

## New data on the Holocene distribution of the Southern Birch Mouse (*Sicista subtilis* (Pallas, 1773)) in Bulgaria

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MITEV I. 2004. New data on the Holocene distribution of the Southern Birch Mouse (*Sicista subtilis* (Pallas, 1773)) in Bulgaria. – *Historia naturalis bulgarica*, **16**: 133-138.

**Abstract.** Ten semi-mandibles and one maxille of at least 8 individuals, collected in 1993-2002 in four new localities of *Sicista subtilis* - the vicinities of the villages Madara (Shoumen Region), Shirokovo, Petrolna Basa to Rouse (Rouse Region) and Strelkovo (Silistra Region) in the NE Bulgaria, considerably widen the species range throughout the country.

**Key words:** *Sicista subtilis*, Mammalia, Holocene fauna, Bulgaria

### Introduction

The Southern birch mouse – *Sicista subtilis* (Pallas, 1773) from fam. Zapodidae is a rare species, spread in the steppe areas of the temperate latitudes. The species has limited distribution in Europe. It is established in the steppe regions of the central and eastern parts of the continent: in Austria, Czech Republic, Slovakia, Croatia, Romania, Bulgaria, Moldova, Ukraine and Russia. Its range reaches Baykal Lake in Siberia to the East (GORNER & HACKETAL, 1987).

According to the published data there are two records of the species in Bulgaria, both from Dobrudzha (NE Bulgaria). For the first time the species is established by PETROV (1954) in the vicinities of the town of General Toshevo, Dobrich Region. As a rare species it is included in the “Red Book of People’s Republic of Bulgaria” (Peshev, 1985). The second record comes from pellets of the Eagle owl (*Bubo bubo* (L.)), found in a rock niche in the Bulgarian Black Sea coast in the neighborhood of the Cape Kaliakra (POPOV, pers. comm.).

### The four new localities

We present here four new records of *S. subtilis* in Northeast Bulgaria, where it was established by bone remains only:

1. Madara. A rock niche, 1 km northwards from the Madarski Skali Park near the Madara village, Shumen region. The niche is situated in a 60 m high rock cliff of western exposition, 20 m above the rock base and about 100 m above the level of the river near the find. The niche is 1 m wide, 1.5 m high and 3 m deep. It contained a layer of 50 cm, rich in accumulations, which were screened from 1994 to 1995. The material originates from the food remains of

*Bubo bubo*. There are two remains of two specimens of birch mouse, established in the obtained material: one subfossil semi-mandible, and one recent semi-mandible. Associated fauna: *Ochotona pussila*, *Spermophilus citellus*, *Mus* sp., *Sylvaemus* sp., *Ratus* sp., *Glis glis*, *Dryomys nitedula*, *Cricetus cricetus*, *Mesocricetus newtoni*, *Microtus arvalis/agrestis*, *Arvicola terrestris*, *Lagurus lagurus*, *Eulagurus luteus*, *Nannospalax leucodon*. The materials of this locality are different in age – from the Early Holocene to the recent time. This locality testifies about the contemporary distribution of the species in the Provadiysko Plateau, part of which is the “Madarski skali” park. Up till now favorable habitats for *S. subtilis* have existed in the plateau. The measurements of the materials are not given in the table, because we could not rely on them at the moment of publishing of the present work.

2. Shirokovo. A cave in the canyon of the Tsherni Lom River, 3 km northwards of the Shirokovo village, Rouse region. The cave is situated in a 30-m high rock, of western exposition, 7 m above the rock base and 60 m above the river level. It is 1 m wide, 1 m high and 3 m deep. The cave contained a 30 cm thick layer of accumulations, which were screened in October 2000. The accumulations contained plentiful food remains of *Bubo bubo*. There are four remains of at least two specimens of birch mouse: one right semi-mandible - partly broken with M/1; one right semi-mandible – fragmentary, with well preserved alveoles, without teeth; and two left semi-mandibles without teeth. Two of the semi-mandibles look recent, although they were obtained from 20-30 cm deep accumulations. We observed that the overlays in this find were really transposed, because of the burrowing activity of predators. Associated fauna: *Sciurus vulgaris*, *Spermophilus citellus*, *Mus* sp., *Sylvaemus* sp, *Ratus norvegicus*, *Micromys minutus*, *Cricetus cricetus*, *Mesocricetus*

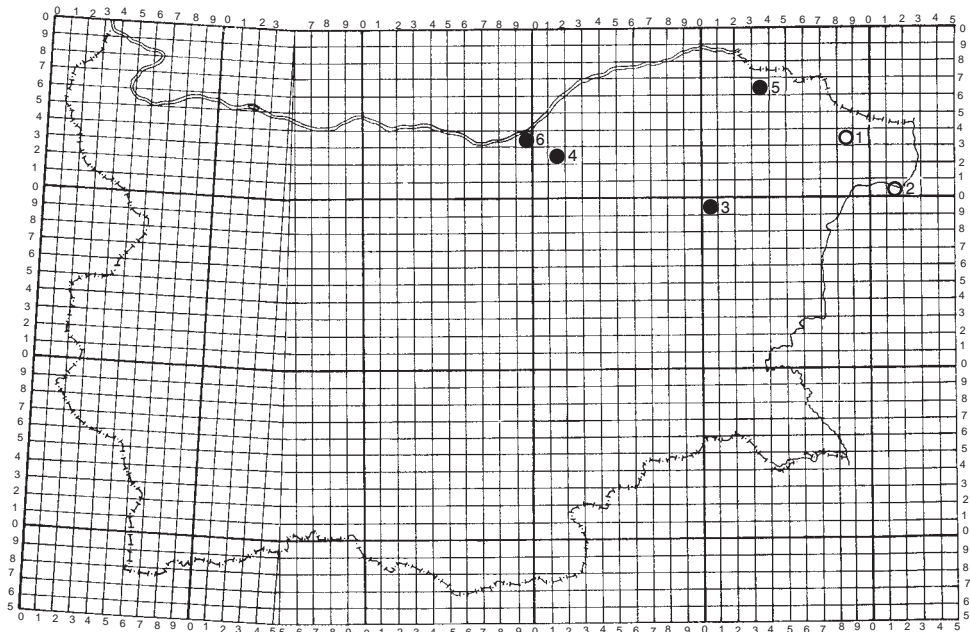


Fig. 1. Distribution of *S. subtilis* in northeastern Bulgaria. Empty circles – literature records; filled circles – new records. 1 – General Toshevo; 2 – Kaliakra Cape; 3 – Madara; 4 – Shirokovo; 5 – Strelkovo; 6 – Petrolna Basa – Rouse

*newtoni*, *Microtus arvalis/agrestis*, *M. subterraneus*, *M. nivalis*, *Arvicola terrestris*, *Nannospalax leucodon*. This species composition indicates prevailing Late Holocene origin of the osteological material but the presence of *M. nivalis* testifies that the most inferior layer contains Upper Pleistocene and Early Holocene animal remains. The locality of Shirokovo is in the vicinity of the karst area of Pepelina village, where there are large steppe habitats suitable for *S. subtilis*.

3. Strelkovo. A rock niche in a dry valley, 3 km southwards of Strelkovo village, Silistra region. The site is situated in a 15-m high rock of southern exposition, 4 m above the rock base and 12 m above the valley level. The niche is 0.5 m wide, 2 m high and 2 m deep. The niche contains a 20-cm deep layer of accumulations. In May 2002 a part of the accumulations was screened, and remains of three specimens of *S. subtilis* were found – three right semi-mandibles, two of them with M/1. The material originates from the food remains of *Bubo bubo* and probably other owl species. Associated fauna: *Mus* sp., *Sylvaemus* sp., *Mesocricetus newtoni*, *Arvicola terrestris*, *Microtus arvalis/agrestis*, *Muscardinus avellanarius*, *Nannospalax leycodon*. All the materials are dated as recent. There are large steppe areas in the surroundings of the site favorable to *S. subtilis*.

4. Petrolna Basa – Rouse. A karst hole near Danube River, 10 km SW of Rouse. The hole is situated in a 10 m high rock of western exposition, 5 m above the rock base and 15 m above the river level. It is 0.5 m wide, 0.5 m high and 1.0 deep. It contained a 20-cm layer of accumulations, which were screened in 1993. Two remains of at least one specimen were found: one right semi-mandible without teeth and a left maxille, also without teeth. The remains look fresh (i.e. recent). The material comes from the remains of the feeding place of *Bubo bubo* and other owl species (probably *Athene noctua*). Associated fauna: *Spermophilus citellus*, *Mus*

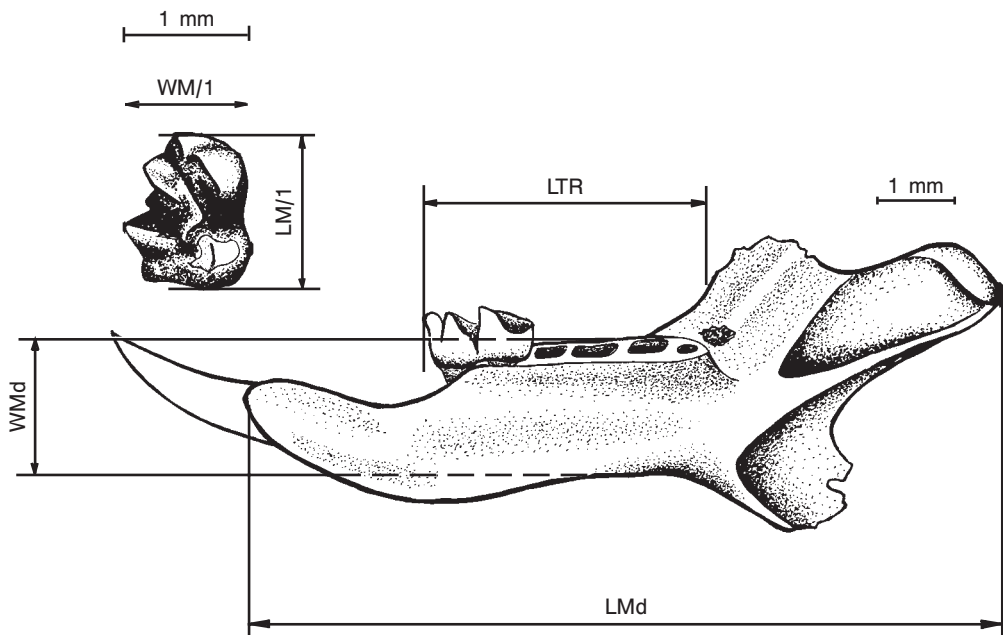


Fig. 2. *S. subtilis* – mandible dextra and molar (for the abbreviations of the measurements see Table 1)

sp., *Sylvaemus* sp., *Cricetus cricetus*, *Mesocricetus newtoni*, *Microtus* sp., *Arvicola terrestris*, *Glis glis*, *Nannospalax leucodon*. The age of this vicinity is determined as Late Holocene. There are steppe areas in the vicinity of this site favorable to *S. subtilis*.

The measurements of the collected mandibles of *S. subtilis* are given in Table 1.

Table 1  
Measurements (in mm) of the mandibles of *S. subtilis*

Site	Anatomical element	LMd	LTR	WMd	LM/1	WM/1	Notes
Shirokovo	Mandible dextra	-	-	2.30	-	-	fragmentary
Shirokovo	Mandible sinistra	11.05	3.40	2.30	-	-	complete
Shirokovo	Mandible dextra	-	3.30	2.15	1.15	0.90	partly broken
Shirokovo	Mandible sinistra	-	3.65	2.30	-	-	partly broken
Strelkovo	Mandible dextra	10.45	3.40	2.20	1.20	0.90	almost complete
Strelkovo	Mandible dextra	-	3.50	2.25	1.20	0.90	partly broken
Strelkovo	Mandible dextra	10.60	3.40	2.40	-	-	partly broken
Petrolna Basa	Mandible dextra	-	3.45	2.20	-	-	partly broken

Abbreviations: LMd – length of the mandibule; WMd – weight of the mandibule; LTR – length of the tooth rows; LM/1 – length of the lower M1; WM/1 – weight of the lower M1 (Fig. 1).

## Discussion

Available data show that *S. subtilis* was a species of large distribution in Northern Bulgaria during the Middle and Upper Pleistocene (POPOV, 1984, 1989, 1994, 2000). The size of M1 of the semi-mandibles from Strelkovo and Shirokovo corresponds to the Pleistocene series from Cave 16 (LM/1: min. 1.12 mm – max. 1.32 mm, mean 1.22 mm; WM/1: min. 0.82 mm – max. 1.22 mm, mean 0.94 mm) rather than to the recent series from Romania (LM/1: min. 1.08 mm – max. 1.18 mm, mean 1.13 mm; WM/1: min. 0.80 mm – max. 0.94 mm, mean 0.89 mm) (POPOV, 2000). This relation indicates a possible Pleistocene origin of these finds, because in the mammal populations, inhabiting colder climatic conditions, the individuals have bigger corporal sizes than those which live in a warmer climate – a well studied tendency, determined as the Rule of Bergman. However, this is not a sufficient evidence of the Pleistocene origin of these finds because we do not rely on the measurement data on recent Bulgarian population of *S. subtilis*, necessary for the comparison with the obtained material.

During the Pleistocene in Northern Bulgaria mainly steppe associations developed, suitable as habitats for *S. subtilis* and other rodent species from the steppe ecological complex. At the beginning of the Holocene when the climate became warmer and dampier, the steppe vegetation was dried

out by the mesophilous woods, which reduced the areals of the typical steppe species, including *S. subtilis*. For this reason the populations of these species have been preserved in some particular localities – refugia: karst areas, favorable to the development of steppe associations. For *S. subtilis* some regions of Dobrudzha, like the Black Sea coast and the vicinities of General Toshevo and Strelkovo, the Provadiysko Plateau and the karst area near Shirokovo - Pepelina and Petrolna Basa – Rouse played the role of suitable refugia. The last three localities prove that the species range spreads much more westwards than considered so far. This makes more realistic the possibilities of records of *S. subtilis* in other regions of Northern Bulgaria.

### Acknowledgements

We would like to express our gratitude to Mr. Ilcho Kolev from Rouse for his assistance in the fieldwork on the site of Shirokovo.

### References

- GORNER M. HACKETAL H. 1987. Säugetiere Europas. Neumann Verlag Leipzig – Radebeul, 239-241.
- PETROV B. 1954. [Composition and distribution of the rodents of Dobrudzha and the means for treatment against them]. – Spisanie na nautshno-izsledovatelските instituti pri Ministerstvoto na zemedelieto, **2**: 81-98. (In Bulgarian).
- PESHEV Z. 1985. The Southern birch mouse (*Sicista subtilis* Pallas). – In: Red Data Book of the People's Republic of Bulgaria, volume **2**: p. 140.
- POPOV V. 1984. The small mammals (Mammalia – Insectivora, Rodentia, Lagomorpha) from the Late Pleistocene accumulations from “Metsha dupka” cave (Western Balkan). 1. Taphonomy, paleoecological and zoogeographical specialities of the fauna. – Acta zool. bulg., **24**: 35-44.
- POPOV V. 1989. Middle Pleistocene small mammals (Insectivora, Lagomorpha, Rodentia) from Morovitza (North Bulgaria). – Acta zool. cracov., **31** (5): 193-234.
- POPOV V. 1994. Multivariate paleoecological analysis of the late Quaternary small mammal succession from North Bulgaria. – Historical Biology, **8**: 261-274.
- POPOV V. 2000. The small mammals (Mammalia: Insectivora, Chiroptera, Lagomorpha, Rodentia) from Cave 16 and paleoenvironmental changes during the Late Pleistocene. – In: Ginter B. et al. (eds.). Temnata cave. Excavations in Karlukovo Karst Area, Bulgaria, **2** (1): 190-191.

*Received on 09.04.2002*

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**Нови данни за холоценското разпространение на степната скачаща мишка  
(*Sicista subtilis* (Pallas, 1773)) в България**

Иван МИТЕВ

(Р е з ю м е)

Съобщавам се четири нови находища на *Sicista subtilis* от Североизточна България. Видът е установен по материали от погачки на бухал (*Bubo bubo*), събрани от 1993 до 2002 г. в находищата до с. Магара (Шуменско), с. Широково и Петролна база (Русенско), както и с. Стрелково (Силистренско). Събрани са общо 10 полумандибули и една максила от общо 8 индивида. Тези находки свидетелствуват за по-широкото холоценско разпространение на вида в България отколкото беше известно досега.