Novitates Theriologicae, Pars 16: 69–75 (2023)
doi: http://doi.org/10.53452/nt1612

To the trapping method of water shrews (*Neomys*)

Alexandr Savarin

Gomel F. Skorina State University (Gomel, Belarus)
e-mail: gomelsavarin@gmail.com; orcid: 0000-0001-9663-6115

Savarin, A. **To the trapping method of water shrews (*Neomys*).** — The article presents the research results (2018−2023) on the trapping method of water shrews in the Ushachi district of the Vitebsk region. To catch the animals, soil traps were used, namely 5–6 litres volume cut-off PET bottles dug in accordance with the shoreline contour. Their distance from the shoreline was 0.5–1.0 m. Most often, shrews fell into traps placed on channels (between lakes on rills), as well as in areas with trees overhanging the other shore, and near lakes on the 'peninsulas.' The maximum distance from water shrew captures in the surveyed areas was no more than 30 m which indicates the animals' low migratory activity in favourable habitats. When traps are dug further than 10 m from the shore, rodents (voles and mice) and shrews predominate in the catches. Shrews were caught under all kinds of weather conditions. Experiments on catching shrews using Gero traps installed on floating boards, as well as soil traps dug along lines as they move away from the water body, ended without results.

Introduction

The basis for obtaining reliable data on species distribution and abundance is the correct choice of research methods and techniques. Theriologists have developed different trapping methods of small mammals but mainly two of them are used: the trap-line method and the trap-ditch method. In wetlands and areas with hard soil, cylinders can be dug in with the installation of fences.

Publications on monitoring the microtheriofauna of Ukraine [Kondratenko & Zagorodniuk 2006; Zorya 2010, Vikyrchak 2022 and others] show that shrews are caught only sporadically when using the above methods. Without denying these works' general scientific and practical value, we believe that the use of only them in the natural conditions of Belarus does not always fully reflect the species diversity and representation of semi-aquatic and aquatic shrew species in the microtheriofauna complex.

Indicative in this regard are individual publications [Shakun *et al.* 2023], in which the status of some shrew species in Belarus is assessed, in our opinion, incorrectly: the Iberian water shrew (*Crocidura suaveolens*) and even the Eurasian water shrew (*Neomys fodiens*) are listed as non-abundant species. The water shrew is well trapped by soil traps along the banks of flowing and standing bodies of water (rivers, lakes, ponds, and reclamation canals), being a common species, and

in some water bodies or sections thereof is an abundant species (even in urban areas). The lesser white-toothed shrew has also become a common species in the south-east of Belarus; it also lives in the territories bordering Ukraine, including the Dnipro-Sozhsky Nature Reserve. Note that the Red Data Book of Belarus (2015) includes the lesser white-toothed shrew, the bicoloured shrew (*Crocidura leucodon*), and the Mediterranean water shrew (*Neomys anomalus*). We believe that the 'rarity' and 'lack of knowledge' of these species are determined by several objective and subjective factors, including methodological errors during trapping: the use of only Gero traps (which in some cases are not effective) and poor choice of the intended habitat.

The purpose of this work is to describe the riparian areas preferred by shrews in the natural conditions of Belarus, as well as to draw the specialists' attention to some of the experiments carried out, which will allow them to evaluate and select the most correct trapping method.

The use of the methods and techniques analysed below made it possible not only to identify new habitats of the Taiga shrew (*Sorex isodon*) and the Mediterranean water shrew in Belarus, but also to prove the co-occurrence of two water shrew species in all surveyed water bodies, as well as a higher abundance of *N. anomalus* in the Ushacha River [Savarin & Savarina 2019; Savarin 2020 and others].

Materials and Methods

In July–August 2018–2023, we captured small mammals in the Ushachi district of Vitebsk region near the interconnected lakes Borkovshchina–Dolzhina–Vechelye, as well as the Ushacha River. These lakes are connected by narrow (on average 3–4 m) and shallow (about 0.5 m) channels, the banks of which are abundantly overgrown with trees, shrubs, and herbaceous vegetation. The total length of lakes with channels is about 8 km.

To obtain reliable information on the distribution and abundance of shrews, the methods used should not have changed the habitat of the animals, both aquatic and terrestrial. For this purpose, we carried out the following:

– When digging soil traps, the riparian vegetation was practically not trampled down. To achieve this, access to the riparian zone was most often carried out from the water;

– The trunks and branches of plants lying near the shoreline were not moved away;

– No grooves were made between the soil traps;

– No preservative liquids were added.

To catch shrews, modified Barber traps were used: PET bottles with a volume of 5–6 litres, 15–16 cm in diameter, cut off at the top. The water filling of the traps

was about 70–80 % with the expected absence of precipitation at night, and with possible rain about 50 % or less.

Traps were dug in accordance with the contour of the shoreline, that is, not in a straight line, but often in zigzag. The distance from their location from the shoreline was usually 0.5–100 m (excluding individual experiments). In case of waterlogged parts of the bank and possible flooding due to precipitation (Fig. 1), a stone was placed on the bottom of the trap so that it 'floated' but did not 'jump' above ground level.

Results and Discussion

The preferred areas of the riparian zone for water shrews are the following:

On the channels between the lakes:

1) Slightly lowered (by 3–5 cm) areas are rills, with broken branches carried by water and abundant vegetation growing around (Fig. 2). Often waterlogged. In such a rill, traps can be placed at a distance from the shoreline much greater than 1.0 m (5–10 m) with the same efficiency. We believe that such attractiveness of rills is determined by the possibility of the animals to quickly flee back to the main body of water in case of danger, as well as by the presence of a large number of invertebrates collected here.

2) The channel sections with trees overhanging the other bank (Fig. 3), especially if there is dead wood connecting both banks. If the banks of the channel differ in height (by 20–40 cm), then traps should be placed on the lower, flat bank.

Near the lakes: sections of the shoreline are 'peninsulas' extending several metres forward (from the shore), overgrown with aquatic vegetation. These areas become more attractive to water shrews if a small barrier of crushed plants is made around the trap (Fig. 4). An interesting fact is that attempts made to create ('reclaim') artificial islands with traps placed on them were unsuccessful. Perhaps this is explained by the animals' 'fear' (avoidance?) of unfamiliar formations.

Fig. 1. 'Floating' trap in a wetland.
Рис. 1. «Плаваюча» пастка на заболоченій ділянці.

Fig. 2. Rills near the channels.
Рис. 2. Промиїни біля проток.

Fig. 3. A section of the channel with trees overhanging the other bank.
Рис. 3. Ділянка протоки з деревами, що нависають на інший берег.

Fig. 4. A ‘peninsula’ with crushed vegetation around the trap.

Рис. 4. «Півострів» з прим’ятою рослинністю навколо пастки.

Fig. 5. A line of traps set off the water body.
Рис. 5. Лінія пасток, виставлених у міру віддалення від водоймища.

For three years, an unsuccessful attempt was made to catch shrews using Gero traps of two modifications (installed one at a time on floating boards, 70 hp) on the channel connecting the lakes Borkovshchina and Dolzhina. An area with a very weak current was chosen. The boards were tied with a fishing line to a tree standing on the shore, since after the rain the speed of the water flow increased significantly, and the channel expanded by several metres. The bait in one trap was pieces of fresh lard with meat, in the other—bread fried in oil. We believe that this experiment indicates the low efficiency of using Gero traps for trapping water shrews in water bodies.

The maximum distance of water shrew catches (n = 2, 1 individual each of *N. fodiens* and *N. anomalus*) from water bodies in the surveyed areas in the Ushachi region was no more than 30 m (traps were placed in areas distant from each other). We assume that such 'attachment' of the animals to the shoreline is determined, first, by the wide range of food supply in the riparian zone, and to a much lesser extent by avoidance of competition with other small-mammal species in the forests adjacent to water bodies. According to the literature, water shrews in search for favourable habitats, for example, in the east of Ukraine, can migrate to a much greater distance (up to 1 km) from water bodies [Zaika 2008].

We conducted an experiment on placing soil traps in an adjacent mixed forest in a straight line every 5 m as we moved away from the water body (Fig. 5). The first trap was located 10 m off the shoreline. Two lines of 10 traps were set up. During the two weeks of exposure, water shrews were not caught on any line, although at the same time near the same body of water the animals were caught in soil traps placed in zigzag along the shoreline.

It is of interest to compare the methods we used and the results obtained with the data of the Ukrainian specialist Tsvelykh [2022] since the purpose of his research was to estimate the relative abundance of the Iberian water shrew compared to other species of shrews that settle near water bodies. Tsvelykh used 2-litre PET bottles, which are 1.5 times smaller in diameter than 5–6-litre PET bottles. Howev-

er, he placed a line of traps not along the shoreline, but perpendicular to it: the first trap was no further than 1 m off the shore, and the rest were a metre apart from each other (4–6 traps in total). That is, the cylinders were dug in no further than 5–6 m from the shoreline.

We consider the indicated maximum distance for digging in traps to estimate the number of shrews to be correct since at a greater distance various species of rodents (voles and mice) and shrews predominate in the catches. The Ukrainian theriologist caught specimens of *N. anomalus* in sedge thickets on the riverbank and in a riparian deciduous forest. These biotopes (habitats) are actively visited by the Iberian water shrew in the natural conditions of Belarus. According to Tsvelykh [2022], shrews were caught in traps only after rain. In the riparian zone of lakes in the Ushachi region, shrews are found under any weather conditions, which, in our opinion, is determined by their high numbers. For example, the relative abundance of the Mediterranean water shrew in the surveyed water bodies was 4–8 individuals/100 trap-days.

Considering the scientific data of Tsvelykh [2022], we assume our earlier assumption about the wider distribution of the Mediterranean water shrew in Belarus to be logical and justified.

The research results obtained indicate the high efficiency of using large-diameter soil traps (15–16 cm). In the natural conditions of Belarus, these traps should be placed on channels (on rills), as well as in areas with trees overhanging the other bank, and near lakes on 'peninsulas.'

References

Kondratenko, O., I. Zagorodniuk. 2006. Small mammal's fauna of reserved territories of Eastern Ukraine based on results of census using traps and pitfalls. *Proceedings of the Theriological School,* **7**: 120–135. [In Ukrainian]

Savarin, A., V. Savarina. 2019. The Mediterranean water shrew (Neomys anomalus) in northern Belarus: new records and identification criteria. *Theriologia Ukrainica*, **18**: 137–143. CrossRef

Savarin, A. 2020. The Findings of little known insectivore species (Lipotyphla) in Belarus: critical analysis and issues of diagnosis. *Novitates Theriologicae,* **11**: 19–28. [In Russian] CrossRef

Shakun, V. V., I. A. Solovej, I. A. Kryshchuk, P. A. Velihurau, E. I. Mashkov, A. I. Larchanka. 2023. Mammal fauna in Belarus and it´s changes in 1961–2022. *Natural resources,* **1:** 38–45. [In Russian]

The Red Book… 2015. *The Red Book of the Republic of Belarus. Animals: rare and endangered species of wild animals.* Belarusian Encyclopedia, Minsk, 1–448. [In Russian]

Tsvelykh, A. 2022. Abundance ratio of shrew species in riparian habitats of the Liubka River in the Holosiivsky National Park. *Novitates Theriologicae,* **13:** 63–65. [In Ukrainian] CrossRef

Vikyrchak, O. 2022. The Eurasian water shrew (Neomys fodiens) in the Dnister Canyon National Nature Park. *Novitates Theriologicae,* **13**: 37–42. [In Ukrainian] CrossRef

Zaika, S. 2008. A new record of Neomys fodiens in Eastern Ukraine. *Proceedings of the Theriological School,* **9:** 264–265. [In Russian]

Zorya, A. 2010. Monitoring of small mammal fauna of the Kharkiv region: totals of 20-year cycle of observation. *Proceedings of the Theriological School,* **10**: 65–72. [In Ukrainian] CrossRef

Резюме

Саварін, А. **До методики лову рясоніжок (*Neomys*).** — У статті наведено результати досліджень за методикою вилову рясоніжок, проведених 2018–2023 рр. в Ушацькому районі Вітебської обл. Для лову звірків використовували ґрунтові пастки — обрізані ПЕТ-пляшки об'ємом 5–6 л, які вкопували відповідно до контуру берегової лінії. Віддаленість їх від берегової лінії становила 0,5–1,0 м. Найчастіше ці землерийки потрапляли в пастки, розставлені на протоках — між озерами на вимоїнах, а також на ділянках з деревами, що нависають на інший берег, а біля озер — на «півостровах». Максимальна віддаленість відловів рясоніжок від водойм на обстежених територій становила до 30 м, що свідчить про невисоку міграційну активність звірків у сприятливих місцезростаннях. При вкапывании ловушек дальше 10 м от берега в уловах преобладают грызуны (полевки и мыши) и бурозубки. Куторы отлавливались при любых погодных условиях. Безрезультатно закінчилися експерименти з упіймання рясоніжок за допомогою пасток Геро, встановлених на плаваючих дошках, а також ґрунтових пасток, вкопаних по лініям в міру віддалення від водойми.