

## SHORT COMMUNICATION

# FIRST FINDINGS OF YELLOW-NECKED MOUSE (*APODEMUS FLAVICOLLIS* (MELCHIOR, 1834)) IN THE NEUM AREA IN BOSNIA AND HERZEGOVINA

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## ABSTRACT

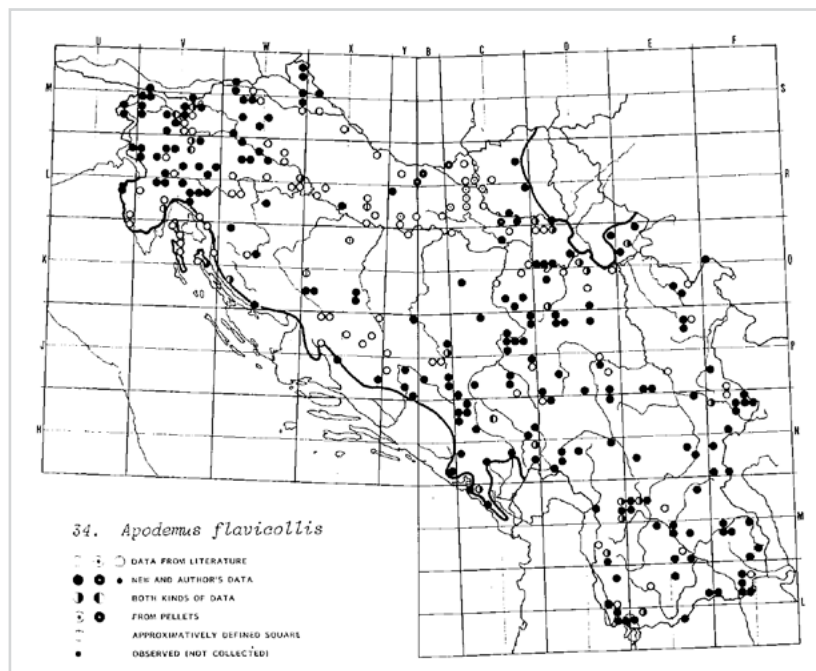
The first documented surveys of the populations of small mammals in the coastal area of the sea in Bosnia and Herzegovina in recent history were carried out from September, 25-28, 2023. A total of 50 Sherman LFG traps were set in two locations: Lastva and Tanko Sedlo on the Klek peninsula. In total, four individuals of the species *Apodemus flavicollis* (Melchior, 1834) and two individuals of the species *Apodemus sylvaticus* (Linnaeus, 1758) were caught, which represents the first finding of this species in the Neum area. The absence of the expected species *Apodemus epimelas* (Nehring, 1902) is a surprise considering the habitat type.

**Keywords:** *Apodemus flavicollis*, Bosnia and Herzegovina, Neum, small mammals

## INTRODUCTION

The species *Apodemus flavicollis* (Melchior, 1834) is a relatively common species in Bosnia and Herzegovina with numerous findings, except in the southernmost part – south from Mostar region. Species' southern border distribution is Dinara Mountain, stretching eastward across the mountain chain of Cincar, Vran, Čvrsnica, Prenj/Velež, Crvanj, Zelengora, Bjelašnica (Gacko), all the way down to Orjen Mountain, bordering with Montenegro. South of that line, the species was never recorded (Figure 1; Petrov, 1992).

South of this natural border is a domination of karst environment, with the influence of Mediterranean climate within the Mediterranean-Dinaric floristic zone – more precisely, a submediterranean area



**Figure 1** Distribution range of *Apodemus flavicollis* (Melchior, 1834) in Yugoslavia (Petrov, 1992)

which is characterized by average altitude of 750 m, vegetation period from 230-260 days per year and with unfavourable ratio between precipitation and evapotranspiration (0,66; Stevanović et al. 1983). This area is a niche of western broad-toothed field mouse species *Apodemus epimelas* (Nehring, 1902), which favours the climatic and other conditions in the area.

According to Petrov, 1992, species *Apodemus flavicollis* (Melchior, 1834) distribution is absent along the Adriatic coast, except on the islands of Cres and Rab. Species generally prefer forest habitats but can also be found in mixed forest-bushy or bushy vegetation with lots of seeds. Species can be found along the human settlements but, generally, it is mostly absent due to the presence of domestic predatory animals (cat).

The aim of this article is to present the first ever finding on *Apodemus flavicollis* (Melchior, 1834) species south of Mostar area in Bosnia and Herzegovina and along the Adriatic coast, in the environment of more expected, *Apodemus epimelas* (Nehring, 1902) species.

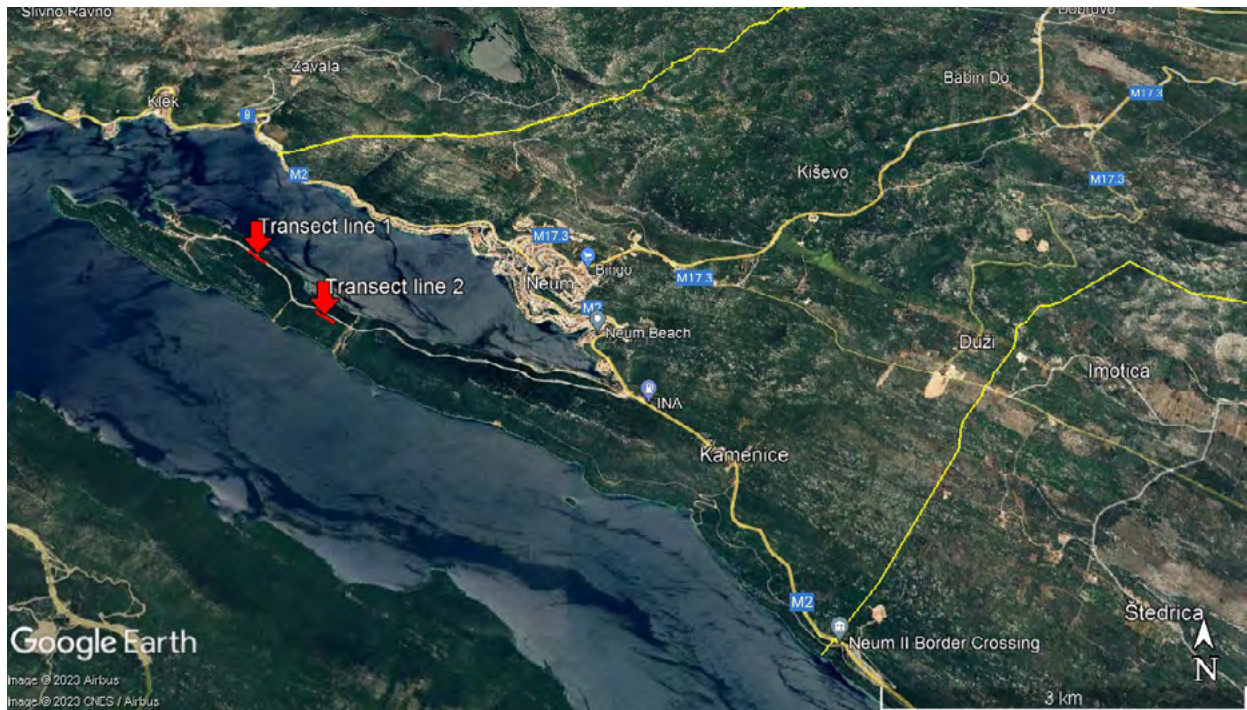
## MATERIAL AND METHODS

The field research was performed from 25-28 September 2023 on the Klek peninsula, along the Adriatic coastline in Bosnia and Herzegovina. The research area is dominated by bushy maquis scrubland and rocky vegetation with unique and quite rich flora species. Latest field research in the area revealed 245 plant taxa, of which as many as 16 taxa are new for Bosnia and Herzegovina (UNEP-GEF, 2021).

We use 50 Sherman LFG (Large, folding, galvanized) traps which we put in 2 transect line fields with 25 traps each:

- Transect line 1 – the area of Lastva – along the existing macadam road to Opuće;
- Transect line 2 – the area of Tanko Sedlo, in bushy vegetation.

The transect line 1 in the area of Lastva was 256 m long, making 10,1 m of average coverage per trap, while the transect line 2 in the area of Tanko Sedlo was 216 m long, making 8,64 m of average coverage per trap. Both coverage areas were satisfying, keeping in mind water and food scarcity in the karstic environment (Figure 2, Figure 3).



**Figure 2** Position of transect lines (red) in Neum municipality (Google Earth)

The used baits were a combination of corn flaps with peanut aroma and vegetable (carrot) and fruit (apple) pieces in order to prevent dehydration. The traps were checked twice a day (morning and evening) and were replenished with fresh baits, if necessary. In order to prevent re-catch, the team marked each caught individual with a waterproof marker on the ventral side before release. By doing this, we prevent damaging or harming the caught animals.

Other used survey equipment includes:

- GPS Garmin eTrex 30,
- CANON EOS 1100D DSLR Camera with EF-S 18-55mm f/3.5-5.6 IS II lens,
- Camera of Samsung Galaxy A52 cell phone.

As an identification guide, we use “Field Guide to European Mammals” (Twisk et al, 2019), which is currently most up-to date field guide in Europe.



**Figure 3A)** Putting traps on Lastva location **B)** Trapping site on Lastva location



**Figure 4** Caught individual of *Apodemus flavicollis* (Melchior, 1834)

## RESULTS

In total, six small mammal individuals were caught. Caught individuals belong to the two species:

- *Apodemus sylvaticus* (Linnaeus, 1758) with two individuals,
- *Apodemus flavicollis* (Melchior, 1834) with four individuals.

Both *Apodemus sylvaticus* (Linnaeus, 1758) were caught in Tanko Sedlo with one specimen of *Apodemus flavicollis* (Melchior, 1834), while three *Apodemus flavicollis* (Melchior, 1834) were caught on the Lastva location (Figure 4).

Team did not take any individual measurements. No species were harmed physically during trapping, species detection and release. All individuals survive trapping successfully, and they were released in nature after taking pictures.

## DISCUSSION AND CONCLUSION

Based upon the literature data, both species were historically not present in the Neum area (Petrov, 1992; Mitchell-Jones et al, 1998). Reason for this may be a lack of scientific field research on small-mammals in this specific area in the past, or researchers did not publish their findings. However, species *Apodemus sylvaticus* (Linnaeus, 1758) was recorded numerous times in the past in the nearby areas of Neretva Delta, Pelješac peninsula and the area near Slano (Petrov, 1992), which proves that the presence of *Apodemus sylvaticus* (Linnaeus, 1758) is historically confirmed and expected.

On the other hand, the presence of species *Apodemus flavicollis* (Melchior, 1834) was not recorded historically, even in the nearby locations (Petrov, 1992; Mitchell-Jones et al, 1998). The closest confirmed location is Orjen Mountain in Bosnia and Herzegovina. It is worth to mention that species was historically absent from the Adriatic coast from the Novigradsko Sea in the Republic of Croatia to nearby Tivat in Montenegro (Figure 1, Petrov, 1992).

That makes the finding presented in this paper the first documented finding of species *Apodemus flavicollis* (Melchior, 1834) on the Adriatic Sea shore. Major surprise was the absence of highly expected *Apodemus epimelas* (Nehring, 1902) species (Petrov, 1992; Mitchell-Jones et al, 1998), but further and more detailed field research is needed to prove its presence or absence. The future research must cover the wider area on the Klek peninsula in different seasons in order to gain a clear insight into the composition of the populations of small mammals along the Adriatic Sea coast in Bosnia and Herzegovina.

## CONFLICT OF INTEREST

The authors declared that there is no conflict of interest.

## CONTRIBUTIONS

Concept – AA; Design – AA, SKA; Supervision

– SKA; Resources - AA; Materials – AA; Data Collection and/or Processing – AA, SKA, MH; Analysis and/or Interpretation –AA, SKA, MH;

Literature Search – SKA; Writing Manuscript – AA; Critical Review – AA.

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## PRVI PRONALAZAK ŽUTOGRLOG MIŠA (*APODEMUS FLAVICOLLIS* (MELCHIOR, 1834) U PODRUČJU NEUMA U BOSNI I HERCEGOVINI

### SAŽETAK

Prvo dokumentovano istraživanje populacije malih sisara u obalnom području Bosne i Hercegovine u novije vrijeme je provedeno u periodu od 25. - 28. septembra 2023. godine. Postavljeno je ukupno 50 Sherman LFG zamki na dvije lokacije, Lastva i Tanko Sedlo na poluostrvu Klek. Ukupno su uhvaćene četiri jedinke vrste *Apodemus flavicollis* (Melchior, 1834) i dvije jedinke vrste *Apodemus sylvaticus* (Linnaeus, 1758), što predstavlja prvi pronalazak ovih vrsta u neumskom području. Odsustvo očekivane vrste *Apodemus epimelas* (Nehring, 1902) predstavlja iznenađenje, uzimajući u obzir tip i tip staništa, dok pojava vrste *Apodemus flavicollis* (Melchior, 1834) predstavlja jedinstveno znanstveno otkriće obzirom da ova vrsta nije dokumentovana u području duž Jadranske obale, od Novigradskog mora u Republici Hrvatskoj do Tivta u Crnoj Gori i područja južno od grada Mostara u Bosni i Hercegovini.

**Ključne riječi:** *Apodemus flavicollis*, Bosna i Hercegovina, mali sisari, Neum