



## Evolution of the Transylvanian Pinzgau cattle breed in its natural habitat in the Carpathian mountain areas (A short review)

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**Abstract.** The Transylvanian Pinzgau cattle breed is historically adapted to mountainous and alpine areas, with altitudes of 400-1800 m, but it is becoming less and less common in households and commercial micro-farms in Romania. The major share in our country is held by the Dorna area (Câmpulung Moldovenesc and Vatra Dornei from Suceava County). The standard red variety predominates in this area, but there are also specimens of the black variety, specific to Dorna area, the so-called Black Pinzgau. The Pinzgau cattle from Transylvania are considered rustic, being very well adapted to the mountain geoclimatic conditions. Their main characteristics are resistance to the action of pathogens and environmental factors, productive longevity and excellent ability to move compared to other mixed cattle breeds. These morpho-functional characteristics are essential for the survival of this particular breed in the specific conditions of the mountain areas, with traditional and socio-cultural importance in our country. However, the conditions imposed on the expansion of commercial cattle farms in the EU are seriously endangering the survival of this breed in the coming years. In order to promote the Transylvanian Pinzgau cattle breed, it is necessary to implement the program initiated for the recovery and extension of this breed, in conjunction with the official control of milk production. Therefore, the conservation and expansion of the existing Pinzgau cattle populations, as well as the genetic conservation of the breed should be ensured, taking into account the global climate changes.

**Key Words:** Dornelor area, households, mountain bioclimate, mountain cows, traditional character.

**Introduction.** The Transylvanian Pinzgau breed was formed between 1670-1740, by crossbreeding primitive cattle from the Pinzgau region (Austria's Salzburg state) with the Bernese spotted cow (imported in 1690-1740 from Switzerland, Tux, Zillertal) and other English breeds (Fisteag 1950). After 1740, the resulting population grew into a pure breed, formed in a temperate continental climate, with rich rainfall, in the Zillesse (Pinzgau) area, at an altitude of over 750 m in rich and extensive pastures. All these aspects have shaped the natural environment that influenced the favorable features of this particular breed (Morar et al 2001; Pavel 2016). According to the historical data, the ancestors of the Pinzgau breed were brought by the Celts around the year 800, and, over time, they evolved into several breeds, depending on the habitat area. Thus, in the areas of Salzburg, Tyrol, Carinthia, Bavaria, Styria, the variety with a brown to black color background predominated. Baron Freiherr von Mesnil described the Pinzgau variety in 1857 as being: "with full fur, white furry on the abdomen and upper line, and later the color with reddish-brown spots and white line", which became the standard breed character (Popa et al 2012). Nowadays, we must accept that even in Austria, the country of origin, the number of Pinzgau specimens has sharply fallen due to intensive agriculture, which has promoted only highly productive cattle breeds. However, the protection and genetic conservation of Pinzgau cattle populations is being discussed (Mang et al 2011).

**Peculiarities regarding the Evolution of Pinzgau Varieties in Romania.** This breed was formed by the absorption of local breeds (Mocănița and Romanian Gray Steppe Cattle) by the Pinzgau breed, originating from Austria (Figure 1). For this purpose, a mating program of indigenous cows with Pinzgau bulls was developed in 1825-1835 in southern Transylvania (Hunedoara, Apuseni Mountains) and in northwestern Moldova, especially in Bucovina (Drăgănescu 2006). The animals were imported from Austria (Salzburg, Tyrol). Based on the obtained results, Romania managed to certify this new breed under the initial name of Transylvanian Pinzgau. Later, Drăgănescu (2006) argues for the introduction of the Romanian Pinzgau name, bringing arguments showing that a large part of this breed can be found in northwestern Moldova and western Bucovina. Therefore, a cattle breed was created with inestimable value for the traditional households and the system of commercial micro-farms specific to the mountain area (Figure 2).



Figure 1. A typical Pinzgau cow from Austria (source: <https://www.nativebreed.org/list-of-austrian-cattle-breeds/>).



Figure 2. Romanian Pinzgau.

The Pinzgau populations have easily adapted to high altitudes, of 400-1800 m, with rich rainfall and wild natural meadows, harnessing especially the structural cellulose from vegetable feeds (Mang 2011; Davidescu 2021). This breed is not pretentious in terms of feed base, which can be exclusively provided by alpine pastures, and, in winter, by hay, coarse and, where appropriate, by small amounts of concentrated feed, without potentiation with feed supplements. Concerning this breed, we must also note other characteristics, such as good health, docile character, lively temper, medium precocity, high longevity, special capacity to adapt and increased resistance to weather and diverse pathologies. All these characteristics of the Transylvanian Pinzgau correspond to the mixed milk-meat and traction breeds, which explains the special utility in the recent past of this breed. In this context, we recall that the historical use as traction animals has played an important role in strengthening the weight, bones, muscles and endurance in long journeys, these being some of the main performances of the Pinzgau breed. These qualities also motivate the preservation of the existing Pinzgau cattle populations (Han & Bobiș 2018), as well as their imports, predominant in the 1820s, in some European countries such as Romania, Slovakia, Czech Republic, Yugoslavia (Popa et al 2012).

Currently, this breed adapted to the harshest climatic conditions (from arid to alpine areas) is found in over 25 countries, of which we mention: South Africa, Canada, Australia. The color of the skin allows protection from UV rays, and their strong, resistant hooves allow them to travel very long distances, features that make this breed appreciated on 5 continents (Popa et al 2012).

**The Expansion of the Pinzgau Breed in Bucovina.** The center of Pinzgau cattle breeding in Romania was outlined in Bucovina between 1925-1930, mainly in the Câmpulung Moldovenesc area and the surrounding places (Sadova, Fundu Moldovei, Pojorâta), and within the mountainous region of Rădăuți and its localities (Putna, Brodina, Straja, Sucevița, Moldova-Sulița and Marginea). After the 1930s, the area expanded to the regions of Vatra Dornei, Gura Humorului and Fălticeni. The 1969 census of animals revealed that the Pinzgau breed, together with their crossbreeds, accounted for 9.4% of the national cattle herd, totaling about 200.000 specimens (Drăgănescu 2006).

According to the breeding program from 1972, only the rearing of three cattle breeds on the territory of our country was promoted: the Romanian Spotted Cattle (Romanian Bălțată), the Holstein-Friesian and the Maramureș Brown breed. For unclear reasons, the Pinzgau breed was excluded from this program. Thus, the decline of this breed began, in 1974 representing less than 9% of the total cattle population, and in 1981 decreasing to 3.8% of the total herd, registering only 51.222 specimens (Dinescu 2002). The decline continued, reaching 2.9% in 2002 (Dinescu 2002), currently accounting for 1% of the total cattle herd. Sporadically, some Pinzgau nuclei have been maintained by some traditional households and small subsistence farms.

**The Morpho-productive Features of Indigenous Pinzgau Varieties.** It was found that Pinzgau cattle varieties have morpho-productive characteristics specific to the area of origin, which in our country are outlined in southern Transylvania and the Romanian part of northwestern Moldavia (Bucovina). Biometrically, the cow body weight reaches 390-400 kg and the withers height is 1.29-1.3 meters in the variety from southern Transylvanian, while for the variety from Bucovina, the size can reach up to 1.25-1.26 m and the body weight is 370- 400 kg. However, the large variations in body weight (345-615 kg) are noteworthy (Dinescu 2002).

The morphological characteristics of Pinzgau varieties are determined by their aptitudes for milk, meat and labor production. The labor skills have gradually declined, currently presenting no interest. The predominant characters of the Pinzgau breed are the following: large head, strong neck with developed dewlap, long torso and narrow thorax, narrow rump at ischium, voluminous abdomen, globular and fleshy udder with large nipples. The well-developed skeleton with solid limbs, and the pigmented, glossy and of hard consistency hooves, with high resistance to stony lands in mountain areas are also of note (Georgescu et al 1990). Regarding the specific color of the Pinzgau

breed, the dark red variety with white spots, forms a characteristic pattern, given by a white stripe starting from the withers region, continuing on the back and rump and covering the inguinal region to the chest head. It forms a ring of variable width around the calves and forearms (Morar et al 2001).

The productive characteristics include modest amounts of milk, influenced by the area, ranging from 2500 to 3200 L per lactation. There are also specialized micro-farms with special fodder purposes, which can register 5000-5500 L per lactation.

The Pinzgau bull has a very long reproductive life, being very virile and fertile. Its docile temperament makes it approachable and useful throughout the reproductive period, even at an old age (Morar et al 2001). The meat production in Pinzgau breed has good results in our country, achieving in semi-intensive system daily increases of 700-750 g, whereas in the extensive system, there are daily increases of 400-550 g, with a yield of 50-53% (<https://www.scribd.com/2020/12/vitele-din-rasa-pinzgau-de-transilvania.html>).

Globally, the Pinzgau breed has been certified as a predominantly meat breed, being highly valued due to its superior aroma, succulence and quality of fiber (Popa et al 2012). In the USA, South Africa and Australia it has been bred for superior meat quality. This breed has a special genetic resistance in extreme mountain conditions, as well as a very high resistance to infectious diseases such as leukosis and tuberculosis, which are almost non-existent in Pinzgau cattle, compared to specialized breeds that are extremely susceptible to these major pathologies. Parasitosis (babesiosis, fasciolosis) can also be found in Pinzgau flocks, but does not affect production until they reach an advanced stage (Rey 1979). Popa et al (2021) stated that the Pinzgau breed is one of the most resistant to mastitis, with a low number of somatic cells in milk, which indicates a possible genetic resistance to major mastitis agents. This natural resistance to some diseases and to the harsh geo-climatic conditions in mountainous areas gives this breed superior ability for movement and can use wild pastures on rough terrains, all these representing high qualities that need to be preserved (Rey 1979).

In order to implement strategies for conserving the genetics of this breed and other endangered breeds, it is necessary to understand the characteristics acquired in the natural environment over many generations (Hall & Bradley 1995). It is already known that molecular genetics provides extensive information about the origin and diversity of many cattle breeds (Groeneveld et al 2010). The dynamics of animal populations is an argument of particular importance in supporting the conservation of endangered local breeds as well as maintaining the genetic heritage (Bruford et al 2003). The Pinzgau cattle breeding area in Bucovina covers almost the entire mountainous area of Suceava County with a surface of over 400000 ha. In Dorna and Câmpulung Moldovenesc regions, cattle breeders are still attached to this breed, the two areas having the largest number of Pinzgau cows in Suceva County.

**Black Pinzgau Variety.** In addition to the Red Pinzgau breed, a black variety was created in the Dorna area, known as the Dorna Cattle, which is not genetically different from the standard one. The Black Pinzgau variety has spread to several areas of Bucovina, especially in the Dorna basin. According to Popa et al (2012), this variety was formed by crossbreeding local cows (Gray Sura and Black Sura) with some improved mountain breeds (Pinzgau, Mölltal, Zillertal, Dutch, Brown and others).

Morphologically, this variety presents the pattern found in Red Pinzgau, but the pigmented areas are black, aspect which some authors have considered to be characteristic of Dorna cattle (Fistea 1950; Drăgănescu 2006; Popa et al 2012) and they have also proposed this variety to be declared a distinct breed. The same authors have believed that the black color can be attributed to the phenomenon of epistasis or hypostasis. However, there is currently no thorough research to clarify this assumption, as the few Black Pinzgau herds are supported mainly by traditional breeders.

The Dorna cow has a robust to fine build (Figure 3), being very well adapted to local conditions and highly resistant to disease. It is more docile, but with a lively temper, less pretentious and with a better harnessing of fibrous fodder than the Red Pinzgau breed. Although they are about 1-2 cm smaller than the Red Pinzgau, they are more

massive. Being raised and maintained in similar conditions to those of the red Pinzgau breed, it achieves an increased milk production, with higher fat and protein content. Their precocity, longevity and fecundity are also superior.



Figure 3. Dorna cow (Black Pinzgau variety).

The Black Pinzgau variety has proven to be more resistant and better adjusted to extreme climatic conditions at high altitudes. Based on the mentioned arguments, the Dorna cow can be considered a particularly superior productive variety, being highly appreciated by traditional breeders from Bucovina (Morar et al 2001).

**Conclusions.** The Pinzgau cattle breed and its varieties have special characteristics in their genetic heritage, of morpho-productive, geo-climatic and historical interest, deserving all the efforts to be preserved and promoted. These populations, adapted to harsh climatic conditions, can be an alternative to the current climate changes. The Pinzgau cattle populations possess great features, such as superior harnessing of alpine wild pastures, resistance to low temperatures, high levels of prolificacy, fecundity and longevity, an increased resistance to major diseases and superior quality of milk and meat.

**Conflict of Interest.** The authors declare that there is no conflict of interest.

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