Original Article

DEVELOPING BASIS OF CONSERVATING THE SUR ASTRAKHAN SHEEPS GENOFUND

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Abstract

The article shows that global climate change and natural landscape degradation have led to a sharp decline in the gene pool of domestic and livestock breeds worldwide and the complete extinction of some breeds, as well as a decline in the gene pool and productivity of karakul sheep. The article also states that for the first time on a scientific and practical basis, selection and genetic methods for the preservation and restoration of the gene pool of Surkhandarya sur karakul sheep with unique and antique variety have been developed.

Keywords: gene pool, molecular-genetic, brand, original, morpho-biological, line, cross, pigment, gomogeneous, geterogeneous, plant type, grading.

Introduction

Today, when the number of the world's population is growing rapidly every day, the requirements and needs for food and industrial products are increasing. In this regard, the development of animal husbandry, the improvement of breeds of domestic animals and livestock of various types, the preservation of the gene pool, breeding and increasing their productivity is one of the global problems.

In the world, out of a total of 8,774 breeds belonging to 38 species of domesticated animals identified in the FAO information system on the diversity of domestic animals, 7,718 breeds are local, and 1,056 are transborder. Over the past ten years, the share of endangered animal breeds has increased from 15-17%. (Stolpovsky Yu.A., I.A.Zakharov-Gezekhus. 2017., FAO, 2015). [9.,10.].

When observing this circumstance in the world sheep breeding, it can be seen that the number of 1200 sheep breeds from the gene pool has decreased to 14-16%. As a result, of the 1.25 billion preserved worldwide, heads of sheep, 31.0 million heads are sheep of the Karakul breed. In Uzbekistan, their total number is about 6.0 million heads.[5.].

Karakul sheep breed is bred in more than 40 countries around the world. Karakul breeding is most developed in Uzbekistan, Kazakhstan, South African countries (Namibia, South Africa, etc.), Afghanistan, Iran, Turkmenistan, etc. Only the Karakul breed is capable of producing lamb skins that are amazing in beauty and grace.

The Karakul breed of sheep was created on the territory of Uzbekistan by local Chorvadars many centuries ago. The first written indications of the presence of such sheep are found in the works of the Arab scholar Ibn-Hawkal (978).[5.].

The following records of the presence of smush sheep are customs logs about lamb skins transported in small quantities to merchant fairs in Russia, from where they were further resold under the name “Astrakhan”.

Scientific substantiation of the development of the karakul industry in the Republic of Uzbekistan has a 100-150-year history. Since the middle of the XIX century, the demand for lamb skins at international fairs has increased, respectively, studies of the productive and biological characteristics of sheep producing such skins have begun.

It was found that when breeding sheep, the Chorvadars used selection and selection for adult animals according to their appearance, structure and quality of the coat, that is, according to the wool-constitutional type, while the methods of breeding and selection were kept secret and were not distributed.

At the end of the XIX century, the expansion of trade with Europe, a sharp increase in the price of karakul stimulated the creation of research institutions in the field of karakul breeding.

So, in 1888, the Poltava Agricultural Society of Russia organized the first expedition to Bukhara to purchase Karakul sheep in order to create a breeding nursery, but its creation was delayed for many years. In 1898, sheep (61 heads) with a place of their keeping near Ashgabat were purchased to create a tribal Karakul sheepfold, but the herd did not last long and did not have a noticeable impact on the spread of Karakul sheep breeding in new areas.[4].

By the 20s of the last century, in many branches of animal husbandry, animal husbandry already had methods of breeding, feeding and keeping animals, but information about Karakul sheep was scarce, it was necessary to start with the development of scientific foundations of karakul breeding.

The first studies on the inheritance of coloration in Karakul sheep were conducted in 1928 by B.N. Vasin, who classified the genes of coloration and introduced letter symbols for their designation. In the early 30s, a study of the inheritance of gray coloration in Karakul sheep was carried out and the lethal effect of the roan gene in gray sheep was revealed.

The long-term

purposeful breeding work of scientists and specialists with the breed, carried out since the 50s of the last century, made it possible to enrich the Karakul breed of sheep with new genotypes.

Among the first scientists who developed the scientific foundations of karakul breeding were M.F.Ivanov, V.M.Yudin, B.N.Vasin, P.V.Arapov, V.A.Petrov, G.I.Balaban, N.F.Nikolsky, M.M.Zavadovsky, E.V.Odintsovo, I.N.Dyachkov, A.M.Lysov, N..S.Amelin, I.Ya.Averyanov, N.S.Gigineishvili, V.I.Stoyanovskaya, O.I.Morozova, N.T.Nechaeva, E.P.Panfilov and others. [4.].

By the beginning of 1950, a progressive system of organization of breeding business was developed, including selection and selection, classification of Karakul sheep by smush qualities and types.

In the same years, the studies performed on the embryogenesis of the Karakul sheep made it possible to establish the stages of the development of the skin and hair and the formation of curls, the direction of combing and the pattern of the arrangement of curls; to develop long-term plans for breeding work of breeding farms and breeding farms.

The developed system of organization of breeding work with the breed, providing for the selection and selection of sheep by type, shape, size of the curl and constitution, specialization of farms for breeding sheep by color, coloring and curl types had a huge impact on the qualitative development of karakul breeding.[7.].

At the beginning of 1941, the state farm "Ak-Kapchigai" of the Surkhandarya region was transferred to the Yuri Gagarin breeding farm among the breeding farms of the Karakul direction. A special group headed by N. G. Gigineishvili, a researcher at the All-Union Scientific Research Institute of Animal Husbandry, was created for the practical implementation of scientific and breeding work. As a result of extensive scientific and breeding work, the task of radically improving the breed qualities of sheep of various colors and increasing their productivity was successfully solved.

During the period from 1942 to 1946, sheep named Holboy, son of Holboy, Okbosh were selected and left to the tribe, who became the ancestors of a new breed type of sheep, whose lambs produce colored doodle of various

colors: "Bronze", "Platinum", "Amber". These doodle colors are new. Previously, they had not met in nature. They characterize the new type of sheep "Surkhandarya sur". [1., 6.].

N.S.Gigineishvili revealed the richest genetic potential of the ancient breed and created a series of colors unprecedented in nature.

Thus, thanks to the creative community of scientists and practitioners-karakul breeders, new types of Karakul sheep were created in the stud farm: "Surkhandarya sur", approved in 1962 and entered into the State Register of Breeding Achievements in 1972, "Yuzhnouzbeksky", approved in 1968 and registered in the State Register of Breeding Achievements in 1970; "Saykhansky" - pink (diamond) coloring; "Gagarin" - white coloring, "Babatagsky" - factory type of gray sheep with increased life stability approved in 1977 [6.].

In the process of improving the type of sheep of the so-called pink color, breeders have achieved enhanced clarity and caloric content of the smushka pattern. To do this, they used the finest selection techniques, remaking the nature of pigmentation - brown hair involved in the formation of a pink doodle was replaced with a harsh one with an enlightened top. For this purpose, gray sheep and bronze sur were crossed.

Currently, the former Gagarin State Gas Processing Plant is called Bobotog-suri Korakulchilik LLC. This farm is the leading one in breeding work and with colored Karakul sheep of Surkhandarya region.

The karakul produced is distinguished by the nobility and richness of commodity qualities, which is determined by the purebred Karakul sheep of domestic reproduction and their inherent intra-breed smush variety, developed in the process of breed formation by the centuries-old breeding creativity of the creators of the breed. These differences in many ways contribute to the fact that it enjoys steady consumer demand and commercial success in the fur market.

Karakul sheep of Sur Surkhandarya breed type, which are considered rare, valuable and expensive.

In subsequent years, in the conditions of transition to a market economy, a situation developed in sheep breeding in which the number of sheep sharply decreased, production of all types of products decreased, material and technical equipment, personnel and scientific support deteriorated. Sheep breeding among the livestock industries turned out to be less protected, which caused a landslide reduction in the number of livestock.

However, over the past 30 years, various causes and circumstances in Uzbekistan have had a negative impact on the development of karakul breeding, in particular, due to a decrease in the gene pool and productivity of purebred karakul sheep, as well as a decrease in the quality of karakul skins ceased to meet the requirements of world fur markets, as a result of which 31 factory and intra-breed types of 25.8% of highly productive fertile breeds disappeared, and 16.2% are endangered.[2.].

The genetic potential of the Karakul sheep population of the republic is very high. For about forty years, breeding and genetic methods were widely used to improve it, highly productivesheep producers of various colors and colors were used.

The problem of conservation and purposeful use of the animal gene pool is currently attracting the attention of the world community, since recently individual breeds have disappeared in many countries of the world, and many have been on the verge of extinction. A similar situation has developed in the Republic of Uzbekistan.

As a result, the breeding base and the number of elite animals sharply decreased, as well as their productive and breeding qualities decreased. Suffice it to note that the number of breeding queens has now decreased by about 25-30%.

There is a real threat of reducing biological diversity and degradation of the gene pool, therefore, the implementation of breeding for the conservation and development of genetic resources of the Karakul breed of original colors and colors, including the creation of new herds and types of sheep, allowing to produce competitive products, is an urgent problem.

In recent years, Uzbekistan has paid great attention to the preservation of the diversity of Karakul sheep breeds, the supply of valuable fur to world markets that meet the requirements of industry. In particular, the volume of production of karakul production and the number of sheep of the Karakul breed increased.

The development strategy of the Republic of Uzbekistan for 2017-2021 pays great attention to agriculture, especially animal husbandry. At the same time, special attention is paid to the expansion of research work to improve the quality of products, enrich the range of products, varieties of raw materials and the introduction of innovative technologies into production.

The main task of the karakul breeders of the Republic is to increase the number of sheep, create highly productive specialized herds of animals that ensure sustainable production of valuable and rare colors of karakul, preserve the gene pool, improve breeding methods and create Karakul sheep of new types, colors and colors that produce export-oriented products.

In karakul breeding, traditional research methods remain mainly, such as the selection of the best animals, selection for a high level of productivity, selection to increase the reproductive ability, vital activity and resistance of animals to diseases, as well as issues that are inevitably associated with the analysis of local gene pools: the processes of selection and change of low-yielding animals to high-yielding ones, evaluation of the possibility of a pedigree gene pool; maintenance and creation of new highly productive herds: assessment of traits promising for breeding, methods of conservation and use of outstanding animals; creation and analysis of gene pools of outstanding lines, methods of creating multibreed synthetic lines, creation of reserve lines, evaluation of genotypic and phenotypic features.

The development of karakul breeding requires accelerating the genetic improvement of animal populations. This determines the need to develop fundamentally new systems of breeding work, mastering the latest achievements from other fields of science: physiology, biochemistry, genetics, biotechnology, etc.

Fig. 1. Karakul sheep sur on pasture in the farms of LLC "Bobotog suri korakulchilik" Kumkurgan district of Surkhandarya region

Successful implementation of targeted breeding for the development of desirable economically useful traits is impossible without studying the gene pool of the original studied animals, their productive and genetic variability, evaluation of inbreeding and differential mutations.

Knowledge of the ways of formation and evolution of the Karakul breed of sheep of various colors will allow for more successful development of techniques and refinement of selection methods, conduct breeding work to create and preserve new types, improve the breed, further expand the range and improve the quality of the karakul.

One of them is the development of methods for more complete realization of the genetic potential of productivity with the involvement of methods of physiological, biochemical and immunogenetic analysis.

Currently, there is an experimental justification of various approaches and methods of breeding work. In karakul breeding, traditional research methods remain mainly, such as the selection of the best animals, selection for a high level of productivity, selection to increase the reproductive ability, vital activity and resistance of animals to diseases, as well as issues that are inevitably associated with the analysis of local gene pools: the processes of selection and change of low-yielding animals to high-yielding ones, evaluation of the possibility of a pedigree gene pool; maintenance and creation of new highly productive herds: assessment of traits promising for breeding, methods of conservation and use of outstanding animals; creation and analysis of gene pools of outstanding lines, methods of creating multi-breed synthetic lines, creation of reserve lines, assessment of genotypic and phenotypic features.

Fig. 2. Karakul sheep sur with lambs.

In the field of karakul breeding, with the development of genetics and breeding, it has become possible to conduct research on the targeted breeding of Karakul sheep of new original colors and colors that have previously unseen properties that can dramatically increase their productivity at an optimal level of feeding. At the same time, fundamental research is combined with applied research.

The complexity of scientific research led to the emergence of original ideas, the practical implementation of which allowed to increase the productivity of Karakul sheep.

The expansion of biotechnological work in karakul breeding has a special perspective. The problem of increasing efficiency in using the most genetically valuable individuals to improve the genetically determined productive and biological qualities of individual populations of Karakul sheep has long attracted the attention of scientists in the industry.

A.S.Akhmetshiev (1989), studying in a comparative aspect the gene pool of Karakul sheep of various colors, Edilbaev and fine-wooled (South Kazakh merino) breeds bred in almost the same ecological zone of the republic, found 4 transperin A, B, C and D alleles in the blood of animals of these breeds. When studying the blood of sheep of these breeds, the presence of identical alleles for transferrin, hemoglobin and arylesterase was revealed. The author believes that the determination of genetic similarity showed the same structure among the Karakul sheep of various colors and their significant proximity to the sheep of the Edilbaevsky fat-tailed breed.[3.].

Therefore, the problem of preserving the gene pool of pedigree Karakul sheep, which produce black, gray, sur and other colors of Karakul skins, which are considered valuable at international fur auctions. Based on this, on the basis of the evolutionary origin of Karakul sheep, reproduction, breeding and preservation of a population of rare and valuable original colors of Karakul sheep suras plays an important scientific and practical significance.

The choice of the farm for the organization of work on the conservation of the gene pool is determined by the presence in it of typical (elite and first-class) purebred sheep of the preserved breed in the farm of LLC "Boboto - suri korakulchilik" meets these requirements, because in this farm, Karakul sheep sur Surkhandarya type producing karakul valuable (orginal) colors are bred for many years. The size of the herd should not be lower than the average established for the region, the distribution zone of the preserved breed.

The preservation of the main qualities of the breed in the gene pool is possible, since representatives of the main genealogical lines will be concentrated in it, and consequently, the genetic structure characterizing the preserved breed will be preserved. This farm has a sufficient number of producing sheep and queens of the main genological lines of the toist called "Holboy". "Alabash", "Mallashoh", "Yassi", "Kahrabo", "Artist", "Mars", etc. that is, there is a heterogeneous hereditary basis.[8.].

Subsequent work on the conservation of the gene pool in a separate gene pool farm (farm) will be successful only with a well-planned and implemented breeding system. This system should ensure the preservation of the genealogical structure of the breeding stock and breeding sheep, the selection system and selection standards characteristic of the preserved breed. Moreover, the technology of keeping and feeding sheep should ensure maximum productivity for the breed.

In this regard, in the karakul breeding of Uzbekistan, in particular, the preservation, restoration and improvement of the quality of the skins of karakul sheep of Surkhandarya sur, breeding and genetic methods have been developed in order to improve the marketable quality and their introduction into karakul farms is of great scientific and practical importance.

On a scientific basis, the work on breeding has been improved, work on periodic monitoring of the production of high-quality products and public control has been established. In this regard, in Uzbekistan, in order to preserve, restore and improve the quality of Surkhandarya sur skins, breeding and genetic methods have been developed, which are widely implemented in karakul farms.

Of particular scientific and practical importance is the disclosure of the distinctive features of the structure and growth of the coat of Karakul sheep Sur Surkhandarya breed type and morpho-biological indicators, as well as the identification of characteristics and degree of manifestation of hereditary signs of rare colors.

Based on the following tasks, it can be concluded that the disclosure of the distinctive features of the structure and growth of the coat of Karakul sheep Sur Surkhandarya breed type and morpho-biological indicators, as well as the identification of characteristics and level of hereditary traits of rare colors sur, which depend on the variants

of sheep ears, studies aimed at analyzing the survivability of animals, the number of biochemical indicators (enzymes, potassium and others) in the blood of sheep of karakul breeds belonging to various types are relevant.

However, these research works do not make it possible to preserve the breeds of rare and original Surkhandarya sur sheep, created by breeding for many years, the fame of which is widely known in the world fur markets.

Thus, the problem of preservation, restoration, reproduction of the Karakul gene pool of sheep, including animals of the most valuable type of Surkhandarya sur, as well as the radical improvement of the quality of rare and orginal Karakul skins, the development of breeding methods in the economy and the systematic establishment of work, is of great scientific and practical importance for the development of the karakul industry in Uzbekistan.

The purpose of the study is to determine scientifically based selection and genetic methods of analysis, conservation and breeding of the gene pool of rare and unique colors of Karakul sheep Sur Surkhandarya breed type.

Research objectives:

to substantiate and characterize the degree of unique and valuable colors of sur, taking into account the uniformity and overflow of the coloring of Karakul sheep sur Surkhandarya breed type;

to determine the content of melanin and its properties in the hair of lambs of various colors;

to determine the biological and morphological features of suras of Karakul sheep of different colors;

to determine the biochemical parameters of blood (enzymes, minerals, etc.) of Karakul sheep sur of different colors;

to substantiate the degree of inheritance and characterize the mating of Karakul sheep with homogeneous and heterogeneous monitor lizards of rare and valuable colors of Surkhandarya breed type;

to describe the morphological parameters of wool and the histological structure of the skin of sheep sur with different colors;

to conduct a comprehensive analysis of the exterior, growth and development, productivity of breeding lambs left for cultivation, as well as to evaluate the quality and marketable features of sur Karakul skins;

preservation of the gene pool of Sur Surkhandarya breed type sheep, restoration and reproduction of a herd of rare colors, as well as the development of breeding and genetic methods to increase the productivity of sheep and their introduction into production.

The object of the study

Samples of blood, skin, wool and skins of Karakul sheep, selected breeding sheep and sheep of Surkhandarya breed type were taken as the object of the study.

The subject of the study

It is the growth, development and productivity of Karakul breeding sheep and ewes of sur of different colors, their morphological and biological indicators, features of the hair cover, marketable qualities of karakul skins and wool productivity.

Research methods

The dissertation uses general biological, zootechnical, biometric, statistical and analytical methods.

The research was carried out in 2005-2020 in LLC "Bobotog suri korakulchilik" of Kumkurgan district of Surkhandarya region of the Republic of Uzbekistan.

For the first time in Uzbekistan, this research work is devoted to the scientific foundations aimed at preserving rare and valuable colors of sheep of the Surkhandarya sur, at developing breeding and genetic methods for their restoration.

The study of the evolution of the Karakul sheep breed has both theoretical and great practical significance. Knowledge of these ways will allow more successful development of techniques and refinement of selection and selection methods, conduct breeding work to create new types of Karakul sheep, to improve the breed and further improve the quality of the karakul.

It should be noted that in order to obtain products that meet the needs of the market and the demand of the population, it is always necessary to take into account a set of quantitative factors. In modern economic conditions, an important task of breeding is to improve the smush productivity of Karakul sheep. Here, along with objectively established quantitative features, qualitative indicators are of approximately equal importance. But various signs of the quality of karakul skins are connected in different ways.

Fig. 3. The gene pool of Karakul sheep Sur Surkhandarya breed type (different colors and colors).

Therefore, knowledge of these relationships allows how other traits can change as a result of a selection change in one trait. To analyze the effectiveness of breeding on a specific trait, it is necessary to anticipate in advance what effect will be obtained in the offspring if one or another level of selection is applied to the parents, i.e. it is very important for the breeder to make at least an approximate forecast of how many animals from the herd will satisfy the reproduction requests, how many years it will take to bring productivity to the desired level. These issues can be resolved to a certain extent using the method of genetic analysis.

Gene mutations disappear from the population immediately if heterozygous individuals with a new allelic mutation do not leave offspring. At the same time, recessive mutations, being in a latent state in heterozygous individuals, create a potential genetic variability of the population. At the same time, it should be noted that in a

large population, the pressure of the mutation process leads to the consolidation of the allele or to a balanced equilibrium.

Chromosome abnormality is one of the causes that leads to early death and low viability of animals. In this regard, the study of cytogenetic characteristics of Karakul sheep in various genetic groups is important.

The results of the study of the number and morphological groups of chromosomes in Karakul sheep of different colors of sur and black lambs are given in the table 1.

Table 1 The composition of the karyotype of Karakul sheep of black and harsh colors

Группа	**Окраска**	**Учтено (голов)**	**Состав кариотипа**				
			Количество диплоида хромосом	**Количество эливок**	**Морфологические гуруппы хромосом**		
					Мета центрика	**Акро цент-рика**	**Половые хромо-сомы**
I	Черная	6	54	60	6	48	xx
II	Сур	6	54	60	6	48	xx

The table shows that lambs of sur and black colors have a diploid number of chromosomes equal to 54, of which 3 pairs are large megacentric, 24 are acrocentric chromosomes and one pair consists of sex chromosomes (XX, XY).

Acrocentric chromosomes in sheep form a gradually decreasing series in size, where the XX - female chromosomes are the largest.

The main mass of chromosomes, that is, the number of chromosomal arms, corresponds to the species norm (NF = 60). No gross karyotype abnormality associated with the number of chromosomes and their morphology was observed in all the animals studied.

In experimental sheep, no abnormalities were found, quite common in other animal species, including cattle, such as chimerism, that is, the simultaneous presence of shaped elements of white blood in the hematopoietic organs, cells with both male and female sets of chromosomes.

At the same time, it was found that some of the cells in the examined animals carried various anomalies in their chromosome set (Table 2).

Table 2 The frequency of spontaneous disorders in the chromosomal set of cells in animals of black color and sur (%), (M±m)

Belly coloration	**Aneuploidy**			**Structural aberrations**	**Poly ploidy**	**Total number of modified cells**
	Hypo ploidia	**Hyper ploidia**	**all**			
Sur	11,85±1,96	1,85±0,80	13,70±2,10	2,90±1,00	0,33±0,10	17,00±2,30
Black	6,67±2,00	1,33±0,90	8,00±2,20	0	0,50±0,20	8,50±2,20

Difference	5,18±2,82	0,50±1,20	5,70±3,00	2,9±1,00	0,14±0,20	8,50±3,20

So, in animals of both colors, the main type of chromosomal set disorders was aneuploidy, represented mainly by polyploids, that is, cells that have lost part of the chromosomes.

Hyperploidy, or cells carrying an additional number of chromosomes, were found in animals about 54 times less often than hypoploidia. A steady tendency to increase both the total number of aneuploids and both types in individuals of severe coloration has been established. Differences in comparison with peers of black color were significant ($P<0.05$).

The number of polyploid cells in animals was insignificant and did not differ significantly between animals of different colors. Polyploid cells were represented by both tetraploids (cells with a double diploid set) and cells of a higher degree of ploidy. Due to the low frequency of occurrence of this anomaly, it was not possible to conduct a statistical analysis of the polyploidy structure.

Another type of karyotype abnormalities is associated with a violation of the integrity of chromosomes, that is, structural anomalies, which in Karakul sheep were represented by chromatid breaks. These anomalies were found in animals of sur color with a frequency of 2.90%. Differences in this indicator between the compared animals were significant ($P<0.05$), differences in the total frequency of altered cells were also significant ($P<0.05$).

The results of these studies indicate an increased instability of the karyotype in Karakul sheep of severe coloration. It is possible that the bone marrow cells of these animals are less resistant to the effects of environmental agents, in addition, it cannot be excluded that the level of chromosomal variability to a certain extent reflects the viability of animals. This assumption is supported by the fact that a number of studies have noted an increased level of spontaneous anomalies in premature or stunted individuals in the prenatal period.

Consequently, our data indicate the need to continue cytogenetic studies in Karakul sheep breeding. The basis is the established facts of individual differences in the frequency of chromosomal abnormalities in animals. It turned out that the frequency of aneuploidy in animals of both groups ranged from 0 to 20%, fluctuations in the frequency of polyploidy amounted to 1%, and structural anomalies up to 10%, that is, it is possible to group and select according to these characteristics. This may be important in the breeding process, since a number of studies have shown that the frequency of chromosomal abnormalities characterizes the reproductive qualities of animals.

To increase the efficiency of selection, first of all, it is necessary to establish to what extent a particular trait for which selection is carried out depends on the hereditary characteristics of the animal (on the genotype), and to what extent on the environment (on the phenotype). Therefore, the identification of the degree of dependence between phenotype and genotype is one of the most important tasks of breeding.[5].

The correlation coefficient (r) is considered to be the most common parameter that reveals the relationship between indicators and signs of Karakul sheep.

The length of the roller is the decisive factor determining the value of the pitch. The length of the hair has a negative correlation with the length of the roller. Moreover, the dependence of this indicator is large. Therefore, selection for shortening the hair will contribute to the lengthening of the roller and, by lengthening the hair, we will contribute not only to shortening the roller, but also to its complete destruction.

Thus, correlative relationships between traits, its quantitative determination of the definition allows for selection by one or more traits, to provide for the change of some traits during selection by others, to study the causal relationship between them, which is a prerequisite for successful breeding work. The value of the correlation between several animal traits makes it possible to find out their relationship and avoid one-sidedness, and, consequently, low efficiency of breeding.

The average value of the trait has acquired great importance in the practice of breeding work. In karakul breeding, the whole system of evaluating producers by the quality of offspring (by genotype) is based on comparing the average indicators of the offspring of this producer with the average level of the same indicator in other groups of

animals, i.e. with the average for the herd, mothers, peers, etc. Comparison of the average values of a trait for a group of parents and descendants allows us to identify the nature of inheritance, i.e. the dominance or intermediate type of its inheritance by offspring, to reveal the strength of the heterosis effect. Without comparing the averages obtained on inbred and outbred offspring, it is impossible to determine the effectiveness of these breeding methods.

The severity of the sura coloring is the main indicator of the quality of Karakul skins. The severity of surah colors of the Surkhandarya type, as well as the results of the study on the severity and equalization of lambs' colors are presented in Table 3.

Table 3 The severity and balance of the coloring of the skin of lambs sur Surkhandarya type

Coloring	**Accounted for (goals)**	**The severity of the coloring**			**Color balance**		
		excellent	**good**	**bad**	**good**	**good**	**Bad**
at birth							
Platinum	20	30,9	63,6	5,5	29,0	60,9	10,1
Amber	20	27,9	64,3	7,8	27,9	63,6	8,5
Bronze	20	23,8	70,0	6,2	25,0	65,0	10,0
Anthracite	20	21,3	68,1	10,6	21,2	71,2	7,6
at 5-6 days of age							
Platinum	20	33,7	64,5	1,8	28,2	60,9	10,9
Amber	20	31,0	65,9	3,1	27,1	63,6	9,3
Bronze	20	27,5	71,3	1,2	25,0	63,6	11,2
Anthracite	20	24,2	72,2	3,0	21,2	69,7	9,1

The table shows that the lambs had significant differences in the severity and equalization of colors. In lambs of platinum coloring, the color intensity is higher, and the excellent category of color expression was 30.9-33.7%. Among them, the intensity of coloring was higher, respectively, with amber and anracite and was 3.0%; 9.6%, and bronze coloring was 7.1% higher.

The level of lambs of the desired type was 98.2% platinum, 96.9% amber, 98.9% bronze and 94.6% anthracite.

It should be noted that among lambs of various colors sur lambs with uneven surface colors are found more. These indicators in platinum coloring were 10.1%, amber - 8.5% and bronze - 10.0%.

In conclusion, we can say that the revealed severity of the colors and colors of at 5-6 days of age has the same tendency that is observed at birth.

The studies also revealed that each color is characterized by specificity to certain types of sur curls (Table 4).

Table 4 Type of curl of lambs sur Surkhandarya type of different colors, % (M±m)

Colors	**Accounted for (goals)**	**Types of curls**			
		Semi - circle left	**Ribbed**	**Flat**	**Overgrown**
Platinum	20	67,3±4,1	4,5±0,9	12,7±2,6	15,5±2,7
Amber	20	65,9±3,2	6,2±1,2	15,5±3,0	12,4±2,5
Bronze	20	61,3±2,7	11,3±2,0	18,7±3,4	8,7±1,9
Anthracite	20	46,9±1,5	6,1±1,1	31,8±4,3	15,2±2,7

It should be noted that the desired colors (platinum, amber, bronze and anthracite) are inherent in the semicircular curl. In lambs of platinum coloring, semicircular curls accounted for 67.3%, and in other groups of lambs, the overgrown type of curl was 8.7–15.5%.

The level of ribbed and flat-curled lambs was 17.2% in platinum coloring, and 20.4% in anthracite, due to the reduction of semicircular curls. When classifying the types of colors of Karakul sheep, complex signs are taken as a basis, where the shapes, types and sizes of curls determine the quality of karakul skins.

In the studies, the ratio of other types of color to the size of the coloring in the skin of lambs of various colors was studied.

Lambs of Sur Surkhandarya type include all types of medium curls. Relative to large-scrolled bows, with rich colors, lambs are inherent, where platinum 10.1 mm, amber 9.8 mm, bronze colors 10.0 mm curls are found. In addition, in the longish curls, as well as in the types of semicircular curls, there are colors platinum 8.9 mm, amber 8.7 mm, bronze 9.2 mm and anthracite 9.7 mm.

The determination of heritability coefficients is used to assess the breeding potential of producers. The main methods of breeding Karakul sheep, taking into account the colors, are homogeneous and heterogeneous mating.

The results of inheritance of colors during homogeneous mating of Surkhandarya sheep of the breed type are shown in Table 5.

Table 5 Inheritance of colors in descendants during homogeneous mating, %

Type of selection	**Accounted for (goals)**	**Lambs ' colors,%**				
		platinum	**yantar To what**	bronze	anthracite	bronze anthracite
Pl. x Pl.	40	71,6	7,9	7,5	10,0	3,0
Yang. Hyang.	40	14,1	68,5	4,7	12,4	0,3
Br. x Br.	40	10,9	13,7	71,5	2,6	1,3
An. Khan.	40	-	3,6	-	92,1	4,3

example: Pl. - platinum; Jan. - amber; Br. - bronze; An. - anthracite.

As can be seen from the table, 71.6% of platinum lambs and other colors of 28.4% were obtained from platinum-colored sheep; amber colors - 68.5% and 31.5%; bronze - 71.5% and 28.5% and anthracite colors - 92.1% and 7.9%.

Homogeneous mating of Surkhandarya-type sheep contributes to the transmission of heredity of parental pairs of sur colors, strengthening offspring, increasing the coefficient of heredity. This will serve to reproduce rare and valuable colors.

Fig. 4. Karakul skins of sur color of the original colors of the Surkhandarya breed type

The preservation and further development of the population is due to the receipt of a new generation. It should be borne in mind that not all individuals participate in obtaining the next generation. Some are excluded in advance as a result of natural waste, others are discarded.

Therefore, the effective population size is determined by the number of individuals participating in reproduction.

In the breeding farm of LLC "Bobotog suri korakulchilik" of the Kumkurgan district, selection and genetic methods of organizing collection flocks to preserve the gene pool of rare and valuable colors of Sur Surkhandarya type sheep were outlined.

Homogeneous mating is desirable for obtaining accurate breeding characteristics and the formation of separate flocks of sheep of different colors. This allowed stable lambing of lambs of original and valuable colors. In the next stage, the breeder in his work solves the issues of increasing the number of Sur Surkhandarya-type sheep, based on the widespread use of breeding sheep in order to consolidate with the typical for the original and equalized: platinum, amber, bronze and anthracite colors.

At this stage, a more rigorous selection, targeted selection will be carried out, and unwanted lambs are culled from the flock at the age of up to one year.

As mentioned above, the problem of preserving the gene pool is also relevant for colored Karakul sheep. In this regard, we have studied the morphological, biological features and productive qualities of Karakul sheep of original colors (bronze, amber, platinum, anthracite), at the breeding farm of LLC "Bobotog suri korakulchilik" reserve collection (in two flocks of senior shepherds M. Ashirov and B. Zhuraev) to preserve the gene pool of valuable colors of Sur Surkhandarya sheep breed type.

A sheep breeding system was developed to preserve the gene pool of the original coloring. The specifics of this system are as follows: the genealogical structure of the flock of sheep and breeding sheep and methods of their selection and selection related to Sur Surkhandarya type sheep.

In order to preserve the gene pool of Sur Surkhandarya-type sheep producing lambs of original colors, it is necessary to preserve and maintain genetic diversity, therefore targeted selection is desirable. This will lead to a change in the genetic structure of the animals (population).

To preserve the gene pool, it is advisable to combine stabilizing selection with rotational selection of animals by culling individuals that do not meet the parameters of severity and equalization of coloring.

Conclusion

1. It is established that in modern conditions the Karakul breed of sheep is diverse and has a complex structure.

2. The peculiarity of Karakul sur Surkhandarya sheep with peculiar biological properties, in particular, high and high-quality productivity, production of unique and valuable multicolored Karakul sur skins, resilience, adaptation to year-round maintenance and grazing in desert, semi-desert, dry steppes, mountains and foothill pastures, to the sharply continental climatic conditions of the Surkhandarya oasis are valuable indicators.

3. Crossing in a systematic way "good x good" when creating the Surkhandarya sur, the gradual transfer of hereditary and qualitative traits to subsequent generations through purposeful selection, the patterns of long-term variability by their creation with the help of homogeneous crossing have historical significance.

4. In the study of homogeneous crossing sur Surkhandarya type, patterns of long-term variability, transmission of hereditary parental colors, in the mating variant platinum x platinum was 71.6%, amber x amber - 68.5%, bronze x bronze - 71.5% and anthracite x anthracite - 92.1%. On this basis, it was revealed that homogeneous mating according to the colors of sheep suras led to the improvement and strengthening of rare and valuable qualities. It is shown that the gene pool of sheep of this breed is unique and can be influenced by both para- and genotypic factors.

References

1. Aripov U.H. Scientific foundations for improving the viability and productivity of Karakul sheep. Autoref. doct. diss.T.: 1992; 32 p.

2. Aripov U.H., Aliyev D.D., Omonov M.I., Narzullaev H. Methodological recommendations for the preservation of the gene pool of Karakul sheep of Surkhandarya sur. Samarkand.: 2017; 21 p.

3. Akhmetshiev A.S. Breeding of Karakul sheep of the Karakalpak sur. Alma-Ata.: Kainar, 1989: –pp.103–105

4. Bobokulov N. A. Formation and development of the scientific base of karakul breeding in the field of breeding and breeding. //Scientific and practical foundations of the development of desert–pasture animal husbandry and prevention of desertification: Materials of the international scientific and practical conference. Samarkand.: 2019; – pp. 5-11

5. Bozorov S.R., Yusupov S.Yu., Gaziev A. The role and significance of constitutional types in the breeding of Karakul sheep. Materials of the international scientific and practical conference. Samarkand.: 2019; – pp. 21-24.

6. Gigineishvili N.S. Breeding work in color karakul breeding. Moscow: Publishing House. Kolos, 1975; 243 p.

7. Dyachkov I.N. Breeding business in Karakul sheep breeding. – Tashkent.: Publishing House. Fan, 1980; 164 p.

8. Omonov M.I. Development of breeding and genetic bases for preserving the gene pool of Karakul sheep of Surkhandarya sur. Autoref. doct. diss.Tashkent.: 2021; 62 p.

9. Stolpovsky Yu.A., Zakharov - Gezekhus I.A. The problem of conservation gene pools of domesticated animals. // Vavilovsky Journal of Genetics and Breeding. Moscow: 2017. 21 (4). – pp. 477-486

10. FAO. The second report on the state of the world's animal genetic resources for food production and agriculture. Summary. – Rome.: FAO, 2015; 14 p.