therefore, in order to avoid slowing down the rates of the planning ability development, it is necessary to implement the assistance of a mentor. The role of the mentor would consist in organizing gifted adolescents' activity, helping to plan and develop a program of executive actions in order to reach the specific result.

Table 2 The fertility of ewes in correlation to age.

Indicators	Age of ewes, years		
	2	3	4
Bred, animal units	50	50	50
Lambed, total, animal units	49	49	49
incl. twins	26	28	30
triples	1	2	2
quadruplets	-	1	1
still-born	1	1	-
Stay open, animal units	1	1	1
Live lambs, animal units	76	83	86
Live lambs per 100 mated ewes, %	52.0	166.0	172.0
Live lambs per 100 lambed ewes, %	155.0	169.0	175.0
Number of lambs dropped per 100 lambed ewes, animal units, %	73 146.0	81 162.0	84 168.0

Table 3 The effectiveness of breeding of Kyrgyz sheep of the multiparous type.

Indicators	Unit	Genotypes	
		Experimental KM	Control MG
Average live weight	kg	□□□	57.5
Sheep pelt	Unit	1.67	1.08
Animal yield	Animal units	1.67	1.08
The price of meat (1 kg in live weight)	som	120	120
1 unit of sheep pelt	som	200	50
1 animal unit/young stock	som	3,000	3,000
Revenues from sales			
Meat in live weight	som	7,284	6,900
Sheep pelt	som	334	54
animal yield	som	5,010	3,240
Total	som	12,628	10,194
The difference with the control group	som	+2,434	-
KM in % to MG	%	19.3	-

CONCLUSIONS

It was found that with the increase of ewes' live weight to a certain limit, fertility increased as well, and the further increase in live weight was associated with the increase in fertility. The ewes with the live weight of 50.0-54.9 kg had the highest fertility (170.4%).

Ewes' fertility in relation to age was in the range of 146.0-168.0%. The highest fertility was observed at the age of 4 years (168.0%).

Thus, summing up all the above-mentioned facts, in identifying the relationship of the age of the Kyrgyz multiparous ewes with indicators of their reproductive functions, it can be concluded that their value gradually increases with age.

Considering the economic effectiveness of hybridization, it is easy to verify the advantage of the breeding of multiparous sheep taken as a result of cross-breeding of hair sheep with rams of the Romanov breed over the local hair rams of the same age.

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