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**FEATURES OF EFFECTIVE BREEDING METHODS TO IMPROVE THE
REPRODUCTION ABILITY OF KAZAKH ROUGH-WOOLED SHEEP**

Abstract

The article presents the materials of the most valuable quality of fat-tailed sheep, along with high precocity, regular fertility is the high viability of the offspring, which serves as an objective criterion for their adaptive ability to various paratypes factors and to study the reproductive productivity of Kazakh fat-tailed sheep in two flocks, 1165 freshly received ewes were cervically inseminated sperm of Kazakh fat-tailed rams. Ewes in natural estrus were detected once daily in the morning from 7 to 8 a.m. with the aid of the teaser rams. Sperm from 6 sire-rams was collected with the aid of an artificial vagina. Double cervical insemination was performed at 9-10 a.m. and 4-5 p.m. On average 78% or 921 ewes out of 1165 inseminated lambed ranging from 76% to 81% in two flocks. Total of 1080 lambs were born, or 117.3 lambs per 100 lambed ewes. Body weights in the single newborn ram and ewe lambs were 5.04 ± 0.07 (n=108) and 4.44 ± 0.07 kg (n=98), while in the twin males and females were 3.94 ± 0.08 (n=20) and 3.79 ± 0.09 kg (n=18), respectively.

It is concluded that Kazakh fat-tailed sheep have a high reproductive capacity.

Key words: *kazakh fat-tailed sheep, reproductive productivity, artificial insemination, fertility, multiple pregnancy.*

Introduction

Fat tail sheep breeding is one of the leading branches of modern domestic animal husbandry, the share of which currently makes up more than 70% of the total number of sheep in the Republic. These sheep are distinguished by exceptionally high meat productivity - as if by nature itself they were created to provide mankind with essential products.

According to the Vice Minister of Agriculture of the Republic of Kazakhstan, Abulkhair Tamabek, the number of sheep and goats in January 2023 amounted to 19 million heads [1], of which approximately 14 million are fat-tailed sheep of various breeds and types, widespread in all regions of the country.

The main economically useful and economically important traits, on the increase and improvement of which selection and breeding work is carried out with Kazakh fat-tailed coarse-wooled sheep, are body weight, growth rate, meat qualities, strength of the constitution, viability and adaptability to local conditions of detention. Along with selection for these traits, great attention must be paid to the multiplicity and safety of young animals, since the profitability of meat production directly depends on them. The selection of replacement calves from lambs born in the number of twins or triplets is a fairly effective method of breeding for this trait.

Multiparous breeds of sheep include the Finnish Landrace, Romanov, Cambridge, Dorset, Dorper, East Friesian and some others [2]. Most Kazakh fine-fleeced and semi-fine-fleeced breeds of sheep are characterized by moderate fecundity; full-aged ewes of these breeds give birth to up to 140-160 lambs per 100 queens [3]. Foreign fine-fleeced and semi-fine-fleeced sheep breeds, such as

German meat merino, South African donnie merino, Suffolk and Hampshire breed up to 160-180 lambs per 100 queens [2].

According to Kanapin [4] and Alishev [5], the multiparity in Edilbaev and Aktobe semi-coarse-wool ewes ranges from 107 to 122%. Many Kazakh sheep breeders, especially in the cold northern regions, do not welcome the birth of twin lambs and therefore immediately castrate rams born in the number of twins, thus considering twinning as an undesirable sign. However, at present, such an attitude of sheep farmers to this economically useful trait is changing because farms with a good forage base and good pastures are interested in more prolific animals that can give birth to 150-160 lambs per 100 queens and 4-month-old age, beat off 120-130 lambs, as in sheep of the Kazakh meat early-maturing semi-fine-fleeced breed [3].

Zhumadilla et al. [6] studied the reproductive productivity of Kazakh meat-and-fat sheep in the Makash breeding farm in the Atyrau region and the Kokzhyra production cooperative in the Abai region, depending on the type of birth of a ram and ewe. In their study, 537 twin-born ewes gave birth to 641 lambs, while 519 single-born ewes gave birth to 564 lambs. Their fertility was 119.4% and 108.7%, respectively, with a statistically significant difference ($P < 0.001$).

This study is carried out to study the fertility of Kazakh fat-tailed sheep.

Materials and research methods

The experimental part of the work was carried out in two flocks of ewes of the Kazakh coarse-haired breed in the Kokzhyra production complex of the Aksuat district of the Abay region. A selection of sheep in heat, obtaining and assessing the quality of sperm, and double cervical insemination were performed according to the instructions [7]. Sheep with natural estrus were identified once a day in the morning from 7 to 8 o'clock using probe rams, in which burlap aprons measuring 50 x 50 cm were tied to prevent coitus on prepuce. Sperm from 6 main rams was obtained using an artificial vagina. After being obtained under a microscope at 400-fold increase, its mobility and density were evaluated. The semen was diluted in a ratio of 1 : 2 (semen : solution) with a diluent based on sodium citrate and ammonium sulfate.

Double cervical insemination was performed from 9 am to 10 am and from 4 pm to 5 pm using an LLT-57-M semi-automatic syringe, on the body of which an ice flashlight was attached with electrical tape, with a total dose of 0.2 ml (0.1 + 0.1 ml in the morning and in the evening, respectively) dilute semen per head.

The live body weight of rams and ewes during mating and lambing periods was measured early in the morning before the pasture of the flock to pasture using a Russian-made TV-M-600.2-A1 electronic scale with a weighing limit of up to 600 kg and an accuracy of 100 g. The body condition of the animals was assessed immediately after weighting by palpation of the thickness of fat and muscles on the lumbar vertebrae on a 5-point scale [8]. Newborn lambs were weighed a few hours after birth using Chinese-made steelyard-type electronic scales with a weighing limit of up to 50 kg and an accuracy of 1 g. The obtained experimental data were processed using the ANNOVA data analysis package in Microsoft Excel and according to Plokhinsky [9].

Research results and discussion

Fat-tailed sheep have valuable and sometimes unique traits that are absent or weakly expressed in factory breeds, thanks to which they are an indispensable genetic material in breeding in the present and in the future, both in the creation of new ones and in the improvement of existing ones. Bred in many regions of Kazakhstan, fat-tailed sheep are represented by several breeds and offspring that differ significantly from each other in meat and wool productivity. The data in Table 1 show that after cervical insemination of ewes with freshly diluted sperm in the first and second flocks, 81.0% (486/595) and 76.0% (435/570) of sheep, respectively, were lambed, which is an average of 78.0% (921/1165). In the first and second flocks, only 586 and 494 lambs were obtained, or 120.1 and 113.6 lambs per 100 queens, respectively. The fertility of Kazakh fat-tailed ewes averaged 117.3 lambs per 100 queens.

Table 1 - Indicators of reproductive productivity of Kazakh fat-tailed ewes

Index	Otara 1	Otara 2	Total
Ewes inseminated	595	570	1165
Ewes have bucked: goal.	486	435	921
%	81,0	76,0	78,0
including twins: goal.	100	59	159
%	20,6	13,6	17,3
Lambs received: total	586	494	1080
per 100 mutated queens	120,1	113,6	117,3

According to Table 2, during the mating period in November 2022, the body weight of Kazakh fat-tailed rams and ewes was 113.6 ± 0.65 and 67.4 ± 0.19 kg, and body fatness was 2.76 ± 0.10 and 2.65 ± 0.05 points, respectively. After a long difficult wintering in April 2023, during the lambing period, the live weight of the body of rams and ewes decreased to 111.7 ± 0.62 and 58.1 ± 0.21 kg, and body fatness - to 2.40 ± 0.11 and 2.20 ± 0.06 points, respectively.

Table 2 - Live weight and body fatness of sires and ewes during mating and lambing periods

Group	n	November 2022		April 2023	
		body weight, kg	body condition score	body weight, kg	body condition score
Sire-rams	20	$113,6 \pm 0,65$	$2,76 \pm 0,10$	$111,7 \pm 0,62$	$2,40 \pm 0,11$
Breeding ewes	100	$67,4 \pm 0,19$	$2,65 \pm 0,05$	$58,1 \pm 0,21$	$2,20 \pm 0,06$

The data in Table 3 show that the body weight of single rams and ewes at birth was 5.04 ± 0.07 (n=108) and 4.44 ± 0.07 kg (n=98), while twins - 3, 94 ± 0.08 (n=20) and 3.79 ± 0.09 kg (n=18), respectively. Moreover, the difference between rams and ewes, both single and twin, was statistically significant, $P < 0.001$ and $P < 0.01$, respectively.

Table 3 - Live body weight at birth of single and twin Kazakh fat-tailed lambs

Group	Singles		Twins	
	n	body weight, kg	n	body weight, kg
Ram-lambs	108	$5,04 \pm 0,07^a$	20	$3,94 \pm 0,08^c$
Ewe-lambs	98	$4,44 \pm 0,07^b$	18	$3,79 \pm 0,09^d$

Note: the difference between a and b in one column is significant, $P < 0.001$;
the difference between c and d in one column is significant, $P < 0.01$.

In our experiment, after cervical insemination with freshly diluted sperm, on average, 78.0% (921/1165) of ewes were lambing in two flocks, while their fertility was 117.3 lambs per 100 ewes. These data are consistent with the data of domestic and foreign researchers [2-5]. So Zhumadilla et al. [6] reported that the fecundity of ewes of the Kokzhyra PK ranged from 105.7 to 122.2% and was the highest in ewes obtained from parents from twins. In the studies of Rakhimov and Bobokalonov [10], the fertility of Hissar ewes was at the level of 86-87%, and the fertility was 116-118%. Pettigrew et al. [11] found a significant effect of the milk productivity of ewes on the fertility, growth and development of lambs. Plakkot et al. [12] reported on the influence of various factors on the fecundity of sheep and goats, among which they noted genetic and feed factors as the main ones. Sheep fed grain and soy meal had 14% higher egg ovulation rates than those not fed.

Our data on the live weight and body fatness of rams and ewes in the spring and autumn periods and the body weight of single and twin lambs at birth are consistent with the data of domestic and foreign researchers [2-5, 13]. So, for example, in our experiment, the body weight of single rams and ewes at birth was 5.04 ± 0.07 and 4.44 ± 0.07 kg, while in the study by Morel et al. [13] in New Zealand, the average live weight of crossbred East Friesian and crossbred Romney lambs at birth on three different farms was 4.90, 4.56 and 4.72 kg; and the live weight of ewes in the breeding period is 58.5, 61.0 and 59.6 kg, respectively. Begembekov et al. [14] reported that the birth weight of the Degeres

rams of the Aktogay population at birth varied from 4.9 to 5.62, and that of the ewes, from 4.63 to 5.12 kg.

Panayotov et al. [15] reported on the high body weight of Lacaun lambs, which averaged 4.5 kg at birth, 15.9 kg at weaning at 45 days of age and 26.2 kg at 90 days of age, as well as a slight superiority of males over females for all indicators at all ages. Single lambs of all ages studied had a higher body weight compared to twin lambs - at birth more by 0.76 kg, at weaning by 3.13 kg, at 90 days of age by 3.36 kg. This indicator significantly influenced the live weight of lambs of different ages, and this effect was relatively higher on the live weight at weaning. McGovern et al. [16] investigated phenotypic factors influencing lambs' body weight and carcass size in Ireland. They recorded heavier body weights at birth, before weaning and at weaning in single lambs. The average weight of lambs at birth was 4.32 ± 1.36 kg and 3.88 ± 7.44 kg at weaning at the age of 98 days. According to Gardner et al. [17] in the UK, the body weight at birth for single rams and ewes of the Welsh rock was 4.18 and 3.65 kg, and for twin rams and ewes, 3.29 and 3.15 kg, respectively.

In a study by Turkish scientists Yenilmez et al. [18], the body weight of single lambs at birth was significantly heavier than that of twin lambs: 5.8 ± 0.96 and 4.8 ± 0.62 kg, respectively. These data are noticeably higher than those obtained in our experiment. Such high rates were obtained by Turkish colleagues on ewes that were kept on a well-balanced diet with mineral supplements, while the animals in our experiment were on year-round grazing. The winter was long, the spring came late, so the ewes during the lambing period were thin, and the weight of the lambs at birth was low. Freitas de Melo et al. [19] reported that single lambs were significantly heavier at birth and at weaning than twins. Early weaning of lambs elicited stronger behavioral responses in ewes with single lambs compared to ewes with twin lambs.

Thus, a review of domestic and foreign data on the productivity and fertility of sheep of various breeds and countries, including fat-tailed and fat-tailed sheep, indicates that the sheep belonging to the Kokzhyra production complex have a reproductive capacity and an average body fatness.

Conclusions

Kazakh fat-tailed sheep of the Kokzhyra farm of the Aksuat district of the Abay region have a high reproductive capacity. Their fertility after cervical insemination with freshly diluted semen was 78% (921/1165), fecundity 117.3% per 100 brooding queens.

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ҚАЗАҚТЫҢ ҚЫЛШЫҚ ЖҮНДІ ҚОЙЛАРЫНЫҢ КӨБЕЮ ҚАБІЛЕТТІЛІГІН ТИІМДІ СЕЛЕКЦИЯЛЫҚ ӘДІСТЕРІ АРҚЫЛЫ ЖАҚСARTУ ЕРЕКШЕЛІКТЕРІ Аңдатпа

Мақалада қонды құйрықты қойлардың ең бағалы сапасы жоғары, төлдегіштігімен, тұрақты ұрықтылығымен қатар ұрпақтарының жоғары өміршеңдігі болып табылады, бұл олардың әртүрлі паратиптік факторларға бейімделу қабілетінің объективті критерийі ретінде қызмет етеді. қазақтың құйрықты қойларының өнімділігін зерттеу үшін екі отарда 1165

аналық қойларына қазақтың құйрықты қошқарларынан жаңадан алынған ұрығымен қойды колмен ұрықтандырылды. Табиғи куйлеген қойларды тәулігіне бір рет таңертең 7-ден 8-ге дейін қошқарлардың көмегімен анықталды. 6 негізгі қошқардың ұрығы жасанды қынаптың көмегімен алынды. Екі рет жатыр мойнына ұрықтандыру сағат 9-дан 10-ға дейін және 16-дан 17-ге дейін жүргізілді. Барлығы 1165 ұрықтандырылған қойдың 921 басы мерзімінде немесе отар бойынша 76,0% - дан 81,0% - ға дейінгі ауытқулармен орта есеппен 78,0% құрады. Барлығы 1080 қозы немесе орта есеппен 100 аналыққа шаққанда 117,3 қозы туылды. Жалқы туған еркек мен ұрғашы қозының туған кездегі дене салмағы $5,04 \pm 0,07$ (n=108) және $4,44 \pm 0,07$ кг (n=98) болды, ал егіздер сәйкесінше $3,94 \pm 0,08$ (n=20) және $3,79 \pm 0,09$ кг (n=18) болды.

Қазақтың құйрықты қойларының көбею қабілеті жоғары деген қорытындыға келді.

Кілт сөздер: қазақтың құйрықты қой, репродуктивті өнімділік, төлдегіштігі, колдан ұрықтандыру, көптөлділік

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ОСОБЕННОСТИ ЭФФЕКТИВНЫХ МЕТОДОВ СЕЛЕКЦИИ ПО СОВЕРШЕНСТВОВАНИЮ ВОСПРОИЗВОДИТЕЛЬНОЙ СПОСОБНОСТИ КАЗАХСКИХ ГРУБОШЕРСТНЫХ ОВЕЦ

Аннотация

В статье представлен материалы ценнейших качества курдючных овец, наряду с высокой скороспелостью, регулярной плодовитостью, является высокая жизнеспособность приплода, которая служит объективным критерием их приспособительной способности к различным паратипическим факторам и по изучению воспроизводительной продуктивности казахских курдючных овец в двух отарах было цервикально осеменено 1165 овцематок свежеполученной спермой казахских курдючных баранов. Овец с естественной половой охотой выявляли один раз в сутки утром с 7 до 8 часов с помощью баранов-пробников. Сперму от 6 основных баранов получали с помощью искусственной вагины. Двукратное цервикальное осеменение выполняли с 9 до 10 и с 16 до 17 часов. Всего из 1165 осемененных овцематок в срок обьягнилось 921 голова или в среднем 78% с колебаниями по отарам от 76% до 81%. Всего родилось 1080 ягнят или в среднем по 117,3 ягнят в расчете на 100 обьягившихся маток. Масса тела одиночных баранчиков и ярк при рождении составила $5,04 \pm 0,07$ (n=108) и $4,44 \pm 0,07$ кг (n=98), в то время как двойневых – $3,94 \pm 0,08$ (n=20) и $3,79 \pm 0,09$ кг (n=18) соответственно.

Сделан вывод о том, что казахские курдючные овцы обладают высокой воспроизводительной способностью.

Ключевые слова: казахская курдючная овца, воспроизводительная продуктивность, искусственное осеменение, плодовитость, многоплодность.