

## EFFECTIVENESS OF SCHEMES FOR HORMONAL INDUCTION OF POLYOVLUTION IN DAIRY CATTLE DONORS IN THE CONDITIONS OF THE SOUTHEASTERN REGION OF KAZAKHSTAN

### *Abstract*

The purpose of the work was to study the effectiveness of hormonal induction schemes for polyovulation in donor cattle for dairy production.

One of the most important stages of embryo transplantation technology is hormonal stimulation of superovulation of the ovaries of high-value donor cows, on which the yield of morphologically complete embryos directly depends. Superovulation is a necessary method for obtaining a large number of zygotes for embryo transplantation technology [1]. Traditional methods use follicle-stimulating hormone (FSH) which is administered to donor cattle twice daily for 3-4 days [2]. The superovulation scheme using a complex of hormonal drugs makes it possible to process donors without identifying the heat stage, while the period of hormonal stimulation of donor cows is reduced to 15 days [3].

During the research, the optimal variant of the scheme for hormonal induction of polyovulation in the reproductive cycles of donor cows was selected. Analysis of the results of superovulation showed that the number of ovulations per donor and the yield of full-fledged embryos were higher in animals treated according to schemes No. 1 and No. 2, including the use of the FSH drug and a complex of hormonal drugs - FSH, CIDR, progesterone, estradiol and prostaglandin. Treatment of donor cows according to scheme No. 2, providing better fertility of cows after insemination, allows one to obtain a higher ( $8.3 \pm 0.9$ ) yield of full-fledged embryos suitable for transplantation and cryopreservation. The combined use of exogenous hormones in scheme No. 2 allows the treatment of donors without detecting the heat stage, while the time period for hormonal stimulation of donor cows is reduced (up to 15 days).

**Key words:** cattle, dairy farming, embryo transplantation, superovulation, follicle, hormone, embryo.

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## IMPROVING THE EFFICIENCY OF THE PRODUCTION OF MUTTON OF KAZAKH FAT-TAILED ROUGH-HAIRED SHEEP

### *Abstract*

The article presents the main qualitative indicators of lamb meat, which include the ratio of bones and pure meat, the specific weight of the most valuable cuts, and the energy value of meat. The meat index of a carcass refers to the weight ratio of the pulp and bones. The greater the proportion of pulp in a carcass, the higher its nutritional value.

In the case of sheep with a pre-slaughter weight in the range of 35.0-39.0 kg, the carcass weight with a tail was found to be 18.06–20.47 kg, with a carcass yield of The percentage of tail weight was found to be 51.6-52.5%, with a tail weight of 2.4-3.2 kg. The slaughter weight was 18.27-20.70 kg, with a slaughter yield of 52.2-53.1%. It was found that all slaughter indicators increased with an increase in the pre-slaughter live weight of sheep. The mass of internal fat was found to be the most

stable slaughter indicator, with a level in the carcass of 4-4.5-month-old sheep ranging from 0.20-0.23 g, with an output of 0.5-0.6%. The distribution of lambs obtained from both types of selection, according to slaughter and meat quality, followed approximately the same pattern as that observed when studying the dynamics of their live weight during the suckling and subsequent periods of development, including two months of feeding. It is recommended that the sale of over-repair young for meat be primarily conducted at 4-4.5 months of age, which coincides with the weaning of the young from their queens. The animals should have a live weight of at least 35 kg and above. The purposeful selection of parents by live weight enabled the slaughter performance of young animals to be enhanced and carcasses to be produced that met the requirements of standards for young mutton.

**Keywords:** Kazakh fat-tailed rough-haired sheep, meat qualities, slaughter yield.

### **Introduction**

Sheep represent a significant animal genetic resource for rural farmers in developing countries. The growth of the human population, increase in purchasing power and consumer awareness are the main factors driving the demand for sheep products [1]. In Kazakhstan, sheep farming plays a significant role in the agricultural sector due to the country's natural conditions. The development of sheep farming is a priority due to the provision of meat, meat products and wool [2]. Currently, the focus of fat-tailed sheep breeding is the production of high-quality young mutton, which is in demand on the international market, and wool that meets the requirements of the light processing industry. This wool is destined for the manufacture of carpets, knitwear and various types of fabrics. Therefore, the production of the aforementioned products should be carried out in a manner that optimises the utilisation of natural pasture feed, thereby rendering this area of sheep farming low-energy and enhancing the efficiency of breeding these sheep in a modern market economy [3].

The Kazakh short-tailed rough-haired sheep is distinguished by exceptionally high meat productivity, as if created by nature itself to provide humanity with essential products. Their breeding has long been predetermined by natural, climatic and economic conditions, as well as the national traditions of the indigenous population [4,5]. Crossing significantly improves the meat productivity of sheep; however, it is unclear whether hybridization changes the qualitative characteristics of lamb meat [6].

Competitive sheep farming products in conditions of year-round use of foothill, steppe and desert pastures [7]. Considerable material has been accumulated to improve the productive qualities of the puffer breeds bred in the republic, offspring through the use of in-breed breeding. A considerable amount of experimental material and practical experience has been accumulated on the rational use of genetic resources of fat-tailed meat-and-fat-wool breeds, with a view to improving breeding productive qualities in Kazakh fat-tailed rough-haired sheep [8,9]. Fat-tailed sheep are characterised by low fertility, with an average of 105-120% [10]. Sheep meat comes from a wide variety of farming systems, from extensive to intensive indoors, with slaughter of animals of different ages [11]. The primary objective of this study is to develop a rational system for further improvement of the local sheep population based on the analysis of experiments to increase the productivity of fat-tailed sheep. The primary indicators of meat productivity of Edilbaevsky meat-and-tallow sheep are slaughter weight and slaughter yield. The meat of 4.5-month-old lambs contains sufficient calories and is of great value for dietary nutrition. It should be noted that the meat of 4.5-month-old lambs contains less fat than that of adult sheep. The literature indicates that an increased level of feeding results in an accelerated growth rate of young animals, accompanied by a 4-7% and the slaughter yield increased from 44.79 to 47.84% [12]. Multidimensional methods were also used to reduce group and discriminatory variables [13].

A study of the feeding and fattening qualities of the Stavropol breed of sheep from 3 to 6 months of age revealed that animals which received green mass and finishing compound feed on fattening grew more intensively than their counterparts, which were on feeding without top dressing with concentrates. The productivity of sheep meat is closely related to the amount of body weight and slaughter quality. This is due to the degree of intensity of growth of body tissues that form the meat content of the carcass. [14,15].

The objective of this research is to develop scientifically based methods of intensive technology for the efficient production of mutton from Kazakh fat-tailed rough-haired sheep.

**Materials and research methods**

The experimental phase of the study was conducted at the Yerzhan farm in the Rayymbek district of the Almaty region between 2022 and 2024. The farm is a leading breeding facility for the Kazakh short-tailed coarse-haired sheep breed. The technology employed in the industry is traditional for this region. To conduct the experiment, full-aged Kazakh short-tailed rough-haired sheep were divided into three groups: Group I comprised sheep with a live weight of 61-65 kg (small), Group II sheep with a live weight of 66-70 kg (medium), and Group III sheep with a live weight of 71 kg and above (large). The experiment was conducted in the context of the fodder prevailing on the farm. Two groups of sheep with 30 heads each were formed and tagged during lambing in February 2022. The groups were formed according to the principle of analogues.

The observed analogy concerned the timing of the birth of lambs and the age of the mothers. The weaning of the offspring from the queens was carried out at the age of four months. The experimental data obtained were processed using the ANOVA data analysis package in Microsoft Excel and according to N. Plokhinsky [16].

**Results of the discussion**

Due to their good adaptability to the natural possibilities of mountain pastures, Kazakh rough-haired fat-tailed sheep are well-producing cheap and high-quality meat.

As a result of many years of breeding and breeding work, there are a large number of sheep with improved coarse wool in the republic. They are well adapted to the climatic conditions of mountainous areas, they are distinguished by high quality meat and wool productivity.

Kazakh rough-haired fat-tailed sheep have been bred in Kazakhstan since early times. This breed has a lower weight than the Edilba sheep breeds, with smaller tails. It is adapted to the pastures of mountainous areas, has a strong constitution. Therefore, as a result of crossing the Kazakh short-tailed rough-haired breed of sheep with rams of the Edilbaev breed, productivity increases and quality improves.

In coarse-wooled sheep breeding, live weight is studied as the main one, and wool shearing as an auxiliary feature. With an increase in the live weight of coarse-haired sheep, the shearing and quality of wool, as well as other indicators of ossification, increase.

Scientific research works with sheep of the Kazakh rough-haired sheep, which were large, with a strong physique. The head is in most cases large or medium, oval in shape. The length of the body is straight, harmonious, without horns. The ears are long and drooping. The head was covered with short shiny hairs. The neck is of medium length, muscular. The fur on the neck is satisfactory. The chest is wide, flat, and the sternum is well developed. The back is straight, the muscles are tense. The sacrum is characterized by a wide, flat, sagging. The flesh of the back is well developed, the back and lumbar spine are invisible, the fat accumulated on the back and ribs is medium, the tail fat is quite large. With a high degree of fatness, depending on age, body weight and size indicators vary greatly.

The live weight of animals at birth is an important selective trait that serves as an indicator of the further development of the organism [17]. Body size indicators, depending on age, corresponded to the requirements of the standard for Kazakh rough-haired sheep and as their age increased, body size indicators also increased, and according to body indices, changes in the age range were not observed, i.e. the development of rams of all ages obtained in practice was normal.

Similarly, although the general exterior characteristics of Kazakh rough-haired sheep are similar, there are differences in productivity indicators depending on their age (Table 1).

**Table 1 - Productivity indicators of Kazakh short-tailed rough-haired sheep**

Indicators	Productivity by group, kg		
	I (n-3)	II (n-3)	III (n-3)

The main sheep producers				
Live weight	$M \pm m_x$	86,2±1,1	93,8±1,6	101,4±1,8
	$\sigma$	1,9	1,8	3,1
	$C_v, \%$	2,1	2,9	3,0
Sheep				
Live weight		I (n-200)	II (n-200)	III (n-200)
	$M \pm m_x$	52,2±0,14	60,5±0,2	67,3±0,31
	$\sigma$	2,1	2,4	3,8
	$C_v, \%$	4,0	3,9	5,6

From the live weight indicators of the sheep that we experimented with, as shown in Table 1, we can see that they are well-fed. The live weight of rams is 78.5 - 101.4 kg, Among the experimental sheep, the highest live weight was observed in males of group III. From this we can see that with age, the number of livestock increases and the live weight. And in terms of wool productivity in experienced sheep, the indicators of average shearing of wool from one head are 2.1-3.2 kg and 1.7-3.1 kg, respectively. In general, the coefficient of variability between the live weight of sheep and the shearing of wool is approximate, i.e. the sheep obtained in the experimental group remain homogeneous.

And according to the variability of productivity, it is known that quantitative traits are transmitted to offspring by the type of intermediate inheritance. Therefore, in breeding work, the productive and hereditary qualities of the father should not be neglected, i.e. it is believed that the mother has the same influence on the formation of the breeding and productive qualities of the resulting new generation.

The general breed characteristics of ewes are also similar to those of rams, except that ewes have differences in appearance and body weight, productivity of wool. The Kazakh rough-haired fat-tailed sheep is not so large compared to rams. However, even among them there are record-breaking sheep with a live weight of 78-80 kg. But the vast majority are not large, but long-legged with a medium-sized head. A specific feature characteristic of the health of this breed is the absence of horns at all. Ewes differ from the vast majority of sheep in their resistance to the adverse conditions of the mountainous region and adaptability to year-round grazing.

One of the main breeding characteristics of meat-and-fat fat-tailed sheep is the volume of the tail. All sheep of average live weight, regardless of origin, on this basis belong to the I class of Kazakh rough-haired fat-tailed sheep.

Indicators of live weight and body size of ewes also change with age, as well as in rams. Sheep from different ages with the same productivity were selected for the experimental groups. And according to body indices, there is no such difference in development depending on age levels, for example, if the length of the trunk in group I is 124.1%, then in group III it is 123.3%, you can see the coincidence of other similar body indices. According to the data given in Table 1, we can see a difference in the indicators of live weight and, accordingly, wool productivity in sheep of different ages. For example, the live weight ranges from 52.2-67.3 kg, depending on the age of the animal. While the difference between group II is 8.3 kg, for group I and group III, this difference is 6.8 kg. That is, as the livestock grows up, the weight difference decreases.

In general, productivity indicators for experimental animals, depending on age, showed high indicators, fully meeting the requirements of the standard for Kazakh rough-haired sheep. This is the result of a high degree of breeding work on the farm.

In order to assess the meat productivity of sheep, a number of indicators are taken into account, including the pre-slaughter live weight, carcass weight, slaughter weight, slaughter yield, ratio of pulp, bones, tendons in the carcass, varietal composition of the carcass, yield of offal, and nutritional value of meat. Studies on the qualities of experimental sheep were organised after 20 days from the day of the culling of lambs from their mothers. A total of 20 heads of sheep were selected from each group of lambs obtained from the selection of parents by live weight. The average weight of the sheep

corresponded to the average value of this trait in the group from which they were selected. The growth and development of lambs and young animals obtained from the selection of parents according to the class of wool is largely dependent on the level of live weight of parents with different classes of wool. This process occurs in a similar manner to that observed in their peers from the selection of parents according to live weight. Consequently, the study of feeding qualities was limited to sheep obtained from the selection of parents by live weight.

Pasture areas with the best herbage and convenient watering were secured for the sheep selected for feeding. The duration of the feeding period was 60 days. No concentrated feeds were provided in addition to pasture vegetation. The results of weighing before feeding showed that in sheep, the body weight lost after beating began to recover due to their gradual habituation to pasture vegetation (Table 1).

**Table 2** - The results of feeding 4.5-5 month old sheep

Group	n	Live weight, kg		Live weight gain	
		Before the production	After withdrawal	Absolute, kg	Daily, g
1	20	35,9± 0,36	41,2± 0,42	5,3	88
2	20	37,1±0,44	42,4± 0,46	5,3	88
3	20	38,8 ±0,46	44,2 ±0,48	5,4	90

In the group of lambs obtained independently of the experimental groups, the rams obtained (1,2,3 group) differed by the greatest absolute and average daily gain during the feeding period - 5.4 kg and 90 g, respectively, versus 5.3 kg and 88 g.

Lamb production has recently been based mainly on slaughtering young lambs in the year of birth. The rationale for slaughtering sheep for meat at this age is that, at a young age, feed is most efficiently used to produce a unit of output and the products themselves are of high quality. At older ages, the increase in carcass weight is mainly due to fat deposition. In order to study the meat productivity of single and double-born sheep, we carried out a control slaughter at 4 and 7 months of age. The results of the control slaughter are presented in Table 2.

**Table 3** – Slaughter rates of sheep (n=3)

Indicators	Age and gender groups		
	I	II	III
4 months			
Pre-slaughter weight, kg	36,3 ±0,42	39,0 ±0,50	37,5 ±0,46
Carcass weight, kg	18,84± 0,24	20,44± 0,28	19,61±0,24
Weight of internal fat, kg	0,21± 0,04	0,23 ±0,06	0,22 ±0,05
The weight of the jacket, kg	2,7 ±0,08	3,2±0,12	3,0 ±0,10
Slaughter weight, kg	19,05 ±0,34	20,67± 0,36	19,83 ±0,34
Slaughter yield, %	52,5	53,0	52,9
7 months			
Pre-slaughter weight, kg	41,1 ±0,54	43,8±0,64	42,5±0,52
Carcass weight, kg	21,25± 0,28	22,91± 0,34	22,14±0,32
Weight of internal fat, kg	0,23± 0,04	0,24 ±0,06	0,24±0,06
The weight of the jacket, kg	2,9 ±0,10	3,5±0,14	3,3 ±0,10
Slaughter weight, kg	21,48±0,30	23,15± 0,38	22,38±0,34
Slaughter yield, %	52,3	52,8	52,7

Analysis of Table 2 showed that three ewes were selected for slaughter from each group of lambs. Their average live weight was equal to the average of the group from which they were selected.

According to the data in Table 2, the four-month-old sheep of the flock of Kazakh short-tailed coarse-haired sheep of the Yerzhan farm are characterised by relatively high slaughter rates, characteristic of the best meat and tallow breeds. When sheep with a pre-slaughter weight of 35.0-39.0 kg were slaughtered, their carcass weight with tail was 18.06-20.47 kg, carcass yield was 51.6-52.5%, tail weight was 2.4-3.2 kg, slaughter weight was 18.27-20.70 kg and slaughter yield was 52.2-53.1%.

### **Conclusions**

Targeted selection of parents by live weight allowed to improve the slaughter performance of young animals and to obtain carcasses meeting the requirements of the standards for young mutton. In order to intensify the industry and increase the efficiency of breeding fat-tailed sheep of different genotypes, it is necessary to widely practice the sale of over-repaired young for meat mainly at 4-4.5 months of age, i.e. immediately after weaning from ewes, with a live weight of at least 35 kg and above.

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## ҚАЗАҚТЫҢ ҚҰЙРЫҚТЫ ҚЫЛШЫҚ ЖҮНДІ ҚОЙЛАРДЫҢ ЕТӨНДІРУ ТИІМДІЛІГІН АРТТЫРУ

### *Аңдатпа*

Мақалада қозы етінің негізгі сапалық көрсеткіштері-сүйек пен таза мяса арақатынасы, ең құнды кесектер массасының үлес салмағы, мяса энергетикалық құндылығы. Ұшаның ет индексі целлюлоза бөлігі мен сүйектердің салмақтық қатынасын білдіреді. Ұшада целлюлоза неғұрлым көп болса, оның тағамдық құндылығы соғұрлым жоғары болады.

Сою алдындағы салмағы 35,0-39,0 кг шегінде қойларды сою кезінде олардың құйрығы бар ұшаның салмағы 18,06-20,47 кг, ұшаның шығымы – 51,6-52,5 %, күрдіктің салмағы – 2,4-3,2 кг, сою салмағы – 18,27-20,70 кг және сою шығымы – 52,2-53,1% құрады. Союдың барлық көрсеткіштері қойдың союға дейінгі тірі салмағының артуымен өсетіні анықталды. Ішкі майдың массасы ең тұрақты сою көрсеткіші болып табылатыны анықталды-оның 4-4,5 айлық қой етінің ұшасындағы деңгейі 0,5-0,6% шыққан кезде 0,20-0,23 г шегінде ауытқиды.

Қойлардың таралуы, союдың екі түрінен де алынған, сою және ет сапасы бойынша олардың тірі салмағының динамикасын зерттеу кезінде байқалғандай заңдылықпен өтті. сору және одан кейінгі даму кезеңдері, соның ішінде екі айлық қоректену, етке сатуды тәжірибеде қолдану ұсынылады. негізінен 4-4, 5 айлық жаста, яғни тікелей кейін олардың тірі салмағы кемінде 35 кг және одан жоғары жатырдан шығарылуы. Тірі салмағы бойынша ата-аналарды мақсатты іріктеу жас малдың сою көрсеткіштерін жақсартуға және жас қой етіне арналған стандарттардың талаптарына сәйкес келетін ұшаларды алуға мүмкіндік берді

**Кілт сөздер:** қазақтың қылшық жүнді қойлары, ет қасиеттері, сойыс шығымы.

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## ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ ПРОИЗВОДСТВА БАРАНИНЫ КАЗАХСКИХ КУРДЮЧНЫХ ГРУБОШЕРСТНЫХ ОВЕЦ

### **Аннотация**

В статье представлен материалы основными качественными показателями мясности ягнят являются соотношение костей и чистого мяса, удельный вес массы наиболее ценных отрубов, энергетическая ценность мяса. Под индексом мясности туши понимается весовое соотношение мякотной части и костей. Чем больше в туше содержится мякоти, тем выше ее пищевая ценность.

При убое баранчиков с предубойной массой в пределах 35,0-39,0 кг их масса туши с курдюком составили 18,06-20,47 кг, выход туши – 51,6-52,5 %, масса курдюка – 2,4-3,2 кг, убойная масса – 18,27-20,70 кг и убойный выход – 52,2-53,1 %. Установлено, что все показатели убоя возрастают с увеличением предубойной живой массы баранчиков. Установлено, что масса внутреннего жира является наиболее стабильным убойным показателем – его уровень в туше 4-4,5 месячных баранчиков колеблется в пределах 0,20-0,23 г при выходе 0,5-0,6%. Распределение ягнят, получены от обоих видов подбора, по убойным и мясным качеством проходило примерно такой же закономерностью, какой оно наблюдалось при изучение динамики их живой массы за подсосный и последующие периоды развития, включая двухмесячного нагула, рекомендуется практиковать реализацию на мясо сверх ремонтный молодняк преимущественно в 4-4,5 месячном возрасте, то есть непосредственно после отъема их от маток, с живой массой не менее 35 кг и выше. Целенаправленный подбор родителей по живой массе позволили улучшить убойные показатели молодняка и получить тушки, соответствующие требованиям стандартов на молодую баранину

**Ключевые слова:** казахские курдючные грубошерстные овцы, мясные качества, убойный выход.