

## Reconstruction of the type specimen of *Canis lupus minor* Mojsisovics, 1897

(Carnivora: Canidae)

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Tóth, T., Marosán, M. & Kocsis, B. 2026. Reconstruction of the type specimen of *Canis lupus minor* Mojsisovics, 1897 (Carnivora: Canidae). Spixiana 48(2): 217–220.

Mojsisovics (1897) described the taxon *Canis lupus minor* based on the pelt of a canine carnivore killed in Bilje (Croatia) and made into a carpet. Although the skin's original dimensions may have changed during preparation, the available data and description suggest that it most likely represents the fur of a golden jackal or a canine hybrid. As far as we know, the pelt has now been lost. Here, the authors, using the available information and starting from a jackal pelt, reconstructed the colouration and pattern of the *C. lupus minor* type specimen.

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### Introduction

Currently, experts consider the term “reed wolf” a synonym or colloquial name for the golden jackal (*Canis aureus* Linnaeus, 1758). This interpretation, however, emerged only after a debate that took place between 1931 and 1962 (Tóth 2024). Previously, many shared an opinion similar to Kramer's (1756) that there were two types of wolves in the Carpathian Basin, and the smaller, greyish type lived in the reeds and was called the “reed wolf”. Subsequently, Tschudi (1856) – who never saw a “reed wolf” – suggested that the reed wolf, apparently common in the Hanság, might deserve to be treated as a separate species due to its smaller size, which distinguishes it from the grey wolf (*Canis lupus* Linnaeus, 1758).

Jeitteles (1876) observed a reed wolf specimen captured near Szentgotthárd in 1866 and brought to the Schönbrunn Zoo. According to the author, the animal had a black stripe on each front leg, its tail tip was also characteristically black, its ears were pointed backwards, and its tail curled upward like that of a tame dog. Unfortunately, the author did not provide further information on the animal's colour.

Regarding the grey wolf, the “variété *minor*” was first mentioned by Ogérien (1863) in his work on the animals of the Jura mountains and neighbouring counties. The author described a wolf type with a body length of 75–85 cm, dark on the back and reddish on the belly, and a white spot on the face, which, contrary to the above descriptions, would be found in high mountain regions. The author does not use the term “reed wolf” in his concise description.



Fig. 1. The jackal pelt used as the starting basis.

Mojsisovics (1888) also addressed the question of the smaller wolf taxon, to whom we owe the description of *Canis lupus minor*. In fact, Mojsisovics had already used the name *minor* prior to the formal description, writing: “Not considering the doubtful form called *Canis lupus minor*, also mentioned as the ‘reed wolf’, we must mention the fox, which occurs everywhere and appears in many different colour variations among the canid predators” (Mojsisovics 1888). Accordingly, *Canis lupus minor* is a taxon whose existence is still considered doubtful even by its describer. The author later states that Hungarian and Srem hunters distinguish two colour variations and two types of wolves (Mojsisovics 1897). One is the common wolf (*Lupus vulgaris* Brist., according to Mojsisovics 1897), and the other is the significantly smaller reed wolf (*Canis lupus minor*), which the author classified not only into two different species but also into two different genera. Additionally, Mojsisovics (1897) notes that, although he visited the Dráva Triangle, considered the typical habitat of the reed wolf, every year for 10 years, he did not spot this predator. However, in his work, the author described *Canis lupus minor* as a smaller subspecies of the wolf based on a pelt prepared as a rug shot in Bilje, but he did not mention the specimen’s subsequent fate.

Although experts have long discredited the subspecies *Canis lupus minor*, and it is no longer mentioned in recent summaries (Sillero-Zubiri

2009, Castello 2018), the authors nevertheless attempted to trace the *minor* type specimen on which the description of *C. lupus minor* was based. As the *minor* type skin’s location remains unknown, we aimed to digitally recreate and present the pelt of the specimen that served as the basis for the original description. The purpose of the present study is not to draw taxonomic conclusions or to revalidate the name *Canis lupus minor*, but to provide a visual reconstruction of the type specimen based solely on the original written account. As no photograph of the pelt exists and the specimen itself appears to be lost, our goal was to obtain an impression of the colouration and pattern described by Mojsisovics (1897) through digital visualisation.

### Material and methods

As a first step in our work, we searched the literature for data on the fate of the *minor* type pelt after the 1897 description. Then, we contacted the following experts and institutions by letter for information:

- Katarina Ljubisavljević, “Siniša Stanković” Biological Research Institute, Belgrade
- Duško Ćirović, University of Belgrade, Belgrade
- Miroljub Milenković, University of Belgrade, Belgrade

Since the pelt and its current location could not be found, we reconstructed the specimen of the original

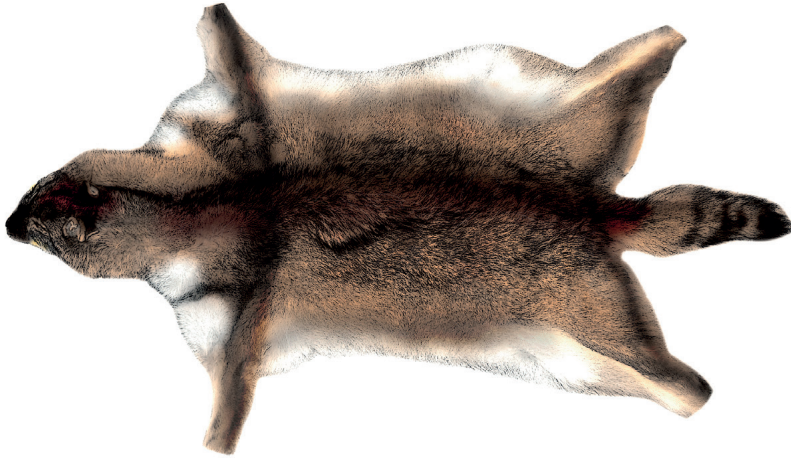


Fig. 2. The digital reconstruction of the *Canis lupus minor* type specimen.

description by digitally transforming a photograph of a jackal pelt (Figure 1). To do this, we translated the original German Gothic text by Mojsisovics (1897) and used the pelt of a typically coloured jackal shot in Hungary. To create the visual copy of the type specimen, we used Adobe Photoshop version 7.0.

## Results

Nagy (1942) already tried to locate the pelt of the *minor* type specimen of *Canis lupus minor* described by Mojsisovics (1897) in the spring of 1942 at the Reed Museum in Bilje, at the castle of Jenő Savolyai. According to the author's investigation, after the Serbian occupation in 1918, the collection was transferred to Főherceglak (Kneževo) and from there to Belgrade. According to Éhik (1931), the pelt in question was supposedly included in the Zagreb Museum's collection, but the author's investigation found no record of its arrival there.

Subsequently, we contacted experts (see methods), who informed us that the *minor* type pelt is not in their care and that they are unaware of its existence at associated institutions. Then we prepared the translation of the description of *Canis lupus minor* (Mojsisovics 1897, pp. 242–243), which reads as follows:

“In 1890, however, I was asked to closely examine the skinned pelt of a wolf-like animal shot during a stag hunt in Bilje. Due to an apparent mistake by the preparator, the notable pelt was unfortunately given a rug shape, with all skeletal parts, and even the paws, discarded. I was particularly struck by the yellowish-reddish-brown base colour, with black stripes running from the mid-back to the sides (partly crossing). Several (clearly 2–3) such bands extended from the withers along the reddish-yellow outer sides of the

front limbs to the wrist, and similarly, from the waist near the base of the tail, there were fairly well-defined stripes that could extend to the severed hock joint. The inner sides of the front and hind limbs appeared more greyish or greyish-black. The throat area was quite clean-white up to about the breastbone, and the ears were dark reddish-brown, with a similar edge but also mixed with black longitudinal spots. The inner ear was dark greyish-white. The head between the ears was rust-red, with light yellowish-white cheek patches under the eyes, but all parts were marked with black longitudinal and transverse stripes. The area around the nose and the upper edge of the lower jaw was almost entirely blackish-grey, except for the chin crease, which was white. The bushy tail, intensely reddish-brown at the base, was again black-striped on a predominantly greyish-yellow base, with a short, black, thick-furred tip. The belly side was greyish-white, with a whitish central band extending to the stomach region. A distinctive rhombus spot on the first half of the upper side of the tail was not recognisable, although a broader black longitudinal spot represented its place. As far as could be discerned, the nose appeared strikingly pointed, but I could not reconstruct its true shape from the shrunken pelt. The length of the animal from the tip of the nose to the base of the tail measured 118 cm, the tail itself was 44 cm long, and the width of the pelt from the edge of the right shoulder across the back to the edge of the left shoulder was 46 cm, while the width at the hips (measured approximately between the hip joints) was 34–35 cm. I could not form a well-founded opinion about the animal's age; I could only surmise, from its appearance in the hunting area, that it was probably sniffing around. Unfortunately, Vienna had no opportunity to find a pair for this animal for comparison.”

Mojsisovics (1897) thought that the *minor* type pelt could be a specimen of *Canis lupus minor*. However, he also acknowledged that the differences between the main form and the *minor*, the lack of knowledge about hybrids, and the extraordinary variability of the jackal mean that his diagnosis based on the *minor* type pelt might be incorrect.

Although Mojsisovics expressed doubts about the “reed wolf” in both relevant works (Mojsisovics 1888, 1897), subsequent authors nonetheless regarded the *minor* as a valid subspecies for a long time (Lovassy 1927, Nagy 1942). Based on the description above, the digitally reconstructed pelt shows how the specimen could have looked (Figure 2).

### Conclusions

In 1897, Mojsisovics described the smaller lowland form of the grey wolf as *Canis lupus minor*, based on an incomplete *minor* type pelt of a dog-like animal killed in Bilje. This pelt can be traced back to the end of World War I; however, its fate remains unknown to this day, and the authors have not been able to locate it. At the same time, the original description of the mentioned specimen survived, from which the authors attempted to recreate the colour and pattern of the original pelt using a computer program and a jackal skin (Figure 2).

It should be noted that the northeastern Adriatic region, including present-day Slovenia and the Bilje area, may have represented an early stronghold of the golden jackal in Europe. Recent syntheses suggest that golden jackals were present along the western Adriatic coast well before their documented modern expansion, which may have contributed to historical confusion between small-bodied wolves and jackals in this region (Spasov & Acosta Pankov 2019).

According to Éhik (1937), in the Carpathian Basin no other wolf form could live simultaneously and continuously alongside the main form of the grey wolf because, according to the rules of animal geography, two subspecies may not coexist in sympatry. The authors share this finding that wolves tend to travel long distances. There has indeed been a continuous transition between mountain and lowland populations in the Carpathian Basin for thousands of years, preventing the development of a lowland subspecies. There is no evidence for the two subspecies model today (Éhik 1931). Furthermore, the pelt alone is not suitable as a type specimen because certain parts were missing, and, as Mojsisovics (1897) also noted, it had at least partially shrunk.

Based on the results, it can be concluded that the colour and pattern of the pelt we reconstructed did not differ significantly from the average jackal

skin used; it was only possible to determine that the individual in the original description was a specimen with a tendency to melanism. Based on these, and emphasising that the reconstruction serves a visual rather than taxonomic purpose, the individual killed at Bilje was most likely a jackal prone to melanism or some canine hybrid.

### Acknowledgement

We gratefully acknowledge Balázs Farkas for his valuable contribution.

### References

- Castello, J. R. 2018. Canids of the world. Wolves, dogs, foxes, jackals, coyotes, and relatives. 331 pp., Princeton and Oxford (Princeton University Press).
- Éhik, Gy. 1931. A sakál. Nimród Vadászújság 19: 572–573.
- Éhik, Gy. 1937. Mi lehetett a nádi farkas? A tyukodi sakál jelentősége. Nimród Vadászújság 25: 119–121.
- Jeitteles, L. H. 1876. Über die Abstammung des Haushundes. Schriften des Vereines zur Verbreitung Naturwissenschaftlicher Kenntnisse in Wien 16: 287–344.
- Kramer, G. H. 1756. Elenchus vegetabilium et animalium per Austriam inferiorem observatorem. 321 pp., Viennae, Pragae et Tergesti (Typis Ioannis Thomae Trattner).
- Mojsisovics von Mojsvár, A. 1888. Az osztrák-magyar monarchia állatvilága. II. Az alföld állatvilága. Vadász-Lap 9: 309–311.
- Mojsisovics von Mojsvár, A. 1897. Das Thierleben der österreichisch-ungarischen Tiefebene. Biologische und thiergeographische Skizzen und Bilder. 344 pp., Wien (A. Hölder).
- Nagy, J. 1942. A magyar sakálról. A farkas, sakál, és a kutya kereszteződéseiről. Nimród Vadászlap 30: 373–374.
- Ogérien, frère 1863. Histoire naturelle du Jura et des départements voisins. Tome III. Zoologie vivante. 570 pp., Paris (Victor Masson et fils).
- Tóth, T. 2024. Vita a „nádifarkas“ rendszertani helyzetéről Magyarországon. Magyar Ápróvd Közlönyek 16: 35–86. <http://dx.doi.org/10.17243/mavk.2024.002>
- Tschudi, F. 1856. Das Thierleben der Alpenwelt. Dritte verbesserte Auflage. 632 pp., Leipzig (Verlagsbuchhandlung von J. J. Weber).
- Sillero-Zubiri, C. 2009. Family Canidae (Dogs). Pp. 352–446 in: Wilson, D. E. & Mittermeier, E. A. (eds) Handbook of the mammals of the world. Vol. 1. Carnivora. Barcelona (Lynx Edicions).
- Spasov, N. & Acosta-Pankov, I. 2019. The golden jackal (*Canis aureus* Linnaeus, 1758) in Europe: Distribution, status and perspectives. Biodiversity Data Journal 7: e34825, pp. 1–36.