USE OF EARLY AGE KARAKUL YOUNG EWES FOR REPRODUCTION

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Abstract

The aim of the present research was to examine the possibilities of using Karakul young ewes at an early age (8-9 months) for reproduction and to elucidate its impact on body development, own productivity and the quality of the descendants. Research has shown that from Karakul young ewes, mated at the early age of 8-9 months, high birth rates were obtained, at the level of 74-78% of the flock of young ewes admitted to mating, as well as increased fertility, at level of 77.9-80.4% of the herd population at the beginning of calving. In order to obtain lambs with normal body development, from which the furskins corresponding to the surface quality standard would be obtained, the body mass of the Karakul young ewes admitted for mating at an early age must be not less than 30 kg or 65% of the body mass of adult ewes. Under normal conditions of feeding and care, early gestation does not cause a negative impact on subsequent body development up to 3.0 years of age. Some losses in ewes body mass during the calving period are fully restored by the following fall at the beginning of the normal mating season. Gestation and calving of young ewes at an early age (13-15 months) did not negatively influence reproductive functions in subsequent calvings. Significant differences by reproductive indices (fertility, prolificacy) in the second and third calving between ewes from the SL-1 sublots, which calved at an early age (13-15 months), and those from the SL-2 sublots, which calved at the usual age (25-27 months), were not found. The ewes from Batch I, reared during summer grazing, had a tendency to be more prolific, compared to their contemporaries from batchs II and III, which were reared all year round in stables, respectively by 6.6 and 4.7 % ($P < 0.05$ and $P < 0.1$). Early gestation and calving of young ewes at 13-15 months of age did not negatively influence the quality of the offspring and the production of hides in subsequent calvings. Significant differences in lamb body weight at birth and second and third lambing furskin qualities between ewes from SL-1 sublots, which calved at an early age, and those from SL-2 sublots, which calved at a normal age, were not found.

***Key words**: Karakul young ewes, early mating, body development*

INTRODUCTION

The early mating of young ewes, as a method of intensification of reproduction, attracts the attention of many researchers in the world. The premise for this serves the biological possibility of the young ewes organism to produce mature eggs at an early age of development in the postnatal period.

English researchers Trounson et al. [1], demonstrated that the ovaries of young ewes are able to produce and eliminate full mature eggs already at the age of 70-112 days. Some researchers [2, 3] report that puberty in ewes of fine-wool races occurs at the age of 6-7 months, but the physiological maturity of the body is mostly formed, at the age of 1.5 years, when the body mass reaches 75-85% of the mass of adult ewes.

Professor Студенцов А.П. [4] reported that, in addition to puberty, it is necessary to distinguish bodily maturity, which comes to ewes at the age of 12-15 months.

According to the information of Rămneamțu N. [5], the puberty young ewes of the Australian Polwarth races comes with reaching a body mass of 25-30 kg at the age of 8-9 months. However, young ewes are used for reproduction at the age of 18 months.

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The manuscript was received: 04.09.2023
Accepted for publication: 01.11.2023

Kennaway et al. [6], report that puberty young ewes in local races of Australian sheep occurs at 9-10 months of age.

In his time the academician Иванов М.Ф. [7] also mentioned that, when breeding Ostfriza sheep, young ewes are admitted to the first mating at the age of 7-9 months, due to their precocity.

In several researches [8, 9, 10] it is shown that in precocious races of sheep, puberty comes at an earlier age and manifests itself more expressive.

Investigating the efficiency of crossing ewes from precocious races with rams from crossbred races, Cameron N. [11] revealed that crossbred young ewes (F1) are capable of mating already at the age of 7 months, having a body mass of 34.8-36.5 kg. At 12 months of age, 62-78% of sows farrowed normally.

Interesting research on the use of the physiological precocity of young ewes for production purposes has been carried out on the Romanov race. Thus, Романюк Н.А. [12], Ковнерёв et al. [13], Ястремский В.Я. [14], Бедило Н.Д. et al. [15], Голубина Л.Т. [16] report that Romanov young ewes can be mated at 6-8 months of age, when they reach a body mass of 30-32 kg or 70-75% of the mass of adult ewes. Their fecundity is from 55 to 70%.

In the Karakul race, the problem of using young ewes at an early age (6-8 months) for reproduction has been experienced by a number of researchers such as: Дъячков et al. [17]; Ерохин В.И. [18]; Арапов П.В. [19]; Семёнов И.Г. [20]; Тавитов М.Д. [21]; Миров М.И. [22]; Ширинский М.А. [23]; Шиманов В. et al. [24]. Depending on the body development of the young ewes at early mating, they obtained from 24-35% of calvings [19] to 81.6% of calvings [17] from the herd of young ewes allowed to mate. Most of the authors concluded that Karakul young ewes with a body mass of 28-30 kg can be accepted for mating, and early gestation does not harm their body development and productivity.

At the same time, some researchers [25, 23] state that the early mating (at 6-8 months) of young ewes later negatively influences their development and productivity, as well as the quality of the offspring.

Generalizing the above-mentioned materials, regarding the early use of young ewes for reproduction, we can note that the researchers' conclusions are controversial. Therefore, most researchers could not give an explicit answer to the question of the impact of early gestation on the development of the body mass of sheep, because they (with the exception of Тавитов М.Д. [21]) conducted research on ewes calving only up to the age of 1.5-2.0 years. The authors did not sufficiently elucidate the degree of impact of early gestation on the subsequent development and productivity of the young ewes, they did not sufficiently evaluate the economic production efficiency of the results obtained.

At the same time, the addressed problem is undoubtedly of scientific and practical interest, taking into account the possibility of intensifying the rate of reproduction in the herd.

In this context, the aim of the present research was to examine the possibilities of using Karakul young ewes at an early age (8-9 months) for reproduction and to elucidate its impact on corporeal development and own productivity, as well as the quality of the offspring.

MATERIAL AND METHOD

The researches were carried out by us in production conditions, in a special scientific-practical experiment at the sheep complex with a herd of over 4000 heads [26]. Three similar batches of young ewes were formed at the age of 3.5 months, 150 heads in each batch, according to the specially developed scheme (Tab. 1).

The birds from Batch I served as controls and were maintained under normal farm conditions. During the winter they were in the paddock with free access to enter the room during bad weather. In the

summer, these young ewes were moved daily to graze on natural meadows that were at a distance of 5-6 km from the paddock where they spent the night.

The young ewes of batchs II and III were maintained during the 3-year period in stable conditions in the paddock with free access to the room.

Table 1 Scheme of the experiment

I N D I C A T O R I	Batch I (control)	Batch II	BatchIII
Number of young ewes	150	150	150
The age of young ewes, months	3.5	3.5	3.5
The number of young ewes admitted to mating at the age of 8 months	100	100	100
Feed level	IUZ norms	IUZ norms	IUZ norms
Type of feeding: winter	Natural fodder, grass pellets	Natural fodder, grass pellets	Natural fodder, grass pellets
summer	Natural pasture grass	Mowed green mass	Mowed green mass
Maintenance system	Stable in winter in paddock, pastured in summer	Stables all year in the paddock, in the summer with active walking	Stable all year in the paddock

In favorable climatic conditions, the young ewes were fed from mangers in the paddock, and in unfavorable conditions - in mangers located in the rooms. During the summer, the young ewes from the experimental batchs II and III were fed in the manger in the paddock with green mass from different predominantly cultivated grasses, fully mowed.

During the summer, the young ewes from Batch II were taken out daily for an active walk (active walking without grazing) at a distance of 5 km. During the winter period, the young ewes from all batches were kept together in the stable in the paddock, under the same nutritional conditions.

At the age of 8 months (autumn), each batch of young ewes was divided into two similar sub-lots, of which, the young ewes of a sub-lot numbering 100 heads were admitted to mating at an early age (8-9 months).

In the young ewes involved in the experiment, the following were investigated: body development; reproductive indices (coming into heat, fecundity, calving percentage, calving intensity, prolificacy). Body conformation and constitution, furskin qualities were investigated in newborn lambs. The research experiments lasted until the age of 3.0 years of the ewes.

RESULTS AND DISCUSSIONS

The results of the research demonstrated that in all experimental batches of young ewes, mated at the early age of 8-9 months, high natality rates were obtained, at the level of 74-78% of the flock of young ewes admitted to mating, as well as fertility increased, at the level of 77.9-80.4% of the herds existing at the beginning of calving (Tab. 2).

Table 2 Calving results of mated young ewes at the early age of 8-9 months

I n d i c a t o r i	Batch I	Batch II	Batch II
The number of young ewes admitted for mating	100	100	100
The number of young ewes existing at the beginning of calving	97	96	95
of them: they gave birth	78	75	74
they aborted	3	1	1
Fertility (young ewes from those existing at the beginning of calving),%	80,4	78,1	77,9
Lambs were obtained, totally	80	76	75
Including stillbirths	1	3	4
Prolificity, %	102,3	101,3	101,4

For comparison, we mention that, in the experiments of Дъячков et al. [17] a fertility of 81.6% was obtained; of Семёнов И.Г. [20] - 29.5%; Тавитов М.Д. [21] - 32.5-66.0%; Миров И.И. [22] - 14.9-48.5%.

Regarding the influence of the maintenance system on the reproductive functions of young ewes, most researchers [27, 2, 28, 29, 30, 31, 11] came to the conclusion that, under normal forage conditions, ewes show high reproductive qualities both by grazing and stable maintenance.

In our experiment, significant differences according to the percentage of young ewes born (fertility index), prolificacy index and other indicators, between young ewes from different experimental batchs were not found. The prolificacy of the young ewes born at an early age was overall not too high, oscillating on average in the lots within the limits of 101.3 - 102.6%. Parturition of the young ewes was mostly normal. During the entire calving period, only a non-essential amount of abortions and stillborn lambs was recorded within the limits of 1-4%, which falls within the limits of the usual norms received in karakultur. The maternal instinct in young ewes, calved at an early age is manifested in most cases quite pronounced. After calving, the ewes lovingly licked, nursed and cared for their offspring. After the lambs were slaughtered for the furskin worm, the young ewes squealed and fussed for several days at a time.

In order to identify the factors that essentially influence the coming of puberty and the formation of fertile fertilization capacities, the analysis of the intensity of fertile young ewes according to their corporeal development at the beginning of the mating company was carried out (Tab. 3).

Table 3 The degree of fertile insemination of young ewes according to body mass

Body mass, kg	Batch I			Batch II			Batch III			Total by batchs		
	Young ewes admitted to mating	From them they fertilized		Young ewes admitted to mating	From them they fertilized		Young ewes admitted to mating	From them they fertilized		Young ewes admitted to mating	From them they fertilized	
		head	%		head	head		head	head		head	%
18-19	-	-	-	1	-	0.0	-	-	-	1	-	0.0
20-21	3	2	66.7	-	-	-	1	-	0.0	4	2	50.0
22-23	5	1	20.0	10	4	40.0	2	-	0.0	17	5	29.4
24-25	7	3	42.9	10	7	70.0	10	6	60.0	27	16	59.3
26-27	14	9	64.3	19	11	57.9	17	10	58.8	50	30	60.0
28-29	30	25	83.3	14	12	85.7	17	14	82.4	61	51	83.6
30-31	21	21	100	19	16	84.2	27	21	77.8	67	58	86.6
32-33	11	11	100	13	13	100	14	12	85.7	38	36	94.7
34-35	3	3	100	9	8	88.9	9	9	100	21	20	95.2
36-37	5	5	100	2	2	100	1	1	100	8	8	100
38-39	1	-	-	3	3	100	1	1	100	5	4	80.0
40-41	-	-	-	-	-	-	1	1	100	1	1	100

The presented data demonstrate that the intensity of coming into estrus of the young ewes at an early age and the frequency of cases of fertile insemination increase proportionally with the increase of their body mass. Of all the young ewes that had a body mass of 22-23 kg (17 heads) only 5 heads or 29.4% came into estrus and were fertilely mated. At the same time, among the young ewes that had a body mass before mating equal to 34-35 kg (21 heads), 20 heads or 95.2% came into estrus and mated fertile, which is typical for adult ewes. The data show that poorly developed young ewes practically very rarely come into estrus, because they have not yet reached the physiological maturity of the organism and are not capable of fertile mating.

Among researchers, however, there is no single opinion regarding the minimum body mass limit of Karakul young ewes for their admission to the first mating.

We have established that, in order to obtain newborn lambs with normal body development, from which furskins corresponding to the surface quality standard would be obtained, the body mass of Karakul young ewes admitted to mating at an early age must constitute, under the conditions of the Republic Moldova, not less than 30 kg or 65% of the body mass of adult ewes of this race. Otherwise, the efficiency of mating and the quality of offspring obtained from them decreases significantly. This fact is confirmed by the high positive correlation of the body mass of the young ewes at mating (at the age of 8 months) with the surface of the furskins obtained from the newborn lambs (r_{xy} = 0.79 ± 0.04). From here it follows that, with the increase in the body mass of the mother young ewes, the surface of the euskins, obtained from their offspring, increases significantly (Tab. 4).

From the data in the table, it can be seen that 231 Karakul furskins with an average surface area of 1447 ± 18 cm^2 were obtained from the newborn lambs of the mated young ewes at the early age of 8-9 months, which on average corresponds to the requirements of the standard for this commercial goods.

Table 4. Relationship between body mass of mated young ewes at early age and furskin area obtained from lambs

Body mass of young ewes at mating, kg	The surface of Karakul furskins, obtained from newborn lambs, cm^2			
	N	M ± m	δ	Cv,%
20-23	7	900 ± 63	163	18.1
24-25	17	1029 ± 42	173	16.8
26-27	31	1287 ± 29	163	12.7
28-29	51	1425 ± 21	153	10.7
30-31	57	1465 ± 20	147	10.0
32-33	35	1580 ± 25	147	9.3
34-35	20	1720 ± 25	111	6.5
36-37	8	1825 ± 53	149	8.2
38-39	5	2020 ± 120	268	13.3
Total	**231**	**1447 ±18**	**266**	**18.4**

When sorting the Karakul skins, obtained from newborn lambs of ewes with a body mass at mating below 30 kg, it was found that a good part of them (the skins), according to the GOSTs in force, do not reach the standard level of large surface area, ranking in the medium surface category (< 1400 cm^2).

In particular, from the progeny of young ewes that had a body mass at mating below 28 kg, furskins with average surface area (below standard) were obtained, and from newborn lambs from young ewes that had a body mass at mating below 26 kg had the furskins were obtained, mostly, below standard, including with a small and particularly small surface area (Tab. 5).

Table 5 Distribution of Karakul furskins by area by function of the body mass of the young

Body mass of young ewes at mating (at 8 months), kg	The amount of furskins, in pieces	Including by surface							
		Big > 1400 cm^2		Average 900 - 1400 cm^2		Small 700 - 900 cm^2		Very small 500 - 700 cm^2	
		pieces	%	pieces	%	pieces	%	pieces	%
20-23	7	-	-	5	71,4	2	28,6	-	-
24-25	17	-	-	15	88,2	1	5,9	1	5,9
26-27	31	9	29,0	22	71,0	-	-	-	-
28-29	51	30	58,8	21	41,2	-	-	-	-
30-31	57	37	64,9	20	35,1	-	-	-	-
32-33	35	32	91,4	3	8,6	-	-	-	-
34-35	20	20	100	-	-	-	-	-	-
36-37	8	8	100	-	-	-	-	-	-
38-39	5	5	100	-	-	-	-	-	-
Total	**231**	**141**	**61,1**	**86**	**37,2**	**3**	**1,3**	**1**	**0,4**

At the same time, the data analysis demonstrates the fact that from newborn lambs of young ewes with a body mass at the beginning of the mating campaign of 30-31 kg were obtained 64.9% of furskins with a large surface area (over 1400 cm^2) and 35.1% of of furskins with an average surface (from 900 to 1400 cm^2). With the increase in the body mass of the young ewes at mating, the weight of large-surface furskins increases substantially and the proportion of medium-surface furskins in the total volume of furskins obtained decreases. Thus, from the progeny of young ewes with a mating body mass of 32-33 kg, 91.4% of furskins with a large surface and only 8.6% of furskins with a medium surface were obtained.

Finally, all Karakul furskins obtained from newborn lambs of young ewes with body mass at mating over 34 kg had one hundred percent large area, over 1400 cm^2. These results served as the main criterion for establishing the threshold of the minimum admissible limit of the body mass of the young ewes for admission to mating at the age of 8-9 months.

Research has shown that early gestation had some temporary influence on the body development of ewe/ewes at different ages (Tab. 6).

Table 6 Dynamics of the body mass of the young ewes in profile by batchs and sub-lots (SL), kg

Sub-lots	Batch I				Batch II				Batch III			
	N	M ± m	d	t_d	N	M ± m	d	t_d	N	M ± m	d	t_d
At the age of 8 months												
SL-1	92	29.71±0.33	0.00	0.00	85	30.26±0.42	+0.25	037	79	30.52±0,36	+0.44	0.85
SL-2	33	29.71±0.61	-	-	37	30.01±0.53	-	-	39	30.96±0,39	-	-
Total	148	29.11±0.30	-	-	149	29.29±0.33	+0.18	0.19	148	29.74±0,28	+0.63	1.54
At the age of 13 months												
SL-1	92	42.26±0.54	+1.90	1.54	85	41.83±0.65	+3.75	3.65	79	40.81±0,61	+1.72	2.01
SL-2	33	40.36±1.11	-	-	37	38.08±0.80	-	-	39	39.09±0,60	-	-
Total	136	40,98±0.52	-	-	139	39.70±0.53	-1.28	1.73	139	39.02±0,52	-1.96	2.81
At the age of 15 months												
SL-1	92	40.64±0.54	-3.14	2.19	82	39.71±0.64	-1.41	1.35	75	40.05±0,62	-2.47	2,65
SL-2	31	43.78±1.32	-	-	37	41.12±0.82	-	-	39	42.52±0,69	-	-
Total	133	41.13±0.51	-	-	135	39.75±0,48	-1.38	1.99	135	40.10±0,46	-1.03	1.49
At the age of 20 months												
SL-1	91	44.72±0.53	-0.49	0.39	78	44.40±0.62	-1.38	0.87	72	44.13±0,61	-1.10	0.88
SL-2	31	45.21±1.12	-	-	35	45.29±0.81	-	-	38	45.00±0,78	-	-
Total	131	44.60±0.46	-	-	127	44.37±0,47	-0.23	0.34	126	43.84±0,46	-0.76	1.16
At the age of 25months												
SL-1	89	47.23±0.56	-0.39	0.32	77	47.47±0.60	-0.07	0.07	72	47.36±0,63	-0.49	0.54
SL-2	30	47.62±1.07	-	-	34	47.54±0.83	-	-	37	47.85±0,65	-	-
Total	126	47.13±0.48	-	-	125	47.14±0,46	+0.01	0.02	125	47.08±0,44	0.05	0.07
At the age of 27 months												
SL-1	86	43.94±0,67	-0.49	0.36	77	44.91±0.66	+0.58	0.47	71	44.84±0,61	-0.25	0.25
SL-2	30	44.43±1.17	-	-	34	44.33±1.03	-	-	35	45.09±0,72	-	-
Total	123	43.60±0.55	-	-	125	44.41±0.52	+0.55	0.72	122	44.48±0,49	+0.62	083
At the age of 32 months												
SL-1	82	50.46±0.65	-0.60	0.57	70	50.55±0.74	+0.47	0.33	66	50.77±0,77	-0.79	0.66
SL-2	30	51.06±0.82	-	-	31	50.08±1.19	-	-	33	51.56±0,90	-	-
Total	119	50.18±0.53	-	-	114	50.09±0,60	-0.09	0.10	112	50.58±0,56	+0.40	0.56
At the age of 36 months												
SL-1	80	53.33±0.68	-0.57	0.51	69	53.57±0.75	+0.48	0.34	64	53.74±0,80	-0.68	0.56
SL-2	29	53.90±0.89	-	-	30	53.09±1.18	-	-	32	54.42±0,92	-	-
Total	116	53.05±0.55	-	-	111	53.10±0,61	+0.05	0.06	109	53.55±0,57	+0.50	0.63

If at the beginning of the mating (at the age of 8 months), the body mass was practically similar in all experimental groups and subgroups, then during the gestation period, at the age of 13 months, the fertilized young ewes grew more intensively in body mass, compared to the non-fertile ones. Towards the age of 13 months, pregnant young ewes from sublots 1 (SL-1) significantly exceeded their non-pregnant contemporaries from sublots 2 (SL-2) according to body mass, respectively by: 1.90; 3.75 and 1.72 kg or 4.7; 9.8 and 4.4% ($P<0.1$; $P < 0.001$ and $P < 0.05$). This is undoubtedly explained by the growth and development of the fetus.

But, after the first calving, the picture changed the other way around. At the age of 15 months (after calving), mice calved at an early age (SL-1) yielded to their non-calved contemporaries (SL-2) by body mass respectively by: 3.14; 1.41 and 2.47 kg or 7.2; 3.4 and 5.8% ($P < 0.05$; $P < 0.1$ and $P < 0.01$). This is mainly related to the sudden loss of body mass during parturition itself. Subsequently, for five months after farrowing, the body mass gain of young ewes from Subplots 1 (SL-1), which farrowed at an early age, was significantly higher compared to non-spawned mice from Subplots 2 (SL-2), by 1.1-2.8 times and by this they quickly regained their body mass. The more intensive growth in the body mass of young ewes during this period can be considered as a compensation for the growing retention of the body during the period of gestation and lactation [32].

In our experiment, already towards autumn (the beginning of the breeding season), at the age of 20 months, there were no significant differences in body mass between the young ewes born at an early age and those that were not born. Overall, in each batch and sublot, at the beginning of the breeding season, the heifers achieved good body development. The average body weight of the young ewes at an early age ranged from 44.13±0.61 to 44.72±0.53 kg, and of the non-logged young ewes it ranged from 45.00±0.78 to 45.29±0.81 kg. These indices fully correspond to the standard requirements of the Karakul breed for ewes of the respective age. Typically, in the second fall, at 20-22 months of age, all young ewes in the experimental lots and sublots were inseminated. At this stage, neither during the gestation period (at the age of 20-25 months) nor after the second calving of the young ewes (the age of 27 months), significant differences according to the body mass of the ewes from sublots 1 (SL-1) and those from sublots 2 (SL-2) were not found. In ewes from all experimental batchs and sub-lots, to the same extent only a loss of body mass after calving by 5.3-7.0% was found.

By the third autumn, at the beginning of a new normal mating season, ewes from all experimental batchs and sub-lots at 32 months of age had fairly good development and fattening status. The average body weight of ewes born at an early age (13-15 months) in the experimental batchs ranged from 50.46±0.65 to 50.77±0.77 kg, and those born at the traditional age (of 25-27 months) made up from 50.08±1.19 to 51.56±0.90 kg.

As can be seen, no significant differences in body mass of ewes from sub-lots 1 (SL-1) and sub-lots 2 (SL-2) were found. At the age of three years (36 months), ewes from all experimental batchs and sub-lots reached a high body mass for the Karakul race. The average body weight of the ewes from sublots 1 (SL-1), which calved at an early age constituted by lot: 53.33±0.68; 53.57±0.75 and 53.74±0.80 kg, and of the ewes from sublots 2 (SL-2), which calved at the traditional (normal) age constituted by lots: 53.90±0.89 ; 53.09±1.18 and 54.42±0.92 kg. The average body mass in profile for the batches was from 53.05±0.55 to 53.55±0.57 kg, which is far above the standard requirements for the adult Karakul race.

Therefore, under normal conditions of feeding and care, early gestation does not cause a negative impact on the subsequent

development of the organism. Some losses in ewes body mass during the calving period are fully restored by the following fall at the beginning of the normal lambing season. At all investigated age periods, significant differences according to the body mass of ewes raised in different maintenance conditions during the summer (pasture or stable) were not found.

The research data showed that calving young ewes at an early age (13-15 months) did not negatively influence reproductive functions in subsequent calvings (Tab. 7).

Table 7 Reproductive indices of ewes in subsequent calvings by batchs and sublots

REPRODUCTIVE INDEXES	Batch I			Batch II			Batch III		
	SL-1	SL-2	Total	SL-1	SL-2	Total	SL-1	SL-2	Total
Second calving									
Nomber of sheep at the beginning of lambing	88	30	125	77	34	125	72	37	125
Of these: they gave birth, head	85	29	121	74	33	120	69	35	120
%	96.6	96.7	96.8	96.1	97.1	96.0	95.8	94.6	96.0
they remained infertile, head	3	1	4	3	1	4	3	2	5
%	3.4	3.3	3.2	3.9	2.9	4.0	4.2	5.4	4.0
Total lambs were obtained, head	91	31	129	78	35	126	72	37	128
Incl: stillborns, head	1	1	2	2	1	3	-	2	3
%	1.1	3.2	1.6	2.6	2.8	2.4	-	5.4	2.3
Prolificacy, %	107.1	106.9	106.6	105.4	106.1	105.0	108.7	105.7	106.7
Third calving									
Nomber of sheep at the beginning of lambing	80	29	116	69	30	111	64	32	109
Of these: they gave birth, head	79	29	115	68	29	109	63	31	107
%	98.8	100	99.1	98.6	96.7	98.2	98.4	96.9	98.2
they remained infertile, head	1	-	1	1	1	2	1	1	2
%	1.2	-	0.9	1.4	3.3	1.8	1.6	3.1	1.8
Total lambs were obtained, head	88	31	126	70	30	112	65	33	112
Incl: stillborns, head	1	-	1	2	1	3	2	1	3
%	1.1	-	0.8	2.9	3.3	2.7	3.1	3.0	2.7
Prolificacy, %	114.4	106.9	109.6	102.9	103.4	102.8	103.2	106.5	104.7

The prolificacy of the ewes from the sublots 1 (SL-1), which calved at an early age (13-15 months), was in the second calving, respectively on the batchs: 107.1; 105.4 and 108.7%, and of the ewes from sublots 2 (SL-2), which calved at the usual age (25-27 months, for them being the first calving), constituted respectively per batchs: 106.9; 106.1 and 105.7%.

In the third calving, the prolificacy of the ewes constituted, respectively by batchs: in the ewes from sublots 1 (SL-1) – 111.4; 102.9 and 103.2%, in ewes from sublots 2 (SL-2), for them being the second calving, it was 106.9; 103.4 and 106.5%. It was found that the ewes from Batch I, which were reared during the summer grazing, had a tendency to be more prolific, compared to their contemporaries from batches II and III, which were reared all year in the stable, respectively with 6.6 and 4.7% ($P < 0.05$ and $P < 0.1$). According to the other reproductive indices, no significant differences were found between the ewes raised in different maintenance conditions (stallage or grazing).

In all experimental batchs and sub-lots, in the second and third lambing, lambs were born with normal body development and robust body constitution (Tab. 8).

Table 8 Body mass of lambs at birth, kg

Batch	Sublot	N	M ± m	δ	Cv%	d (SL_1- SL_2) ($M_{2,3}$-M_1)	t_d
Second calving							
Batch I	SL-1	90	4.58 ± 0.08	0.76	16.6	-0.02	0.10
	SL-2	30	4.60 ± 0.16	0.87	18.9	-	-
	Total	127	4.57 ± 0.07	0.78	17.1	-	-
Batch II	SL-1	76	4.76 ± 0.08	0.74	15.5	+0.07	0.45
	SL-2	34	4.69 ± 0.13	0.75	16.1	-	-
	Total	123	4.70 ± 0.06	0.72	15.4	+0.13	1.44
Batch III	SL-1	75	4.67 ± 0.08	0.71	15.2	+0.01	0.08
	SL-2	35	4.66 ± 0.09	0.56	11.9	-	-
	Total	125	4.65 ± 0.06	0.66	14.3	+0.08	0.90
Third calving							
Batch I	SL-1	87	4.83 ± 0.09	0.81	16.0	+0.07	0.50
	SL-2	31	4.76 ± 0.11	0.60	12.6	-	-
	Total	125	4.82 ± 0.07	0.77	15.9	-	-
Batch II	SL-1	68	4.78 ± 0.08	0.67	14.1	-0.02	0.10
	SL-2	29	4.80 ± 0.13	0.72	15.1	-	-
	Total	109	4.79 ± 0.07	0.68	14.2	-0.03	0.27
Batch III	SL-1	63	4.98 ± 0.09	0.74	14.8	-0.12	0.74
	SL-2	32	5.10 ± 0.13	0.76	14.8	-	-
	Total	109	5.01 ± 0.07	0.74	14.7	+0.19	1.98

The average body weight of the lambs at birth varied by lot, in the second calving, within the limits of 4.57 - 4.76 kg, and in the third calving, 4.76 - 5.10 kg. Significant differences by body mass at birth of lambs from sublots SL-1 and SL-2 in all experimental batchs, in the second and third calving, were not found. However, in total for the lots, the lambs from Batch III, obtained from ewes reared permanently in stable conditions, in the third calving, surpassed their contemporaries from Batch I (control), obtained from ewes reared during the period of body mass at birth from summer to grazing, by 3.9% ($P < 0.05$).

The vast majority of lambs at birth were of robust constitution. Their average rate in the total herd by batchs and sublots varied in the first calving from 76.7±7.9 to 82.1±3.5% and in the second calving, from 77.8±5.3 to to 82.8±4.1%. Significant differences according to the birth constitution of lambs from sublots SL-1 and SL-2 in all experimental batchs, in the second and third calvings were not found.

From the above we can conclude that, under normal feeding and maintenance conditions, the use of ewes at an early age for reproduction does not cause any negative influence on the reproductive functions of ewes in subsequent lambings.

The results of the research showed that the lambs obtained in the second and third lambing of the ewes both in the experimental sublots 1 (SL-1) and in the sublots 2 (SL-2) possessed, mainly, a thick, silky hair coat, glossy, with intense black pigmentation. In the lambs of batches II and III, born from ewes reared the whole period of the year in stable conditions, an obvious trend of longer hair fiber length on the rump is observed. The furskins of the lambs at the rating were mainly covered with valuable types of curls, such as waves and grain. In newborn lambs, the surface of the furskin occupied by wave-type curls was on average in batches: in the second calving – within the limits of 60.4 - 62.0% and in the third calving, 70.3 – 70.5%. The skin on most lambs was of medium thickness, dense and loosely wrapped around the body of the lambs. By the type of furskin curl, the predominant majority of newborn lambs had the jacket curl type – required for breeding.

We want to mention that, significant differences, according to the weight of lambs with a certain type of curl between the progeny of the sublots (SL-1 and SL-2) and

the experimental batchs, obtained from the ewes calved at an early age (13 – 15 months) and those calved at the usual age (25-27 months), as well as between the progeny of the experimental batchs, obtained from the ewes raised in different maintenance conditions (stallage or grazing), were not found.

The overwhelming majority of lambs, obtained in the second and third calving, were reported to Class I to rating (Tab. 9).

Table 9 Distribution of lambs by rating class, M ± m

Batch	Sublots	N	Including the class, %		
			Elite	Class I	Class II
Second calving					
Batch I	SL-1	91	17.6±4.0	67.0±5.0	15.4±3.8
	SL-2	31	16.1±6.7	64.5±8.7	19.4±7.2
	Total	129	16.3±3.3	65.9±4.2	17.8±3.4
Batch II	SL-1	78	19.2±4.5	66.7±5.4	14.1±4.0
	SL-2	35	14.3±6.0	65.7±8.1	20.0±6.9
	Total	126	19.0±3.5	63.5±4.3	17.5±3.4
Batch III	SL-1	75	18.7±4.5	65.3±5.5	10.0±4.3
	SL-2	37	18.9±6.5	62.2±8.1	18.9±6.5
	Total	128	17.2±3.4	65.6±4.2	17.2±3.4
Third calving					
Batch I	SL-1	88	37.5±5.2	48.9±5.4	13.6±3.7
	SL-2	31	38.7±8.9	48.4±9.1	12.9±6.1
	Total	126	37.3±4.3	49.2±4.5	13.5±3.1
Batch II	SL-1	70	37.1±5.8	52.9±6.0	10.0±3.6
	SL-2	30	33.3±8.8	56.7±9.2	10.0±5.6
	Total	112	34.8±4.5	53.6±4.7	11.6±9.2
Batch III	SL-1	65	30.8±5.8	52.8±6.2	15.4±4.5
	SL-2	33	36.4±8.5	51.5±8.8	12.1±5.8
	Total	112	32.1±4.5	54.5±4.7	13.4±3.2

The share of individuals of this class, in the second calving, was between 63.5-65.9% in batchs. To the upper class Elita, as a whole in batchs, 16.3 - 19.0% of the newborn lambs were reported.

In the progeny from the third calving, the yield of lambs of the highest quality class (Elite) as a whole in the lots increased, compared to the progeny from the second calving, up to 32.1 – 37.3%. Most of the lambs in the third calving, however, were Class I rating. The share of lambs of this class constituted as a whole in the batchs within the limits of 49.2 - 54.5%. Significant differences, according to the weight of lambs of certain rating classes, between the progeny of the sublots (SL-1 and SL-2) and experimental batchs, obtained from the ewes calved at an early age (13 – 15 months) and those calved at the usual age (25-27 months), as well as between the progeny of the experimental batchs, obtained from the ewes raised in different maintenance conditions (stable or grazing), were not found.

Karakul furskins, obtained from lambs born in the second and third lambing, were distinguished by quite competitive commercial qualities. The average surface of the furskins in the salted-dry state was on average 1589-1633 cm^2 in the experimental batchs. The rate of furskins of the first sorts (I) made up the limits of 86.7-89.1%, including the most valuable jacket group - 69.5-73.6%.

Overall, according to lamb furskin characteristics and commercial furskin qualities, significant differences between lambs and furskins from experimental sublots SL-1 and Sl-2 obtained from ewes calved at an early age (13–15 months) and those calved at the usual age (25-27

months), as well as between the progeny of the experimental batchs, obtained from the ewes raised in different maintenance conditions (stallage or grazing), were not found.

Therefore, the use of Karakul young ewes at an early age for reproduction, under optimal feeding and maintenance conditions, presents an important reserve for increasing the reproduction rate of the herd, which ensures an increase in the volume of furskins and an increase in the economic efficiency of the exploitation of the ewes in the farm.

CONCLUSIONS

1. From Karakul young ewes, mated at the early age of 8-9 months, high birth rates were obtained, at the level of 74-78% of the flock of young ewes admitted to mating, as well as increased fertility, at level of 77.9-80.4% of the herd population at the beginning of calving.

2. In order to obtain lambs with normal body development, from which the furskins corresponding to the surface quality standard would be obtained, the body mass of the Karakul young ewes admitted for mating at an early age must be not less than 30 kg or 65% of the body mass of adult ewes.

3. Under normal conditions of feeding and care, early gestation does not cause a negative impact on subsequent body development up to 3.0 years of age. Some losses in ewes body mass during the calving period are fully restored by the following fall at the beginning of the normal mating season.

4. Gestation and calving of young ewes at an early age (13-15 months) did not negatively influence reproductive functions in subsequent calvings. Significant differences by reproductive indices (fertility, prolificacy) in the second and third calving between ewes from the SL-1 sublots, which calved at an early age (13-15 months), and those from the SL-2 sublots, which calved at the usual age (25-27 months), were not found.

5. The ewes from Batch I, reared during summer grazing, had a tendency to be more prolific, compared to their contemporaries from batchs II and III, which were reared all year round in stables, respectively by 6.6 and 4.7 % ($P < 0.05$ and $P < 0.1$).

6. Early gestation and calving of young ewes at 13-15 months of age did not negatively influence the quality of the offspring and the production of hides in subsequent calvings. Significant differences in lamb body weight at birth and second and third lambing furskin qualities between ewes from SL-1 sublots, which calved at an early age, and those from SL-2 sublots, which calved at a normal age, were not found.

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