



# First Evidence of the Presence of the Marbled Polecat *Vormela peregusna* (Güldenstädt, 1770) (Carnivora: Mustelidae) in Montenegro

Marina Radonjić<sup>1</sup>, Belma Šestović<sup>1</sup>, Jeffrey N. Peereboom<sup>2</sup> & Stefan Ralević<sup>1</sup>

<sup>1</sup> Wildlife Montenegro, Vidikovac bb, 85330 Kotor, Montenegro; E-mail: marina.djurovic84@gmail.com; sestovicbelma@gmail.com; steffy.ralevic@gmail.com

<sup>2</sup> The Habitat Foundation, Arend Lammerslaan 5, 6816 PT Arnhem, the Netherlands; E-mail: jeffrey.peereboom@thehabitatfoundation.org

**Abstract:** The marbled polecat *Vormela peregusna* is poorly studied throughout its distribution range in Europe. In Montenegro, there was no clear evidence of the presence of marbled polecat, although there was a high probability according to its mapped geographical range. It was presumed that if the species would occur in the country, it would be in the eastern part near the border of Serbia. Additionally, there are two former records for Montenegro but outside of the assumed distribution range on the Balkans. However, these records are insufficient to confirm its presence in Montenegro. With the help of the local people in the Plav Municipality (north-eastern part of the country), we collected evidence of the presence of the marbled polecat in Montenegro. According to the data from the past, this species has not been expected to be present there. Considering its classification as Vulnerable by the IUCN and its recognition in Annexes II and IV of the EU Habitats Directive, collected records call for the need of systematic research to determine conservation and legal status of this species in Montenegro.

**Key words:** mustelids, mammals, western Balkans, distribution

## Introduction

The marbled polecat *Vormela peregusna* (Güldenstädt, 1770) is a small carnivore species of the family Mustelidae distributed from the western part of South-Eastern Europe, across the Caucasus, the Middle East, Central Asia and to northern China and Mongolia in the east (MITCHELL-JONES et al. 1999). The species taxonomy needs revision, especially for its populations in Europe, as currently only the subspecies *Vormela peregusna peregusna* has been registered there (NIETHAMMER & KRAPP 1993, MITCHELL-JONES et al. 1999, ABRAMOV et al. 2016). Within Europe, it is assumed that Montenegro is the westernmost record within the species distribution range. There are only two records known from Mon-

tenegro, from 1966 and 1986, in the western part of the country, which are insufficient to confirm the presence of the marble polecat in the country nowadays (ATANASSOV 1966, MILENKOVIĆ et al. 2000).

In Europe, the marbled polecat is classified as Vulnerable under Criterion A2c of the IUCN Red List, which means that it has suffered a population decline of 30% over the last decade (ABRAMOV et al. 2016). This has been caused by the loss of suitable habitats (ABRAMOV et al. 2016). The species is also included in Annexes II and IV of the Habitat Directive (COUNCIL DIRECTIVE 1992). The marbled polecat is poorly studied throughout its European range and there are no local or regional recovery or management programmes for it (ABRAMOV et al. 2016).

Although considered as one of the rarest mustelids on the Balkans, the marbled polecat's presence was at the peak of interest among researchers starting from the 1960s until the beginning of the 21st century. Currently, its distribution is based on scarce and very old data and the population size is still undefined (KRYŠTUFEK 2000). However, in the past few years, multiple sightings of the marbled polecat have been reported in the eastern part of the country, far away from the suitable areas identified earlier (MILENKOVIĆ et al. 2000, ŽUPAN & HORAŠEK 2019), suggesting that the marbled polecat's range extends further than currently documented. New records of the marbled polecat from Montenegro point out the gaps in biogeographical knowledge related to this vulnerable species.

## Materials and Methods

We collected data opportunistically between 2018 and 2020 in cooperation with the local people in the area of the Plav Municipality during the spring and summer seasons. We considered data as reliable only if they were possible to be confirmed as "hard facts", i.e. unequivocal data by personal habitat inspection of every location where the animals were recorded by photographs or video. We applied the SCALP criteria of Category 1 (C1) as described by MOLINARI-JOBIN et al. (2012). Category 1 includes



**Fig. 1.** The marbled polecat from the summer village of Hoti (Locality 1) on 7 July 2018. Photo: Š. Jasavić.



**Fig. 2.** Habitat of *Vormela peregusna* at the village of Hoti (Plav Municipality) on 19 September 2021. Photo: S. Ralević.



**Fig 3.** Habitat of *Vormela peregusna* at the village of Završ (Plav Municipality) on 29 June 2020. Photo: M. Radonjić.

records from (a) dead animals, (b) captured animals, (c) good quality and georeferenced imagery and (d) samples (such as hair and scat) attributed to a certain species using a scientifically reliable analysis. MOLINARI-JOBIN et al. (2012) used this methodology for the Eurasian lynx (*Lynx lynx*) in the Alps but we consider it applicable and useful for other mammal species in Montenegro. The collected data were visually presented on a map using QGIS (Desktop version 3.8.3).

## Results

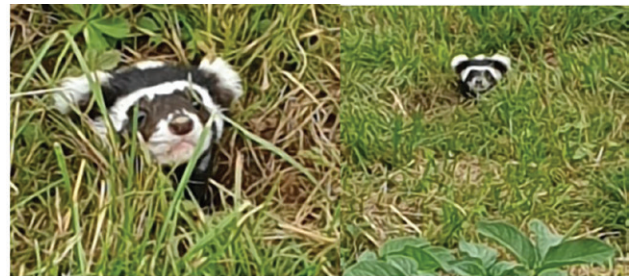
During the summer of 2018, we received photos of an unknown animal killed by a car in the National Park Prokletije. The photos were sent by local people from the remote summer village of Hoti within the borders of National Park Prokletije (Locality 1

**Table 1.** Records of *Vormela peregusna* in Montenegro between 2018 and 2020.

Locality	Date	Time of observation	Name of location (GPS)	Altitude (m)	Finding
1	07.07.2018	12:00 PM	Hoti /Vrgonos, Tahir Jasavić property (42.5686251, 19.9882179)	1729	Picture (of the road kill)
2	13.05.2020	11:13 AM	Završ, Zufer Jahdadić property (42.584365, 19.942475)	998	Picture/video
3	15.06.2020	14:00 PM	Završ, Fetah Canović property (42.589838, 19.943014)	1031	Picture/video
4	08.07.2020	13:00 PM	Završ, Enver Musić property (42.589585, 19.943939)	1018	Picture/video

– see Table 1). Based on the photographs, the individual had the typical characteristics of the marbled polecat appearance: long claws and white or yellow spots on its reddish-brown back, dark brown facial mask and belly, white chin and whitish tail with a black tip (Fig. 1). It was not possible to retrieve the carcass for further analyses due to the remote location where it was found. After this record and through interviews with the local people who have found the animal, more information was collected about additional sightings of the animal near the place where the photographs were taken. However, it was not possible to verify them.

The location consisted of two mosaic habitats: terminal phase of mountain heaths with blueberries, in an expansion phase towards the surrounding oro-Mediterranean pine forests, a typical acidophilic community described for the area of the Montenegrin Prokletije (Fig. 2). Both habitat types are of EU importance described in MILANOVIĆ et al. (2021) under the Natura 2000 codes 4060 and 95A0. In the summer of 2020, we received a new record of a marbled polecat from the village of Završ (Locality 2), outside of the borders of the National park Prokletije. This location was at a much lower altitude (c. 700 m lower) than the first record in the mountain. This habitat included agricultural area with prominent preserved natural elements. These natural elements consist of a mosaic of mountain hay meadows (Fig. 3), which have been partially turned into arable land and degraded by human activities (greenhouses, beekeeping) described further under the Natura 2000 code 6510 (MILANOVIĆ et al. 2021). After our contact with the locals, they started to be more alert for the species that resulted in receiving more data from the same village (Završ) from different properties (Table 1, Fig. 4). According to the observers, the marbled polecats did not show any signs of fear and remained available for observation for long enough to be correctly identified. Thus, the locals could take a video or photograph of every sighting.

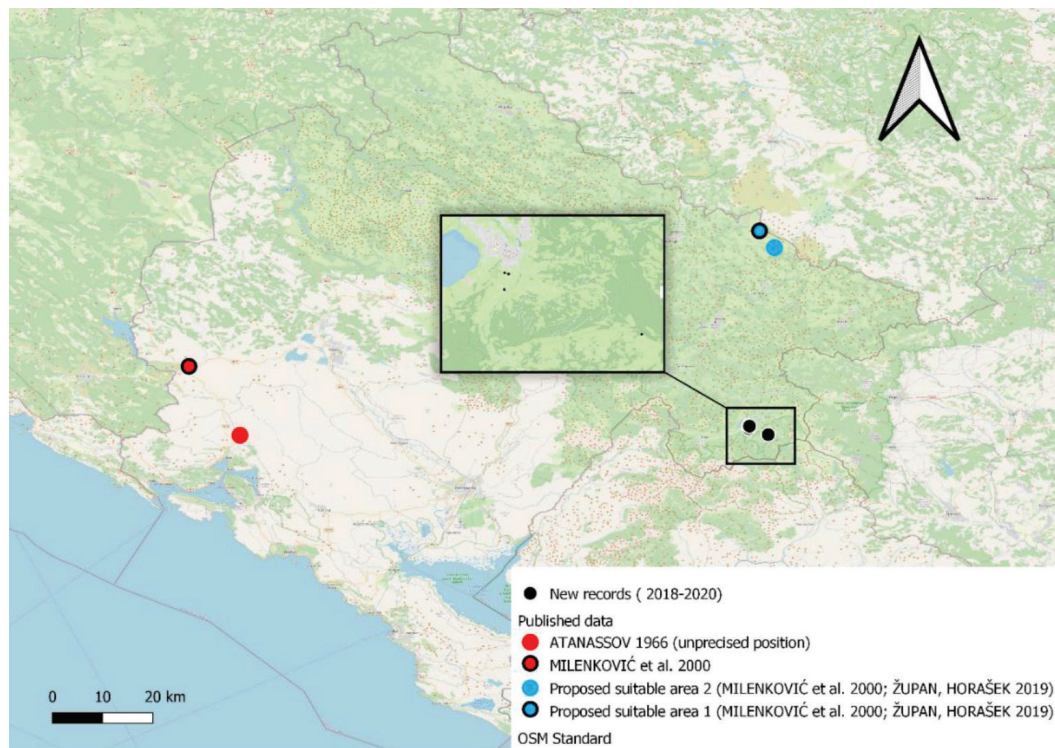
**Fig. 4.** *Vormela peregusna* in the garden of Fetah Canović, village of Završ, on 15 June 2020. Photo: F. Canović.

Regarding unconfirmed data, according to the locals, the species was observed several times in the Hoti Village before the recorded road kill during the same year. It was also observed in 2019 in a property in Završ near those described in Table 1. Furthermore, we found a dead European mole (*Talpa europaea*), a species that is common in the Plav Municipality, adjacent to a hole in one of the locations of sightings. According to the owner of the property (F. Canović), at least five dead European moles had been found near this hole a few days before seeing the marbled polecat.

## Discussion

SPASSOV & SPIRIDONOV (1993) have elaborated a distribution map of the marbled polecat on the Balkan Peninsula, including some potential core areas, one of them located closely to the north-eastern border of Montenegro. MILENKOVIĆ et al. (2000) confirmed the importance of this region by reporting records at Sjenica and Pešter in the western part of Serbia, not far from the Montenegrin border. Recently, ŽUPAN & HORAŠEK (2019) considered the Montenegrin habitats near the western part of Serbia as possibly suitable for the presence of the species but believed that it was unlikely a viable population to be supported at the Montenegrin side of the border.

Even the suggested high probability of the occurrence of marbled polecat in Montenegro (SPASS-



**Fig. 5.** Geographical overview of published data, assumed distribution data and actual presence data of *Vormela peregusna* in Montenegro.

OV & SPIRIDONOV 1993, ABRAMOV et al. 2016, MILENKOVIĆ et al. 2000), there is no clear evidence of its presence. The species has now been recorded in the eastern part of the country bordering Albania and Kosovo (Fig. 5), despite the assumptions that the most likely place of its occurrence is at the border with Serbia. This supports the previous conclusions that the distribution of the marbled polecat has been insufficiently studied on the western Balkans (KRYŠTUFEK 2000, MILENKOVIĆ et al. 2000) and that its status urgently needs updating.

MILENKOVIĆ et al. (2000) stated that there were no reliable data of the marbled polecat's presence on the Montenegrin side but, most probably, the most suitable area would be that bordering Serbia. ŽUPAN & HORAŠEK (2019) noted that the most likely area where the species could occur was near Čampari and Lazovići, close to the Serbian border; however, they assumed that these similar-looking habitats were too small to sustain a viable population in comparison with those on the Serbian side of the border. ATANASSOV (1966) described two localities in South Dalmatia, with one locality above the Boka Bay, close to the area where MILENKOVIĆ et al. (2000) observed one individual (at Vilusi). Recently, these areas were described as probably unsuitable for this species (ŽUPAN & HORAŠEK 2019).

According to the locals, the marbled polecat has been starting to appear in the area of Prokletije Mountains in the last few years. It is possible that its local presence has been very recent (a possible population expansion from neighbouring countries) or it has been noticed by the locals only after our inquiry. This consideration suggests that cooperation with local communities must be stronger when it comes to rare species conservation.

In Europe, there are many discrepancies concerning the knowledge of distribution, habitat use, ecology and behaviour of the marbled polecat. MIRIĆ (1983) stated that the species rarely occurs at altitudes higher than 1000 m. However, there have been several records at an altitude of 1740 m in the Rila Mountain (Bulgaria), while they have also been recorded at an altitude of 2100 m in (former) Yugoslavia (ATANASSOV 1966). By the current knowledge, the species is generally associated with the open and dry habitats: desert, semi-desert and steppe habitats (ABRAMOV et al. 2016). In western Serbia, MILENKOVIĆ et al. (2000) described the marbled polecat presence in montane-steppe and woodland-steppe type of pastures. Very recently, ZLATANOVA & POPOVA (2018), through their camera trap research project, recorded a marbled polecat in a high mountainous forest area in Bulgaria at an altitude of 1551

m a.s.l. (Zlatanova, pers. com.); this contrasts with the general assumption that the species avoids forested areas. Our data have shown that the species occurs at the altitude range from ca. 1000 up to 1700 m a.s.l. on mountain hay meadows on the town periphery, in the centre of the village and on sub-alpine hay meadows located at summer villages far away from the town. Thus, not specific marbled polecat's habitats, with enough prey base and similar ecological factors (i.e. altitude, climate, zonal vegetation) might also be suitable for the survival of this species.

Even though the marbled polecat is mainly described as a specialised predator on fossorial rodents (BEN-DAVID 1988; HEPTNER & NAUMOV 1988, SPASSOV & SPIRIDONOV 1993, ABRAMOV et al. 2016), it also shows an opportunistic predation strategy (OGNEV 1935, NOVIKOV 1962, ATANASSOV 1966, HEPTNER & NAUMOV 1988, MILENKOVIĆ et al. 2000).

As European moles were noted near the marbled polecat burrow recorded in the village of Završ in our study, it is possible that besides fossorial rodents, this species will also form part of the marbled polecat's diet. According to our knowledge, this has not been recorded before and needs further data collection to confirm or reject it.

All sightings shown in Table 1 occurred during the day, close to noon. Our observations are more similar to the observations of HEPTNER & NAUMOV (1988) described as unusual behaviour. According to the published data, the species was more known to be active during the morning and evening (NOVIKOV 1962, ATANASSOV 1966, HARRISON 1968, STROGANOV 1969, MACDONALD & BARRETT 1993, SPASSOV & SPIRIDONOV 1993). Yet, some authors observed predominantly nocturnal behaviour (SLUDSKIJE 1953, BEN-DAVID 1988). ROBERTS (1977) recorded marbled polecats basking in the sun during colder days. This was not the case here, as all sightings occurred during the warmest months (average temperature 11.5°C in May, 14.7°C in June and 16.0°C in July; RADOJIĆIĆ 2008) in the region.

These recent sightings of the marbled polecat in Montenegro require long-term research into the presence of the species in the municipality of Plav and the country as a whole. It also warrants the necessity of raising awareness of the species to the local people in Montenegro and raising support for its conservation. It is equally important to urge the government of Montenegro to ensure the necessary legal protection for the species since it currently has no legal protection in the country.

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