

LIVESTOCK BREEDS OF MONTENEGRO

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Montenegro (in the local language *Crna Gora*) is a Balkan republic that became independent in 2006, after the separation from Serbia, and which until 1992 was part of the Federal Socialist Republic of Yugoslavia.

The nation has about 620 thousand inhabitants, approximately equal to those of the municipality of Palermo, and an area of 13,812 km² (5,333 sq mi), approximately equal to that of Campania. The area is 85% mountainous, and is located at the same latitude as Abruzzo, Latium and Umbria. The capital Podgorica is approximately at the same latitude as Pescara.

Montenegro is linked to Italy by tight bonds, the name itself of the country was given by the Venetians, who ruled it from 1420 to 1797. Helen Queen of Italy from 1900 to 1946, wife of the King of Italy Victor Emmanuel III, was a Montenegrin princess, Jelena Petrović-Njegoš, daughter of the future king of Montenegro Nicholas I. However, there is an ancient tradition of intense commercial exchanges across the Adriatic, not always legal, while as regards cattle and sheep, Montenegro has always exported to Italy live animals for slaughter (*Baldacci*).

The livestock census in the country is in sharp decline compared to previous decades. According to FAO in 2020, 80,018 cattle were raised in Montenegro (in 1950 they were 188,354), 186,043 sheep (in 1960 their number was 640,000), 28,913 goats (in 1939 the census was 178,777), 26,853 pigs (in 1951 there were 39,763) and 3,951 horses (in 1960 the total was 32,000).

For many breeds, the most recent biometric measurements have instead shown an increase in body size compared to the past. Pig and poultry farms are small in number due to the weakness of the national feed industry (*Marković M. et al., 2018*).

In any case, livestock breeding makes 50% of the total value of the agricultural sector, and employs 24.4% of the domestic workforce (*Marković M. et al., 2018*).

According to the Statistical Office of Montenegro (Monstat), 30,780 cattle heads were slaughtered in 2020, of which 22,598 calves, and 39,892 sheep, of which 38,886 lambs, 13,962 pigs, of which about a quarter in December.

In 1958 Yugoslavia began exporting a product called “*Yugo baby-beef*”, from pure-bred Simmenthal cattle, born in Bavaria and Austria and reared in Yugoslavia. In the mid-1970s the EU imposed heavy tariffs on the product, to protect domestic production, and the flow of baby beef was cut off, until 1980, when an annual *quotum* of 50,400 tons of product with a reduced duty import tariff was introduced. With the disintegration of Yugoslavia the tariff rate *quotum* was divided between four of the new states that originated, but Serbia and Montenegro were excluded until 1997 due to the sanctions imposed for the war (*Nikitović*).

Currently, the European Union, by means of the Commission Implementing Regulation (EU) 2020/761 of 17 December 2019, has opened a tariff quota with Montenegro of 800 tons per year of baby beef, expressed in carcass weight, with the number 09.4199, on which 20% of the *ad valorem* duty and 20% of the specific duty provided for by the Common Customs Tariff are applied.

Montenegrin livestock breeding has been based for centuries on transhumance, with summer grazing in the mountains using traditional buildings, called *katun* (plural: *katuni*), now largely abandoned, due to the reduction in livestock breeding, but which are being recovered, even if it is difficult to do it for breeders' use, but is already underway for tourist use (*Pelcer-Vujačić, et al.*).

The dairy products of the *katuni* are distinguished by the particular organoleptic characteristics, due to the milk coming from grazing animals, similarly to the products of alpine *malghe* (huts). The products are cheeses, *kajmak* (clotted cream), *skorup* a product with intermediate characteristics between cheese and butter and *kisjelo mlijeko* (thick yoghurt).

The *katuni* culture was marked by the seasons of transhumance, and in particular by the day of departure for the pasture, called *izdig*, which usually happens in May, preceded by a festival that

took place on the previous day and night.

With regard to native breeds, Marković B. *et al.* (2021) notes that Montenegro has a greater number of breeds than three countries of the Balkan area (Slovenia, Croatia and Greece), in relation to the territory.

Cattle

The entirely autochthonous breed is the **Buša** or *Busha*, once known as Illyrian breed, which is part of the same strain as the analogous short horns breeds reared in all the Balkan countries with the same name, while in Greece it is called *Vrahikeros*.

Until the beginning of the 20th century Buša was the only breed in Montenegro, and until the 1960s it was the prevailing breed, despite the introduction of cosmopolitan breeds, such as Brown Swiss of the Montafon strain, Pinzgauer, Holstein-Friesian and, above all, Simmental.

Today a population of between 250 and 300 heads is estimated, mainly reared at pasture, with minimal consumption of hay or other nutrients in winter (Marković B. *et al.*, 2021).

The Buša's coat is reddish, with shades from almost white to almost black. In animals with darker hair, a lighter dorsal stripe is visible along the back. Occasionally the coat is brindle, usually associated with the absence of pigment in the mucous membranes and around the cornea. Around the muzzle frequently there is a ring of light hair, forming the so-called "deer face". The skin, the mucous membranes and hooves and the bottom of the scrotum are dark, except in brindle animals (Marković B. *et al.*, 2021).

The head of Buša has a narrow front profile with crown-shaped horns, bent upwards and inwards, of a yellowish color tending to white having almost always black tips. The trunk is relatively short, with moderate development of the abdomen, narrow pelvis, slightly bent towards the root of the tail, which favors calving (Marković B. *et al.*, 2021).

The size of Buša cattle is very small, the average height at the withers is 113 cm (44.4 in), the average trunk length is 126 cm (49.6 in), the average chest circumference is 158 cm (62.2 in) and the average body weight is 290 kg (639,34 lbs). All the measures of today's population are greater than the 1960s population, thanks to the best breeding conditions, and partly due to the crossing with other breeds (Marković B. *et al.*, 2021). In 1906 Pirocchi reported withers heights of 1 meter (39.4 in) or less.

The Buša is a late maturing breed, with full maturity from 12 to 15 months, while the productive lifespan of a cow is 10-12 years, often even longer. They have a good fertility, with regular calving and an excellent ability to cope with adverse rearing conditions and great resistance to diseases.

Milk production is very poor, around 1,000-1,500 kg (2,220-3,300 lbs) per 8-9 month lactation, and largely depends on rearing conditions. It has little tendency to fatten and the meat is not sufficiently juicy and tender, it is dark red in color, and the dressing percentage is around 45% (Marković B. *et al.*, 2021).

In southern Montenegro, the animals are slaughtered between six and ten months after being raised on pasture with their dams. In central and northern Montenegro, slaughter takes place at about 18 months, after a summer stay at pasture in the second year of life (Marković B. *et al.*, 2021).

A foreign breed, but which can now be considered autochthonous, is the grey **Oberintalac**, a name that comes from the original Austrian breed Oberinntal, meaning "from the upper valley of the River Inn", in Tyrol. The breed is also related to the Grigio Alpina breed, widespread in Italy in the provinces of Bolzano and Trento.

The Montenegrin selection is slightly smaller than Austrian population, with an average withers height of 127 cm (50 in) for cows and 137 cm (54 in) for bulls, with an average body weight between 400 and 550 kg (882-1,213 lbs) for cows, and over 600 kg (1,323 lbs) for bulls. These cattle are well adapted to high mountain pastures with scattered vegetation, thanks to sturdy limbs and resistant hooves, which allow them to move on hard and rocky terrain (Marković B. *et al.*, 2021).

The breed is resistant to diseases and climatic adversities, has a high fertility and longevity,

and cows often live over 12 years. Precocity is medium and reproductive age begins at 18-19 months. The average daily growth can exceed 1,000 g. (2.2 lbs), Meat is of good quality, with a dark color and the dressing percentage of fattening cattle is about 60% (Marković B. et al., 2021).

Among the cosmopolitan breeds, the most widespread according to FAO data are Holstein-Friesian (13,000 head), Brown Swiss (12,000 head), Simmental (15,000 head) and Angus.

A fresh cow's raw milk cheese, *Lisnati sir*, or *Kartika*, originating from the northern mountainous region of Montenegro, and precisely from the areas of Vasojevici, Kolasin and Bijelo Polje, has been included by the nonprofit Slow Food Foundation for Biodiversity in the Ark of Taste, a collection of products that belong to the culture, history and traditions of the whole planet.

Sheep

In the country there are several breeds of Pramenka strain, belonging to the Zackel group, widespread throughout the Balkans and also in Italy, in the Julian March.

The strain takes its name from the Slavic term “*pramen*” which means “curl”, with reference to the wide loops formed by its open fleece. These sheep are extremely frugal, resistant to environmental adversities and suitable for transhumance (Marković B. et al., 2006).

The Montenegrin pramenkas are Jezeropivska Pramenka, Žuja, Ljaba, Bardoka and Sjenička. A 2019 study (Marković B. et al., 2019) analyzed the main phenotypic and morphological characteristics, and calculated the morphometric indices to be used as indicators of the functional type.

The main local breed is **Jezeropivska Pramenka**, also called *Pivska*, *Piva* or *Durmitorska*, typically Montenegrin, native to the mountainous area around the lakes formed by Piva river, and that of Durmitor and Sinjajevina mountains, with an altitude between 800 and 2,000 meters (2,600 to 6,500 ft), and therefore adapted to live in inaccessible areas with cold winters (Marković B. et al., 2006, 2021).

After the World War II, to improve the yield in meat and wool, it was crossed with Merino-blood breeds, such as the Sjenička, and at the end of the 1970s and 1980s there was a crossing with Württemberg, and even to a lesser extent with the Friesian. This has led to a drastic drop in purebred census, also due to the migration of human population from Mount Durmitor area, where the breed was traditionally reared. Currently about 2,500 heads are reared (Marković B. et al., 2021).

The average withers height is 71 cm (28 in), with a chest circumference of 100 cm (39.4 in) and an average body weight of adults of 71 kg (156.5 lbs) (Marković B. et al., 2021). It belongs to the group of long-tailed sheep with over 20 vertebrae, whose tail extends below the hock. All rams have strong spiral-shaped horns, and 50-70% of ewes have sickle-shaped horns with the tips pointing forward.

It has a prevalent meat purpose, especially aimed to lamb, put on the market at the age of about 6 months, with a live weight of 40-45 kg (88.2-99.2 lbs). Anyway ewes are also milked, with a production of about 110 kg (242.5 lbs) of milk in a 203 days lactation, to produce typical local cheeses, while the wool production, of 1.5-2 kg (3.3-4.4 lbs), is marginal, also due to the poor fineness of the fleece, with a diameter of 35-40 μm (Marković B. et al., 2021). Average fertility is 120 lambs per 100 ewes (Marković B. et al., 2006).

In winter, in addition to hay, the sheep get additional concentrates from 10 to 25 kg (22 to 55 lbs), depending on the season and on the economic capacity of the producers (Marković B. et al., 2021).

The **Žuja**, whose name means “yellow face”, has two very popular varieties, the *Zetska žuja*, and the *Piperska žuja*. The former is raised in the lowland area around the capital Podgorica, and is therefore adapted to a warm climate, with long drought summers and relatively poor grazing. The breed has experienced a sharp demographic decline, due to urbanization, and today it has about 150 head in two flocks and is the breed most seriously threatened with extinction. It has yellowish-reddish head, ears and limbs and white fleece, only 1-2% of ewes have horns, while rams are all horned. The average withers height is 63 cm (25 in), the chest circumference 82 cm (32.3 in) and the body weight is 37 kg (81.6 lbs) for rams and 32 kg (70.5 lbs) for ewes (Kugler). It is a short-

tailed breed, the tail does not reach the hock and has less than 13 vertebrae (*Marković B. et al., 2019, 2021*).

The breed is late-maturing, and starts mating between 18 and 20 months. Lambs are born in January and slaughtered in late May, with a body weight of around 20 kg (44 lbs) (*Marković B. et al., 2021*). Zetska žuja produces 1.3 kg of wool and about 70 kg of milk per lactation with an average 7% fat.

Piperska žuja, on the other hand, originates from the Piper area, north-east of Podgorica, is raised in mountainous areas, with good pastures, and is also in sharp demographic decline, with only two flocks left. The average withers height is 67 cm (26.4 in) and the average body weight of ewes is 52 kg (114.6 lbs), while rams are always heavier by 10 to 15 kg (22 to 33 lbs). All rams have strong horns with three spiral turns and more than 70% of the ewes are horned.

The **Ljaba** or *Laba* or *Ulcinjaska Ljaba* or *Baca* is widespread in south-eastern Montenegro, but most of the animals are reared in Albania. Many heads are crossed with the Bardoka breed and purebred specimens are decreasing. Given the breeding area, the sheep are very resistant to the dry climate and poor nutrition; they are grazed all year round, with winter additions of hay and concentrates. There are currently about 1,500 animals.

The average withers height is 57 cm (22.4 in) and the average body weight is 40 kg (88.2 lbs). It is a short-tailed breed, and the tail reaches above the hock. Rams are horned while ewes are hornless. The fleece, the legs and the face are white, except in some specimens.

The income produced is divided equally between meat and milk. It starts mating around 18 months and its reproductive lifespan is 6-7 years. Lambs are born in January or early February, and slaughtered by the end of May, weighing 20 to 22 kg (44-48 lbs). The milk production is 90-95 kg (198-209 lbs), at 7.40% fat in an average lactation of 220 days; the wool produced is 1.5-2 kg (3.3-4.4 lbs) (*Marković B. et al., 2021*).

The **Bardoka** breed in 2018 counted 3,200 breeding females and 25 males in 25 flocks (*FAO*). It is a breed traditionally reared in the north-west of Albania, in Kosovo and in Montenegro, and is characterized by good adaptability to all temperatures. It has been intensively crossed with merino or meat breeds. The fleece is open, entirely white (the name of the breed comes from the Albanian word “*bardhe*”, meaning “white”), and with coarse wool (over 50 µm in diameter), the skin is pink. For ewes, the average withers height is 66 cm (26 in), and the average weight is 54 kg (119 lbs). It is a short-tailed breed, with 12 caudal vertebrae. Rams have horns while ewes are hornless (*Marković B. et al., 2021*).

It is a late-maturing breed with a balanced production of meat and milk, with approximately equal incomes. They start to mate around 18 months. Lambings take place in January-February, birth weight is 3.0-3.5 kg (6.6-7.7 lbs), and the lambs are slaughtered at the end of May, weighing between 20 and 25 kg (44 to 55 lbs). Then the ewes are milked with a lactation lasting up to 8 months (on average 242 days), with an average production of 109 kg (240 lbs), although in good grazing seasons it easily reaches 200 kg of milk (*Marković B. et al., 2021*). Ewes are particularly gentle and easy to milk (*Kugler*). The wool is coarse (42.9 µm on average) with an average production of 2-2.5 kg (4.4-5.5 lbs). Fertility is around 110% (*Marković B. et al., 2006*).

The **Sjenička** or *Pešterska* breed originates from the homonymous town on the Pešter plateau, in southwestern Serbia, at an altitude of 1,100-1,500 meters (3,600 to 4,900 ft). In Bosnia it is also known as *Vasojevic* or *Vasojevicka* or *Vlascka* (*Kugler*). After the Second World War it was crossed with Merino breeds, such as the German Württemberg and the Île-de-France (*Marković B. et al., 2021*). According to Porter, it was improved by Corriedale from New Zealand and Mérino Précoce from France. Currently over 5,000 heads of the breed are estimated, and also counting the crossings it makes 35-40% of the sheep of Montenegro.

It has a white head with black eye patches, lips, ear tips and edge of the muzzle. The fleece is semi-open to semi-closed, the fibers length is 10 to 13 cm (3.9 to 5.1 in). The average withers height is 72.5 cm (28.5 in), the average weight of the ewe is 77 kg (170 lbs). It is a long-tailed breed, with 18-20 vertebrae. Rams have three-volute spiral horns while ewes are hornless.

The Sjenička has a medium precocity, it starts mating at 8-9 months and it is common it

yields three lambs in two years. The main product is meat, lambs are slaughtered from 3.5 to 4 months, weighing 30 to 35 kg (66 to 77 lbs). Fertility is 130 lambs per 100 ewes (Marković B. et al., 2006). Lamb has a peculiar taste, appreciated by consumers (Kugler) and together with that of adult animals it is used to produce *Kastradina*, a dried meat specialty, similar to *pashtrami* (Marković B. et al., 2021).

The milk production is 80-95 kg (176 to 209 lbs) with 6.9% fat, in a lactation that can last up to seven months but currently ewes are milked less and less. Wool has a fiber diameter of 36 to 38 µm with a yield of 2 to 2.5 kg (4.4-5.5 lbs) (Marković B. et al., 2021).

The Sjenička breed, with the names “*Sjenička Pramenka*” and “*Sjenička Ovca*”, has also been included in the Ark of Taste by the Slow Food Foundation.

A breed not belonging to the Pramenka strain is the **Sora** or *Ruda*, traditionally bred, but only recently identified in some farms, with a stable population of 1,000-1,500 heads. It is a very resistant breed, suitable for rearing in the mountains and with cold climates. Rams are horned, while ewes are hornless. It is a long-tailed breed, with tail reaching 4-5 cm (1.6-2.0 in) from the ground (Marković B. et al., 2021).

The breed is larger than the Montenegrin Pramenkas: the average withers height is 70 cm (27.5 in), the average weight of the ewe is 61 kg (134.5 lbs) and that of the rams is between 70 and 80 kg (154.3 to 176.4 lbs); their ears are longer than those of the breeds of Pramenka strain. (on average 13.3 cm, 5.23 in), ewes often have skin folds called “*reje*” in the lower part of the neck (Marković B. et al., 2021).

The Sora has a medium precocity with triple purpose, but with a prevalence of meat (60%). It starts mating at 8-9 months, usually between the end of August and the beginning of September, the lambings occur between January and the beginning of February and the lambs are slaughtered in May, weighing between 30 and 35 kg (66 to 77 lbs). Lactation length has an average of 193 days, with an average production of 109 kg (240 lbs) of milk with 6.4% fat. The wool yield is 2–2.5 kg (4.4 to 5.5 lbs) per sheep, which despite its good quality is used only in a family or handcraft context, with low economic value (Marković B. et al., 2021).

Non-autochthonous breeds reared in Montenegro include Île-de-France, Württemberg, Cigaja and Romanov.

Goats

The local breed is the **Domestic Balkan Goat** (*Domaća Balkanska Koza*) which in 2018 counted about 7,500 females and 650 males (FAO). This breed is also widespread in the various Balkan countries, with different morphologies, and has suffered both from the introduction of cosmopolitan breeds, with which it has been widely crossed, and from the depopulation of the mountains on which it is raised (Marković B. et al., 2021).

The breed typically has a red coat, but also white, black or multicolored specimens can be found. It has a great resistance, adaptability and skill in grazing on rough terrain, even in comparison to other animals of the species. It starts mating at 15-18 months, with fertility from 110% to 130%. The birth weight ranges from 2.5 to 3.5 kg (5.5 to 7.7 lbs) and at 3 months the kids reach 15-18 kg (33-40 lbs), and are slaughtered at a weight between 18 and 20 kg (40 to 44 lbs). The goats begin to be partially milked towards the end of the second month of lactation, with an average production of 140 kg (309 lbs) with a wide range (from 80 to 260 kg, 176 to 573 lbs) and lactation has an average of 205 days, with a range from 120 to 250 days (Marković B. et al., 2021).

Among the most widespread cosmopolitan breeds are Alpine, Saanen, Boer and Murciana.

Pigs

In Montenegro there are no longer indigenous pig breeds, although sources from the 19th century report the presence at the time of the *Šiška* breed, now present in Bosnia-Herzegovina (Kugler), and of Apulian pigs, while in 1906 Pirocchi reported indigenous domestic pigs looking like wild boars. In the absence of native breeds, cosmopolitan ones are reared: German and Swedish Landrace, Yorkshire, Duroc, Hampshire and Pietrain as well as the Balkan Mangulitsa (Marković B.

Equids

Among the native horse breeds, the **Montenegrin Hill Horse** (*Crnogorski brdski konj*) can be mentioned, with about 1,500 heads, belonging to the larger Balkan population, including breeds adapted to specific local environmental conditions. This breed is similar to the Bosnian breed, but with peculiar adaptations to the Montenegrin environment (*Adžić et al.*). Originally, the local horses, derived from *tarpan* wild horses and Przewalski's horse, were crossed with Persian origin horses, with those of the Illyrian tribes, with Russian horses and with the Huns' Asian horses (*Adžić et al.*). Under the Ottoman domination, the genetic basis became the Arab horse, and later Austro-Hungarian horses had a certain influence (*Marković B. et al., 2021*).

They have small size with a withers height from 120 to 140 cm (47 to 55 in) and a body weight of 250-350 kg (551 to 771 lbs), with an average of 314.87 kg (694 lbs) (*Adžić et al.*). The main uses are packing and draught, thanks to the resistance and morphological characteristics suitable for this use. They have a slow growth, which ends at five years of age, and begin mating at three years of age. They are very frugal, resistant to disease and long-lived, often being able to work up to the age of 30 (*Adžić et al., Marković B. et al., 2021*).

Recently this breed has also been converted to recreational, hippotherapy and tourist purpose, also thanks to its particularly calm and tame temper (*Adžić et al.*). In Montenegro, around the capital Podgorica also small herds of feral horses can be found (*Marković B. et al., 2021*).

In Montenegro there is only one donkey breed, the **Balkan donkey** (*Balkanski magarac*), with about 400 heads (*Marković B. et al., 2021*) which is part of the same population as the similar grey donkeys of the other Balkan countries. It is bred where natural conditions are unfavorable for horse breeding, in karst and inaccessible soils (*Adžić et al.*) and is extremely resistant and frugal. The average withers height is 97.5 cm (38.39 in) and the average weight is 129 kg (284.4 lbs), with variations from 95 kg to 180 kg (209 to 397 lbs) (*Marković B. et al., 2021*).

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