

# European Hamster at the edge: declining in nature and rare in owl pellets<sup>x</sup>

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**Abstract** Over the last decades, the European Hamster (*Cricetus cricetus*) has been declining in many parts of its European range. Due to the lack of recent information on the occurrence and status of the European Hamster in the south-western Carpathian Basin west of the Danube, we used information gathered from prey remains in Common Barn-owl (*Tyto alba*) pellets. In spite of considerable sampling effort, we retrieved only few hamster remnants. Two skulls were found in Podolje (Croatia) in 2007 and 2016, respectively. Further five hamsters were retrieved from pellets collected in 2017, 11 km to the northwest in Udvar (Hungary). In Sátorhely, 5 km north from Udvar, one roadkill male was found on 27.07.2019. Testimonies from local inhabitants confirmed the current presence of the European Hamster in the area. Our results suggest the presence of a small isolated population in the border area of Croatia (UTM 10 km grid square CR27) and Hungary (CR18, CR19). This small isolated population is on the south-western limit of the range of the species. We presume that the population requires conservation attention because of its isolated position at the edge of the species' range, its small size and low abundance. We call for a transboundary action by nature conservation authorities in Croatia and Hungary.

Keywords: Baranja, *Cricetus cricetus*, Croatia, Hungary, *Tyto alba*

**Összefoglalás** A mezei hörcsög (*Cricetus cricetus*) az utóbbi néhány évtizedben európai elterjedési területének egy jelentős részéről visszazorult. Aktuális előfordulási adatok hiányában a Dunától nyugatra, a Kárpát-medence délnyugati részén gyöngybagoly (*Tyto alba*) köpetekből előkerülő zsákmánymaradványok alapján nyert információkat használtuk a mezei hörcsög elterjedésének és státuszának megállapítására. A mintavételezésbe fektetett jelentős erőfeszítések ellenére csak kevés hörcsög maradványa került elő. A horvátországi Podolje terepülésről 2007-ben és 2016-ban összesen két koponyát, majd 11 km-re északnyugatra a magyarországi Udvar településen 2017-ben gyűjtött köpetekből 5 mezei hörcsög maradványait mutattuk ki. Udvartól mindössze 5 km-re északi irányban, Sátorhelynél az úton 2019.07.27-én egy elgázolt hím példányt találtunk. A mezei hörcsög aktuális jelenlétét a területen a helyi lakosság megfigyelései is alátámasztották. Az összegyűlt adatok arra utalnak, hogy Horvátország (CR27 a 10 km-es UTM háló alapján) és Magyarország (CR18, CR19) határmenti területén él egy kis elszigetelt populáció, mely a faj elterjedési területének délnyugati határán van. Megítélésünk szerint ez a populáció megérdemli a természetvédelem figyelmét, mivel a faj elterjedési területének peremén található, helyzete elszigetelt, mérete kicsi, és a hörcsögök előfordulási gyakorisága alacsony. Horvátország és Magyarország természetvédelmi hatóságait határon átnyúló fellépésre hívjuk fel.

Kulcsszavak: Baranya, *Cricetus cricetus*, Horvátország, Magyarország, *Tyto alba*

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## Introduction

The European Hamster (*Cricetus cricetus*) has been a common inhabitant of agricultural landscape in many parts of Europe and Asia. During population outbreaks, hamsters were serious pests to crops (Nechay 2000). Since the 1950s, populations in western and central parts of Europe experienced gradual decline, which was observed also in the western Carpathian Basin (Surov *et al.* 2016, Banaszek *et al.* 2020, Kryštufek *et al.* 2020). Chain of events like habitat fragmentation and degradation, including a decline in food supplies, also damped down its population cycles (Nechay 2008). An increase in winter precipitation and widespread monocultures further contributed to population decline (Tissier *et al.* 2016). Small, fragmented and isolated populations are vulnerable to various threats, which accelerate their further decline and finally lead to extinction (Weinhold 2008). Improvements in land management are a crucial step to avoid further decline (Tissier *et al.* 2016). The IUCN status of the species is Critically Endangered which was justified by a decline in reproductive rate, population size and distributional range.

Recent surveys retrieved local hamster extinctions in certain parts of Hungary, including Southern Transdanubia (e.g. Bihari 2004, 2007, Cserkész 2017, Kondor & Cserkész 2017). In this communication, we address the situation in the Baranya region. Baranya (also Baranja) is a flat plain between the Drava and Danube Rivers and is administratively divided between Hungary and Croatia. European Hamsters used to be widespread and common throughout the Croatian part of the region (Petrov 1992) but are now restricted to the southern part of the Hungarian Baranya (Nechay 2000). The hamster population in Baranya is of particular conservation interest for at least two reasons. Because of recent decline (Bihari 2007, Cserkész 2017, Kondor & Cserkész 2017), it requires conservation management on its own. Equally important, Baranya anchors the entire hamster population along the Drava in Croatia and Slovenia. This population is in a shape of a long (c. 200 km) and very narrow stripe (up to 20 km) which stretches – presumably continuously – on the right bank of the river. Gene flow in this narrow corridor can become disrupted at any point and at any time, making the right bank of the Drava a deadly effective population trap for hamsters. The area is densely populated and heavily used for agriculture. The majority of information on hamsters is from the early 1970s (Ružić 1978, Petrov 1992) and is therefore primarily of historical interest. There are no hamsters on the left bank of the Drava River in Hungary (Bihari 2007, Cserkész 2017), however, during an outbreak in the 1980s, the hamster population spread toward the Drava Plain till the western edge of Baranya County, Hungary (Nechay 2000).

The presence of European Hamsters at the far end of the Drava in Slovenia was confirmed for the first time in May 1980. Two specimens were found in the vicinity of the village Obrež, situated alongside the road Ormož – Središče ob Dravi (Kryštufek 1987). This tiny population is very marginal and restricted to a narrow strip of agricultural habitat between

the hilly area to the north and the river to the south. The last individual was recorded in late 1990s and recent observations yielded no positive evidence on the animal. The conservation status in Croatia was reviewed by Tvrtković (2006), but this account includes hardly any new evidence. Tvrtković mainly stressed the lack of recent scientific information. While the current situation in Croatia is enigmatic, the European Hamster presumably still has considerable populations in the lowland to the east of the Danube in Hungary and Voivodina (the northern part of Serbia) (Banaszek *et al.* 2020).

In the Hungarian Baranya, the European Hamster is very rare (Bihari 2007, Cserkész 2017, Kondor & Cserkész 2017), hence its detection is a difficult task. In such cases, mammalogists frequently collect information from remnants found in pellets of avian predators, particularly owls. Owl pellet analysis is an important supplementary method in small mammal surveys (Mikuska *et al.* 1979, Horváth *et al.* 2007). In contrast to trapping, it can be particularly effective in monitoring difficult-to-detect small mammals (Torre *et al.* 2004, Heisler *et al.* 2016). The method has its limitations, e.g. the exact location of a small mammal prey can only be assumed. Despite this, the information gathered from the owl pellets can facilitate and direct further research, which can utilize different field techniques.

Research in Hungary retrieved the European Hamster as an important and frequent prey of the large-bodied Eurasian Eagle-owl (*Bubo bubo*), while the smaller Common Barn-owl (*Tyto alba*) and the Northern Long-eared Owl (*Asio otus*) preyed on hamsters only rarely or extremely rarely (Bihari *et al.* 2008). The Common Barn-owl prefers open areas during hunting (Taylor 1994) and, as an opportunistic feeder, consumes prey in proportion to its abundance in the hunting habitat (Tores *et al.* 2005). Although the European Hamster is not an easy prey due to its comparatively large and robust body and aggressive behaviour (Kryštufek *et al.* 2020), we still presumed that the Common Barn-owl should be able to capture juvenile European Hamsters, e.g. at the time they start feeding above ground.

Our goal in this study was twofold. Firstly, we aimed to re-evaluate the current distribution of the European Hamster in Southern Transdanubia, relying primarily on the results of owl pellet analyses. In order to complete the distributional picture, we also used unpublished observations and literature data. Another goal was to re-draw attention to the importance of owl pellet collections and analyses in the detection of elusive small mammals and in performing a non-invasive monitoring.

## Material and methods

Our database on prey composition of Common Barn-owl pellets contains information gained between the years 2007–2017 (Croatian part of Baranya, and Udvar in Hungary) and is based on remnants of 11,792 small mammal individuals. The database is stored at the Department of Ecology, University of Pécs. We extracted the information on the occurrence of hamster present in the study area, as well as on their relative abundance (Yom-Tov & Wool 1997). We completed the list of hamster records by interviews carried out among local ornithologists and upon sporadic inspection of roadkills (one skeleton is preserved in the

Natural History Museum of Slovenia). The four persons were included in searching for typical hamster holes (burrows) in agricultural habitats. Walking in transects about 5 meters apart, we examined the agricultural plots suggested by the hamster observers and also those areas, which we considered as potential habitats based on our own experience. In the period between 2018 and 2020, searching was performed two times in spring and three times in autumn in the areas north of the Croatian settlement of Podolje, and five times in Hungary in the area enclosed by the Udvar, Sátornhely, Nagynyárád and Majs settlements.

## Results and discussion

Positive records of European Hamsters in Baranya are summarized in *Table 1*. All sites are located close to the international border between Croatia and Hungary (*Figure 1*). Three records are from Common Barn-owl pellets, one observation was a road casualty, and two were reliable verbal reports (*Table 1*). One of the records is historic (1988) but we still list it to document more thoroughly the status of the hamster in this part of Baranya.

For the hamster from Podolje, we were not certain if it had been preyed by the Common Barn-owl near its resting site (*Table 1*). In 2007, we carefully sampled owl pellets in Croatia between the Drava and Danube rivers and the Hungarian border but found no further hamsters (Szép *et al.* 2018). Earlier detailed surveys in this part of Croatia (e.g. Mikuska *et al.* 1978, Mikuska & Vuković 1980, Tórizs 2010, 2011) similarly did not detect a single European Hamster. The species, however, was reported for the area prior to the mid-1970s (Ružić 1978, Petrov 1992). Despite this, we concluded that a single skull does not provide

*Table 1.* Occurrences of European Hamster (*Cricetus cricetus*) in the border region of Croatia and Hungary

1. táblázat Mezei hörcsög (*Cricetus cricetus*) előfordulások Horvátország és Magyarország határmenti régiójában

Map Id	Locality, Country	Latitude	Longitude	Date	Mode	Material	Source
1	Podolje, Croatia	45.815394	18.728147	28.09.2007	Owl pellets	1, juv, skull and mandible	Szép <i>et al.</i> 2018
1	Podolje, Croatia	45.815394	18.728147	29.10.2016	Owl pellets	1, juv, skull and mandible	own data
2	Udvar, Hungary	45.900367	18.659647	16.03.2017	Owl pellets	5, juv, skull and mandible	own data
3	Sátornhely, Hungary	45.942702	18.643589	27.07.2019	Roadkill	1, male, carcass	own data
4	Majs, Hungary	45.917971	18.632420	2015–2020	Observation in nature		Csaba László, pers. comm.
5	Babarc, Hungary	46.002709	18.551715	1988	Observation in nature		Támás Treitz, pers. comm.



Figure 1. Occurrences of European Hamster (*Cricetus cricetus*) in the border region of Croatia and Hungary (1–5), on the south-western limit of its distribution range

1. ábra A mezei hörcsög (*Cricetus cricetus*) előfordulási helyszínei Horvátország és Magyarország határmenti régiójában (1–5), elterjedési területének délnyugati határán

indisputable evidence on the presence of the hamster but instead left open the possibility that the owls might prey the hamster to the east of the Danube in the nearby Serbia.

A subsequent survey, repeated in 2016, revealed a young hamster skull from the same location (Table 1, Figure 1). A year later a large pellet sample was collected from the attic of a family house in Udvar (the Hungarian side of Baranya), which contained skeletal remnants of five hamsters (Table 1, Figure 1). The site was so close to the Hungarian-Croatian border that hamsters could be preyed upon on either side.

Intensive owl pellet surveys have been continuously undertaken in Baranya (the southern county of Hungary) since 1985. European Hamster remains were not found either in the first ten years (Horváth 1999) or in subsequent surveys (e.g. Horváth 1998). Such a lack of evidence is surprising, as hamsters were present in Southern Transdanubia during the last decades of the 20<sup>th</sup> century (Nechay 2000, Bihari 2004). Near the current finding site (Figure 1), it was observed in Babarc (CR19) in spring 1988 (Tamás Treitz, pers. comm.). We accepted the presence of the European Hamsters in Hungary as proven after a road casualty was found at Sátorhely (Table 1, Figure 1). Mr. Csaba László drew our attention to the carcass of the hamster that he collected. He recollected another observation of European Hamster nearby a few years earlier. In his testimony, hunters also observed hamsters on nearby fields (in the area of settlement Majs) several times during the last five years (Csaba László, pers. comm.). In 2019, we surveyed the vicinity of the site of the road casualty, as well as potentially suitable habitats in Croatia, but found no sign on the presence of the European Hamster.

Our survey covered only a small surface area in the border between Croatia and Hungary. The question remains whether there are still hamster habitats in the southern section of

Drava in Slavonia and further west. In Hungary, no hamsters were found in Common Barn-owl pellets collected along the Drava and Mura (e.g. Horváth 1998, Purger 1998, Szép *et al.* 2017), but similar surveys have never been conducted on the Croatian side (Tvrtković 2006). It would therefore be important to urgently perform this task.

## Conclusion

Results of the Common Barn-owl pellet analyses and further data from field observations proved that a small isolated population of the European Hamster is still present in the Croatian-Hungarian border area. The habitat patch, which is estimated to cover an area of  $20 \times 10$  km is on the south-western limit of the hamster's distribution range. Without proper attention and timely conservation measures, and in the absence of further population monitoring, hamsters can easily vanish from this area in the near future, just like they did in many parts of their European range. To counterbalance the negative population trend, a joint coordinated action by the relevant nature conservation authorities and cross-border cooperation is urgently needed, here and now.

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