



## Black woolled sheep breeds of the world, I

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**Abstract.** The present paper describes phenotypically the eastern black woolled sheep breeds, in order to eventually establish a possible kinship, and last but not least to contribute to the Romanian black woolled Tsigai origins elucidation. A common characteristic of the screened breeds consists in their rusticity, and production capacity under harsh environmental conditions. From the studied breeds (Gissar, Red Karaman, Karakul, Karnobat, Racka) the Karnobat seems to be the most similar with our black woolled Tsigai in both phenotypic and genotypic terms. While in other countries (e.g. Bulgaria, Hungary) conservation programs were developed and financed by the government, in Romania the authorities have not yet acknowledged the importance of supporting and maintaining the national old genetic heritage.

**Key Words:** genetic heritage, old strain, conservation program, Karakul, Racka.

**Introduction.** Wool industry has always been interested either upon black or white wool depending on the destination of the raw material. The fact that occasionally black lambs are born from white parents, even after many generations of culling of the black sheep, proves the fact that in the case of black wool we are dealing with a recessive gene (Figure 1).

Parents	Progeny
1. Non-carrier x non-carrier WW WW	All non-carriers WW
2. Non-carrier x carrier WW Ww	50% carriers, 50% non-carriers Ww WW
3. Non-carrier x black WW ww	All carriers Ww
4. Carrier x black Ww ww	50% carriers, 50% black Ww ww
5. Black x black ww ww	All black ww

Figure 1. A few possible mating schemes of black, carrier and non-carrier sheep (source: <http://agriculture.vic.gov.au/agriculture/livestock/sheep/breeds/breeding-black-sheep#>).

In our previous papers (Rakossy et al 2019a,b) we have mentioned that in the western countries naturally colored wool is an increasingly sought product, so the sheep breeds with black wool experiences its renaissance in many places, but colored sheep are also appreciated in developing countries. In order to support the previous statement, we've been investigating the sheep breeds of the world, and further we described and analyze some of the most important, or most special, black wool producer breeds.

The aim of the present paper is to present and analyze the eastern black woolled sheep breeds which seem to have something in common with our black woolled Tsigai in order to eventually establish a possible kinship, and last but not least, to contribute to the Romanian black woolled Tsigai origins elucidation.

### **Eastern black woolled sheep breeds**

**Gissar.** The Gissar sheep (Figure 2 & 3), is the most popular breed in Tajikistan, most of which is bred in black color variety. It is a large, hardy, ancient breed of sheep which is immediately recognizable by its characteristic fat tail. The breed show excellent adaptation to highland pastures (Ikromov 2010; Deniskova et al 2019).



Figure 2. Gissar rams in Tajikistan (Photo: Latifi Latif).



Figure 3. Gissar sheep (Source: <https://genetic.by/en/meat-breed-of-sheep-their-characteristics-and-photo>).

**Red Karaman (Ghezel).** In Turkey there is a similar breed to Gissar, known as the Ghezel or Red Karaman (Figure 4 & 5). This is also a fat-tailed, drought-tolerant sheep breed, but while the Ghissar is always polled, the Karaman rams show spiraled horns.

The Karaman sheep reproductive activity is characterized by an extended breeding season and their relatively insensitivity to photoperiod stimulation qualifies the breed for efficient out of season lamb production (Arsoy & Sağmanlıgil 2018).

"The Red Karaman bears some similarities with White Karaman, and in fact carries the word Karaman in its name. According to Mason (1967), however, it merits classification as a separate breed, along with the White Karaman, and not merely as a color variant of the Karaman. The Turkish names Kizil Karaman and Mor Karaman are used for the breed, often interchangeably, because of its reddish-brown colour. Kizil is the Turkish word for red and Mor is the Turkish word for maroon. The breed also exists in the port of Iran bordering Turkey, with the name used in the literature as Kizil, Gezel or Ghezel. The Red Karaman is distributed in the northeastern provinces of Turkey, namely Kars, Erzurum, Agri, Muş, Bingöl, Van, Bitlis, Erzincan and Elaziğ. The White Karaman also occurs in the above provinces in smaller numbers. Nomadic flocks of the Red Karaman are seen in the southeastern provinces of Diyarbakir and Urfa during winter. The number of Red Karaman sheep in Turkey in 1983 was estimated to be 11.9 million; this corresponds to 24.4 percent of the total sheep population of the country" (FAO 1986).

Baneh et al (2013) reported heritability estimates for birth weight, weaning weight and six-month old weight of  $0.16\pm 0.05$ ,  $0.24\pm 0.06$  and  $0.35\pm 0.07$ , respectively.



Figure 4. Red Karaman sheep (Ghezel) in Turkey (Source: <http://www.oturn.net/rugs/anatolian-prayer.html>).

**Karakul.** Heading west, the next big black woolled sheep is the Karakul, which has been made world famous by its lamb sloe-black and wavy fur (Figure 5). An adult Karakul weight is about 40-45 kg (up to 2.5 years old) (Degen 2013).

This breed is native to Central Asia; their exact origin has not been elucidated exactly but it is assumed that its cradle is the Bokhara region and its surroundings. Karakul sheep have been exported to many countries, among which the more prominent



were South Africa, Austria, France, Argentina, Germany, Canada, and Peru. The first imports into the United States seem to have been made first in 1908 (Lush et al 1930).

Today, in Kazakhstan, smallholder farms produce about 90% of the livestock; however, there are many households at subsistence levels, mainly due to poor marketing and capital constraints (Degen 2013).

However, the Karakul was bred mainly for its fur, which nowadays do not have so much value, therefore the livestock is valorized for meat production, where appropriate marketing channels linking smallholders to food processors need to be established. Most rural farmers with small herds are not reliable for such networks and, consequently are forced to produce for home consumption or sale on local markets where prices are low and unstable (Degen 2013).



Figure 5. Karakul lambs (Source: [www.sunphoto.ro](http://www.sunphoto.ro)).

There was a time when every Szekler man who respected himself had a karakul hat, and even Nicolae Ceaușescu (Romanian president 1974-1989) could not miss this fashion accessory (Figure 6).



Figure 6. Nicolae Ceaușescu wearing a black astrakhan hat (Source: Internet).

Nowadays, thanks to the blessing of animal protection, the astrakhan fur has become less and less sought after and the number of Karakuls has begun to decline (is that the way to protect animals?), but yet in the case of the Karakul we cannot talking about endangered breed. Karakul is also a fat tailed breed, but while Gissar and Karaman have almost no tail, and the fat accumulation is limited only on the tail, the Karakul has a long, wide, flat and fat tail.

Despite of the fur/pelt market decline, in Romania (Botosani County), specialists are still concerned and involved in the Karakul sheep genetic improvement in order to be in line with the market requests in relation to pelt products (Nechifor & Pascal 2016).



Figure 7. Black and silver Karakuls in Botoșani county, Romania (Source: <http://www.radioiasi.ro/stiri/regional/botosani-mielul-din-rasa-karakul-produs-unic>).

**Karnobat.** The next black woolled sheep breed, that is worth to be mentioned, is a Bulgarian breed registered under the Karbonat name (Figures 8-11), which is a less popular breed but, nevertheless, very interesting from our point of view.

This ancient breed was bred in northeastern Bulgaria, but its popularity was declining, until an alliance for the rescue of indigenous Bulgarian sheep breeds was formed in 2003, which embraced the breed. Since then the breeds population has been increasing, in 2008, more than 10,000 individuals were registered. Phenotypically the Karnobat sheep is almost identical with our black woolled Tsigai sheep; a significant difference may be found only in the slightly coarser wool. Although there is some variation in production indices, but in fact, this is not significant either, which in our opinion, it is due to better climate conditions and a few decades of conscious selection. The Karnobat sheep weigh only 35-45 kg, rams 60 kg (Staikova & Iliev 2017), but their milk production can reach 110 L lactation<sup>-1</sup>, with 7.6% fat content, and fertility 135% ([https://bg.wikipedia.org/wiki/Медночервена\\_шуменска\\_овца?fbclid=IwAR1d-dEWYEac398t6Rs\\_RJjce6da6SM-9Xcqs1MIF7piD2MkfoDkwIiJv1o#/media/Файл:Copper\\_red\\_1.JPG](https://bg.wikipedia.org/wiki/Медночервена_шуменска_овца?fbclid=IwAR1d-dEWYEac398t6Rs_RJjce6da6SM-9Xcqs1MIF7piD2MkfoDkwIiJv1o#/media/Файл:Copper_red_1.JPG)). Concerning the same traits, very contrasting data are presented by Popova et al (2008), milk yield of 30 L lactation<sup>-1</sup>, and prolificacy of 105% (n=200). Although reproduction traits typically have low to medium heritability and do not exhibit a noticeable response to phenotypic selection (Abdoli et al 2016).

A future research project is to perform a kinship investigation between the two breeds, because although we do not know about Szekler-Bulgarian sheep-breeding cooperation, but in our opinion, such high degree of similarity, cannot be a coincidence. More than that, Ryder (1981) classified the Karnobat sheep in the alpine group, just where our black woolled Tsigai belongs.

Interestingly, despite of its rustic nature and appearance, Semerdjiev et al (2012) supposed a probable decreased resistance to bacterial infections in Karnobat sheep, according to its phagocytic activity.





Figure 8. Karnobat sheep (Source: <https://fermabg.weebly.com/105210771076108510861095107710881074107710851072-10961091108410771085108910821072-1086107410941072.html>).



Figure 9. Karnobat rams (Source: [http://porodibg.com/?page\\_id=216](http://porodibg.com/?page_id=216)).



Figure 10. Karnobat rams with well-developed twisted horns (Source: [https://bg.wikipedia.org/wiki/Медночервена\\_шуменска\\_овца?fbclid=IwAR1Nj-T8\\_9JuTOaK LCfmD--M\\_qbPi-uvH3Sdwk2AkSd7OA0WGCi7niLqvww#/media/Файл:Copper\\_red\\_1.JPG](https://bg.wikipedia.org/wiki/Медночервена_шуменска_овца?fbclid=IwAR1Nj-T8_9JuTOaK LCfmD--M_qbPi-uvH3Sdwk2AkSd7OA0WGCi7niLqvww#/media/Файл:Copper_red_1.JPG)).



Figure 11. Ruminating Karnobat rams (Source: <https://sinor.bg/foto/pg18-sn86/>).

**Racka.** Heading toward west, but still considering the eastern breeds, we have the Black Racka (Figures 12 & 13), which is also an old heritage breed, whose and, just like and the Karnobat sheep, is subjected to conservation programs based on governmental subsidies in order to prevent its extinction. However, shape of the horn and the nature of the wool mark a radical difference with our black woolled Tsigai. In fact, it does not resemble any known sheep breed, therefore would be interesting to trace its origins. However, the Black Racka has a Red-face variety (Figure 14), just like our black woolled Tsigai.

In terms of meat production, Nagy et al (2014) reported a daily weight gain of Black Racka of 272.85 g (CV%=13.73) for males and 197.19 g (CV%=14.48) for females, performing better than the breed white variety (247.99 g day<sup>-1</sup> with CV%=14.91 for males and 191.02 g day<sup>-1</sup> with CV%=9.29 for females). The hierarchy being the same concerning dressing percentage: 49.10% with CV%=3.53 for black males, 49.99% with CV%=2.40 for black females and 48.44% with CV%=1.79 for white males and 50.54% with CV%=3.19 for white females.



Figure 12. Black Racka sheep (Source: Internet).





Figure 13. Black Racka with its lambs (Source: Internet).



Figure 14. Black and Red face Racka (Source: Internet).

**Conclusions.** Black sheep breeds were necessary throughout history, which is suggested by the number of geographically spread out varieties which have been created. There are some places where they are still held in the highest esteem they used to be and their population is numerically stable (e.g. Gissar) in other parts of the world, people are trying to maintain stocks with conscious measures for the future. In Bulgaria, where the animal husbandry is not even that highly developed, the specialists, realized in 2003 that the ancient breeds have value and should be appreciated, In Hungary, the Racka is also protected by gene bank stocks and state subsidies. It is time for us to appreciate and preserve our natural capital and to prevent the extinction of valuable species.

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