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## **Some Genetic and Selection Characteristics of Bozakh Sheep Breed in the Western Region of Azerbaijan**

### **Abstract**

Sheep breeding is one of the oldest and most profitable branches of animal husbandry. The state pays special attention and care to the development of sheep breeding in our country. Because, unlike other animals raised in agriculture, sheep have the characteristics of producing more types of products. Sheep produce mutton and dairy products that are well absorbed by the human body. Mutton differs from the meat of other animals in its high calorie content and low cholesterol content in its fat. Sheep wool is considered superior as a raw material source for the wool processing industry and for human health due to its beneficial properties and cannot be replaced by any textile fiber. In Azerbaijan, gene pools of a large number of valuable sheep breeds have been created through folk selection to meet people's needs for food products. Examples of these breeds include: Absheron, Mil-Karabakh, Balbas, Bozakh, Godek, Jaro, Shirvan, Lezgi, Azerbaijan Mountain Merino, Mazek, Garadolog, etc. The article studies some genetic and selection characteristics of Bozax sheep bred in the western region of Azerbaijan. Bozax sheep are bred for meat-milk-wool production. Depending on the direction, the weight and yield of the animal change. These animals are local, distinguished by their high productivity. Currently, in the conditions of a market economy, pedigree Bozakh sheep are also bred in sheep farms and private farms of our country.

**Keywords:** *sheep, breed, genetics, sheep breeding, selection*

### **Introduction**

Sheep breeding in Azerbaijan has an ancient history. The natural climatic conditions of our country, the presence of large areas of summer and winter pastures are very favorable for the development and further expansion of sheep breeding here. Even in ancient times, the emergence and development of the art of carpet weaving in our country was also associated with sheep breeding. Various types of products are obtained from sheep breeding, which distinguishes it from other livestock breeding areas. In normal pastures with favorable ecological conditions, sheep spend up to 76% of the nutrients of the feed they eat for crop production. Also, in such conditions, every hundred mother sheep can give birth to 100-110 or more lambs. Sheep have a well-developed herd instinct. Therefore, their maintenance and feeding are carried out in large flocks (Abdullayev, Aliyev, 2012; Abbasov, 2011; Zeynalov, 2008; Zeynalov, 2016).

### **Research**

Sheep with high qualities, selected as a result of selection, have retained their valuable genetic traits, disease resistance, breeding ability, and ability to adapt to pasture conditions, despite being exposed to environmental variability due to the influence of various environmental conditions.

Sheep have the ability to adapt well to changing conditions. In this regard, the great potential of sheep to adapt to different conditions of keeping and feeding is their most important feature. Due to their good adaptation to changing conditions, the creation of new sheep breeds by breeders and their breeding in zones with different ecological climates is a positive phenomenon (Podkorytov, 2017; Jensen, 2002).

Today, one of the most promising tasks in the selection and breeding of sheep is to determine the meat and milk productivity of sheep.

Improving these qualities will allow enriching the gene pool and, as a result, improving the quality of mutton and other sheep products (Jukhoveeva, 2020). Recently, while the range of products made from artificial fibers in light industry has been increasing year by year, sheep breeding is still considered irreplaceable as a source of raw materials for the wool processing industry. Because the best, most beautiful, elegant and high-quality fabrics are made from fine and semi-fine wool. Semi-coarse and coarse wool are used as valuable and high-quality raw materials in the carpet industry (Podkorytov, 2019; Volkov, 2006).

**Conducting the research:** Sheep products have been widely used as food in our country since ancient times and are still widely used today. The vast majority of national dishes are made from sheep meat, and sheep milk is especially distinguished by the large amount of nutrients it contains. Products made from sheep milk, including Motal cheese, are very popular with our people. In connection with all this, very serious measures are being taken at the state level to further develop sheep farming in Azerbaijan and increase the number of productive sheep breeds. Breeders are working to create new sheep breeds with high genetic characteristics.

Sheep are ruminant animals. They were first domesticated by humans seven thousand years ago. Over time, sheep have been developed in Azerbaijan to meet people's food needs, and through folk selection, gene pools of many valuable sheep breeds have been created. Examples of these breeds include: Absheron, Mil-Karabakh, Bozakh, Godek, Jaro, Shirvan, Lezgi, Azerbaijani mountain merino, Balbas, Mazeikh, Garadolag, etc. (Abdullayev, 2012; Zeynalov, 2008; Veniaminov, 1984).

In our country, Bozakh breed sheep are more widespread in the lowland and foothill regions of the western region. These sheep differ from other breeds in that they are both meat, wool, and dairy. Bozakh breed sheep are widespread in Western Azerbaijan and partly in Eastern Georgia. These sheep are considered one of the ancient and local Azerbaijani sheep breeds.

According to the research of Prof. I.I. Kolugin, Bozakh sheep resemble Karabakh sheep in some relative body sizes and appearance. However, they differ from them in the nature and length of their wool. In terms of their appearance, Bozakh sheep are intermediate between Karabakh and Tush sheep and most likely originated from the hybridization of these two breeds.

During the communist era in Azerbaijan, in order to improve the productivity of local meat-wool-milk sheep, Bozakh sheep were crossed with fine-wool rams of other breeds. As a result, the Bozakh breed was brought to the brink of extinction. In the eighties, with the direct participation and initiative of scientific staff of the sheep breeding departments of Azerbaijan Scientific Research Institute of Animal Husbandry and Azerbaijan State Agrarian University, work began on the restoration of Bozakh sheep and improvement of their productivity. In the early nineties, breeding herds of Bozakh sheep were created in the farms of the Tovuz region, a western region of Azerbaijan. This local sheep breed is loved by the people for its high productivity. Currently, in the conditions of a market economy, breeding Bozakh sheep are also bred in sheep farms and private farms of our country.

The most valuable qualities of sheep wool have been known to people since ancient times. Sheep wool is light, elastic, stretchable, durable, has excellent thermal insulation and hygienic properties. It is well dyed and spun, and felt is also made from sheep wool, a property of wool that none of the synthetic fibers have (Weaver).

Although many types of chemical fibers may be superior to wool in certain properties, for example, some in lightness, others in strength, or in beauty and even in price, sheep wool is considered superior to human health in terms of its beneficial properties and cannot be replaced by any textile fiber (Abdullayev, 2012, Podkorytov, 2019).

The wool of the Bozakh sheep is mainly gray, rarely white, brown. Most likely, it was given the name Bozakh sheep, taking into account the grayness of its color.

The Bozakh breed belongs to the coarse-wooled sheep. Its wool is mainly gray (36%), rarely white (12.4%), black-brown (10.1%), yellow and yellow-brown (21.8%). The weight of wool in breeding rams is 6.7-7.3 kg, in ewes 4.8-5.2 kg. It produces an average of 1.8-2.2 kg of wool per year. The length of the wool, which is one of the main quality indicators of wool, varies between 7.6-9.0 cm (Sukhoveeva, 2020).

### Quality indicators of wool in Bozakh breed sheep by gender.

Table 1.

Gender	Fringe length, (cm)	Actual length of wool fiber, (cm)	
		Rustling	Mohair
Male	11,5 - 13,2	12,1-14,6	5, 0 -7,2
Female	10,9-13,6	9, 4 - 11,6	5,1 – 6,9

It should be noted that the quality of the wool also depends on the age, sex, live weight of the animal and the ability of the wool to develop during the corresponding period.

Bozakh sheep are very mobile, medium-sized, well-built animals. Their chest is well developed, and their legs are characterized by strong bones, which is the main feature that distinguishes Bozakh sheep from other breeds. Sheep of this breed are resistant to piroplasmosis and are well adapted to keeping in mountain pasture conditions. They are the only sheep breed in Azerbaijan that has different ear shapes.



Figure 1. Bozakh sheep breeding bred in the western region of Azerbaijan (Azerbaijan Scientific Research Institute of Animal Husbandry).

The live weight of this breed of sheep is usually 50–65 kg. It gives good meat. The live weight of the mother sheep is 45–47 kg, the rams are 55–60 kg, and the meat yield is 50–55%. While the live weight of wool and dairy rams is 52–56.4 kg, this indicator reaches 59.6 kg in the meat-oriented type. Thus, the lowest body weight is recorded in dairy rams, which is equal to an average of 53.7 kg. When examining the live weight indicators of the mother sheep, it becomes clear that while the average indicator for the herd is 40.5 kg in mother sheep, this indicator is equal to an average of 43.8 kg in those of meat-oriented type. The lowest weight is recorded in dairy animals. So, this weight is equal to 37–38 kg.

Mother sheep produce 45-50 kg of marketable milk during lactation. Their lambs weigh 3.3-3.5 kg at birth. They weigh 20-22 kg when they are weaned. The meat yield of these sheep is 50-55%. Due to milk yield, the mother sheep produces 45-50 kg of marketable milk per year. Some productivity indicators of Bozakh breed sheep are given in table 2.

Table 2.

### Average productivity indicators of Bozakh sheep.

Productive type	Live weight, kg				Clean wool shearing, (per year) kg			
	Ram, male lamb		Mother sheep, female lamb		Ram, male lamb		Mother sheep, female lamb	
	yaşlı	bir yaşında	yaşlı	bir yaşında	yaşlı	Bir yaşında	yaşlı	Bir yaşında
Wool	56,1±1,26	40,8±1,30	40,2±1,30	35,2±1,33	3,2±1,35	2,5±1,30	2,3±1,28	2,1±1,34
Meat	59,8±1,72	45,9±1,65	43,6±1,58	37,6±1,32	2,8±1,58	2,1±1,32	2,1±1,31	1,8±1,27
Dairy	52,6±1,32	38,2±1,30	38,2±1,35	33,2±1,27	2,2±1,43	1,7±1,29	1,8±1,45	1,7±1,35

Sheep milk differs significantly from cow's milk in terms of its chemical composition and nutritional value, as sheep milk contains 1.5 times more dry matter, 1.7 times fat, and 1.6 times more protein. Milk from mountain sheep contains 17-20% dry matter, 5.5-7.0% fat, and 5.7-6.0% total protein, and the energy value of one kg of such milk is 1218 kcal.

Although Azerbaijani mountain menino sheep are meat and wool-producing, the milk yield of the mother sheep during lactation is 45-50 kg. Its milk is known for its normal nutrition of lambs until weaning and its high fat content.

### Conclusion

The Bozakh breed is fully adapted to living in the natural geographical and climatic conditions of the Ganja-Gazakh region of our republic (mainly in the mountain and foothill zones). They make good use of mountain and foothill pastures. These sheep have very sharp, pointed teeth and thin, mobile lips, which allows the sheep to skillfully use pastures with very low or coarse cover. Sheep of this breed make good use of the feed available in pasture conditions throughout the year. This directly affects the low cost of the product obtained from them. In natural conditions, Bozakh sheep use various types of grass, including weeds, throughout the year. The multi-chambered stomach of the sheep and the well-developed digestive system ensure the full use of nutrients contained in the feed. At the same time, these sheep have a very tolerant temperament.

Since 2025, Azerbaijan Scientific Research Institute of Animal Husbandry has been conducting modern selection work and creating new sheep breeds, and work is being done to obtain new lines and breeds by crossing sheep imported from foreign countries with local Bozakh breed rams. The goal of this work is to create a more productive, disease-resistant sheep breed with good genetic characteristics. In addition, work is being done to improve local sheep breeds and types, restore and protect sheep breeds created through folk selection, as well as those in danger of extinction. Proper use of the potential of sheep is of great importance in sheep breeding.

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