

## THE FARM ANIMAL GENETIC RESOURCES OF MONTENEGRO\*\*

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**Abstract:** The review of farm animal genetic resources, degree of danger of extinction and way of preservation of certain autochthonous breeds of livestock in Montenegro was the aim of this article. Origin, geographical distribution, population size, morphological and productive traits of the important populations of livestock, as brachyceros breed of cattle – Busha, coarse wool domestic breeds of sheep (Pivska, Zetska zuja, Ljaba, Bardoka), domestic hilly horse breed and donkey were presented.

**Key words:** farm animal genetic resources, cattle, sheep, goat, horse, donkey

### Introduction

Montenegro, as a country with relatively small territory (13812 square kilometers), has a large number of populations of domestic farm animals. These populations are small and very specific in terms of their genetic and phenotypic characteristics. Some of them are endangered and facing extinction.

Research and conservation of all these species, breeds and strains, especially autochthonous, as the carriers of specific genes for creation of new breeds and genetic combinations for direct use and for keeping of gene-pools, have a great importance.

A review of the most endangered populations of breeds and strains, reared in Montenegro will be given in this paper. More precisely, population size, origin, and data about most important morphological and productive traits achieved in the investigation performed until now, will be presented.

## Basic characteristics of the endangered breeds and strains

### Cattle

There are several breeds of cattle reared in Montenegro: Brown Swiss, Tyrolean gray, Holstein-Frisian, Simmental, and local breed called Busha. Autochthonous brachyceros type of cattle - Busha is the most important for the purpose of breed conservation.

**Busha** is, according to *Adametz (1925)*, an autochthonous type of cattle of Balkan Peninsula, also known as an Illyric cattle.

Till the middle of XX century, the population of cattle with most heads (approx. 90%) in Montenegro was the type of Busha. In the meantime, situation has changed considerably. More productive breeds, like Brown Swiss, Holstein and Tyrolean gray and their crosses with Busha became dominant in the total population.

The current number of purebred Busha heads is very small, and according to the estimation it hardly covers few hundreds breeding animals, reared mainly in isolated, less developed villages that are far away from the urban centers.

Busha breed is usually single colored with different level of pigmentation. There are black, red, dark or light brown and different light colors to the total white colored heads (*Adametz, 1925*). Partly depigmentation occurs only on the dorsal part of body (udder and stomach). Horns are thin and bended forward in the form of wreath, but sometimes in the form of pitchfork.

Busha is very small cattle, almost dwarfed. Body weight of adult animals ranges between 150 and 250 kg (*Ljumovic, 1961 and 1964*), but in better feeding condition it can reach to 300 kg. Average height to withers is 105 cm (ranging from 90 to 110 cm, depending on feeding conditions), *Lalatovic (1957)*, *Ljumovic, (1973)*.

There are no exact scientifically approved data on production traits, except estimations that Busha is relatively good milk producer in comparison to its body size. Well shaped udder can be proof for this statement, as well as fact that Busha can easily produce more than 2000 l of milk in lactation with very high fat percentage.

This breed is well adapted to the very harsh feeding and housing conditions, resistant to diseases and has long production life – 10 and more

lactations. It could be said that the Busha's genome is very elastic, since this breed in favorable conditions easily achieves higher body weight and much better production, keeping good ability for adaption and resistance.

### Sheep

Domestic coarse wool sheep – Pramenka (Zackel type) is dominant, with few exceptions, in the whole population. In terms of morphological and production traits there are several different strains of sheep. Pivska Pramenka is the most numerous one, followed by Sjenicka, while crosses between Württemberg (Merinolandschaf) and local breeds are of much smaller importance in terms of share in total population. Other strains of Pramenka, like Zetska zuja, Ljaba, Bardoka and Vasojevicka ruda have very small percentage in the whole population.

**Pivska Pramenka (synonym - jezeropivska)** is coarse wool local strain which belongs to group of long tail sheep, with more than twenty vertebrae. It originates from *Ovis vignei arkar*.

This is the most numerous strain of sheep in Montenegro. Together with its crosses, it participates with 40% (approximately) in total sheep population. Rearing region of typical Pivska Pramenka animals is mountain area of Durmitor and Sinjajevina, and partly in the central part of Montenegro.

In terms of body size, Pivska is one of the largest strains of Pramenka breed in Montenegro. Adult breeding female animals weigh 51 – 54 kg, with height to withers of about 66 cm (*Adzic and Ljumovic, 1987*). Face and fore legs are covered with spots. All males and 50% of females are horned. This strain is characterized by white wool, although 5-7% from the total population are black or gray. Diameter of wool fibers is 35 micrometers in average. Yield of greasy wool is 1,5-2 kg in average.

Average milk yield in lactation ranges from 100 to 110 liters of milk, with average fat content of 5,5% (*Adzic 1985, Ljumovic and Adzic, 1987, Lalatovic 1954*).

Fertility of ewes (approximately 120 newborn lambs per 100 ewes) and level of production to the great extend depend on nutrition and housing. In good conditions, this strain reacts very quickly by increasing the performance of fertility, milk yield and growth of lambs. This strain is well adapted for the rearing in the cold mountain climate.

**Zetska zuja (Zeta's yellow face sheep)** is characteristic Pramenka strain, which originates from Asia Minor, from where it was probably brought to this region during Turkish imperia.

This strain can be easily determined because of the characteristic yellow – brown face and legs by which it is named “yellowface”. Rearing area of this strain is very limited, only flat area around of Podgorica (Zetsko – Bjelopavlicka plain and basen of lake Skadar).

Till the middle of last century the population size of Zetska zuja was several tens of thousands of breeding animals, but today that number decreased to only few tens purebred heads and few hundred heads in the type of Zetska zuja. It is the most endangered strain of Zackel type in Montenegro. If the trend of decreasing continues, the strain will be extinct completely in near future. So, this strain urgently needs to be protected (*Markovic et al., 2006*).

This strain is one with smallest body frame among Pramenka strains in Montenegro. Average body weight is about 35 kg, while withers height is 57cm (*Lalatovic, 1952, Adzic and Ljumovic, 1987, Adzic and Markovic, 2003*). Average milk yield in 6 months lactation is about 80 kg with 7,5% of fat content (*Ljumovic and Adzic, 1987*). One of the characteristics of this strain is high fat percentage in comparison to all other strains in Montenegro. Wool is white, like in many other strains, but it is very coarse (40 micrometers fiber diameter in average).

The greatest advantages of this strain are good resistance and excellent adaptability to very hot climate in the rearing area.

***Ljaba*** is the strain of Pramenka reared mainly in the part of Montenegro close to border of Albania (Malesija plain in area of Podgorica municipality, Krajina in Bar and in Ulcinj). Total number of animals is unknown, but it is assumed that there are several thousand heads. Level of their endangerment is lower than for Zetska zuja, nevertheless this strain needs to be protected from extinction.

Ljaba is similar strain to Zetska zuja, but it has white face and legs and name of strain is based on that characteristics. There are animals with long pale yellow spot on the face. Height to withers is practically the same as for Zuja (57,5 cm), and average body weight is close to 40 kg (*Adzic and Ljumovic, 1987*).

Ljaba has relatively good potential for milk production, with milk yield for the whole lactation of 90 kg. Average fat content, like in Zetska zuja, is much higher than in many other strains of Pramenka – 7,44% (*Adzic and Ljumovic, 1987*).

Like Zuja, Ljaba is well adapted to the Mediterranean climate and to scarce nutrition during dry summer and during winter when animals were fed inadequate quantities of hay.

***Bardoka***. The breeding area of bardoka is very similar as for Ljaba. Bardoka is a strain which is raised mainly alongside of border with Albania and Kosovo, areas in municipalities Plav, Gusinje, Ulcinj and partly Podgorica. Exact number of animals and degree of danger of extinction are not known, but it is sure that number has been continually decreasing in the last time, so that current population has only several hundreds of purebred heads, while there is much bigger number of crosses.

Bardoka is one of the largest strains of pramenka reared in Montenegro. It is white coarse-wool sheep, with white face and legs. Average live weight of the ewes is approximately 45 kg, with height to withers of 63,2 cm (*Adzic and Ljumovic, 1987, Mitic, 1987, Markovic et al., 2006.*). The average lactation yield of milk is 110 kg, but sometimes it can increase up to 200 kg per lactation. This strain is characterized by long duration of lactation, even more than seven months. The fleece is opened with pointed and long staples (25 – 30 cm) and with very coarse fibers.

Bearing in mind the importance of its genetic potentials, it should be included into program of conservation of farm animal genetic resources.

## Goats

Goat as species of livestock is reared mainly in the least favorable areas of Montenegro, characterized by karsts relief with big slopes and pure forest (bushes). In these areas most common breed of goats is primitive **Domestic/indigenous Balkan breed**.

For the purpose of genetic conservation, the most important is above-mentioned breed, mostly, because of its adaptation to scarce nutrition and resistance to diseases. Very similar breed is reared in other Balkan countries like Albania and Greece.

Domestic Balkan breed of goat originated from *Capra prisca* (*Adametz*), which was spread out in South-eastern Europe.

There are no exact figures about the size of goat population. According to our estimation, size of population of breeding animals is roughly 50.000, of which 40% belongs to the domestic Balkan breed. The rest includes crosses and more productive breeds.

There are several different strains of domestic/indigenous Balkan breed in terms of coat color: red-brown, considered as authentic representative of domestic/indigenous Balkan breed; reddish/bay; black or even spotted (*Adzic and Ljumovic, 1981, Markovic, 1997 and Markovic, 2004*).

According to *Markovic (1997), Markovic et al. (1994) and Adzic et al. (1995)*, average live weight of breeding females was 41 kg, height to withers

65 cm, milk yield 130 kg with 3,36% milk fat content in lactation which lasted 217 days in average.

Domestic Balkan breed of goats is endangered partly by migration of inhabitants from the areas where goats are traditionally reared, and partly by crossing it with productive breeds.

In order to protect this breed from extinction certain conservation activities are necessary, especially for variety with red colored coat.

### **Horse**

Due to massive application of broad range of agricultural mechanization and transport means, horse has lost its previous importance. However, in less developed, hilly and mountain regions, horse is still necessary and irreplaceable as a source of work power.

In the most of Montenegro the most important is **Domestic hilly breed of horse**, since it is very enduring, modest concerning feeding, and is used for many purposes. Domestic hilly breed of horse still exists in mountain part of country, where it is still possible to find authentic representatives of this breed, which have to be protected against extinction.

Written data about domestic hilly breed of horses in Montenegro can be found in paper of *Lalatovic (1947)*. This breed is very similar to Bosnian breed of horses.

Exterior of domestic hilly horse is characterized by small head, long neck, long back and short junction, round croups and deep chest (*Ogrizek and Hrasnica, 1952*). This is relatively small horse with average body weight of 300 kg and withers height of approximately 135 cm in male and 130 cm in female heads.

The size of horse population has decreased permanently. Current population has about 20 thousands of heads but the actual number of Domestic hilly horses is much lower, possible only a few thousands. There is a big interest to determine exact number of heads of this breed and to get data about current state of endangerment of this breed.

### **Donkey**

It is common situation in small village households in the south part of Montenegro (region of municipality Ulcinj, Bar and partly in Cetinje and Podgorica) that horse is replaced by donkey. Donkey has much smaller body frame than hilly horse, with less of power and slower run, but it can carry weight of 80 to 100 kg.

No actual data on Montenegrin donkey population exists and therefore

there is no information about the size of population or breed structure.

There is only data that Cyprus donkey had been reared in Livestock station at Niksic during first half of XX century, as well as that small number of donkeys was imported from Italy after the Second World War (Sakotic).

Due to lack of basic information on donkey's population in Montenegro, it is necessary to perform appropriate research in order to get needed data for the conservation program of this livestock species.

## Conclusion

Bearing in mind the above-mentioned, Montenegro can be considered as a country rich in autochthonous populations of different species, breeds and strains of domestic animals.

Even though, with relatively poor production capacity, described populations are very important for the conservation of their genes.

In order to protect these breeds and strains, the following steps should be taken:

1. Preparing the Program of conservation of all autochthonous breeds and strains of animals on the national level that should include the following priorities:
  - a) Identification of the most important farm animal genetic resources and their habitats;
  - b) Characterization of animal genetic resources, their distribution, main characteristics and current state;
  - c) Definition of the role and importance of breeds and strains, proposed for the conservation program of animal genetic resources, in the national livestock production;
  - d) Establishment of permanent program for monitoring and organization *in situ* conservation on the farms and development *ex situ* methods of conservation (cryo-preservation, DNA, etc)
2. Development of appropriate legislation and regulations.
3. Improving of international communication and cooperation.

## GENETSKI RESURSI U STOČARSTVU CRNE GORE

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## Rezime

U radu je dat pregled genetičkih resursa u stočarstvu Crne Gore, stepen ugroženosti od nestajanja kao i načini moguće zaštite i očuvanja postojećih autohtonih rasa i sojeva domaćih životinja. Porijeklo, geografska distribucija, osnovne morfološke i proizvodne karakteristike dati su za najvažnije rase i sojeve, kao što su: brahicerne goveče – buša, sojevi gruborune domaće pramenke (Pivska, Zetska žuja, Ljaba, Bardoka), domaća balkanska koza, brdski konj i magarac.

**Ključne reči:** genetički resursi, goveda, ovce, koze, konji, magarci

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