

Distribution of *Mus spicilegus* (Mammalia: Rodentia) in Slovakia

Rozšírenie myši kopčiariky (*Mus spicilegus*) (Mammalia: Rodentia) na Slovensku

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Abstract. In the years 2001–2002, occurrence of *M. spicilegus* was mapped in the lowland areas of Slovakia. The presence of the typical loamy mounds with food reserves consisting of weed and grass seeds was searched for. Occurrence of *M. spicilegus* has been recorded in southern Slovakia from 17° 34' E to 18° 55' E and from the Hungarian border to 48° 20' N. The population in vicinity of the Čunovo village near Bratislava probably represents a part of a larger population penetrating there from Austria. Occurrence of *M. spicilegus* in eastern Slovakia has been recorded in two areas: (a) from 21° 06' E to 21° 20' E and from the Hungarian border to 48° 37' N; (b) from 21° 39' E to the Ukrainian border and from the Hungarian border to 48° 26' N.

INTRODUCTION

Mus spicilegus Petényi, 1882 occurs in natural steppes, in arable land, in open areas along water streams, rarely also in open woods out of human settlements. Its occurrence rarely exceeds the altitudes of 200 m above the sea level. Morphologically it is difficult to distinguish from *Mus musculus*, but in late summer *M. spicilegus* shows a typical ethological feature – building of loamy mounds to hide food reserves consisting of spikes of grasses, cereals and maize and pieces of sunflower etc. and different weeds.

M. spicilegus is distributed in a relatively small area at the western margin of the south-palaeartic forest steppe zone. Its range includes the Pannonian and Valachian lowlands, Danube basin as well as the lowlands and plains along the rivers Prut, Dniestr, Bug, Dniepr and Don and it is limited by the Carpathians, the Sredne Ruskaya Vozvyshennost highlands and the Donetskij Kryazh highlands (UNTERHOLZER et al. 2000). A small isolated population occurs in Montenegro on the Uncinjko Polje area, but also in Albania and north-western Greece (MACHOLÁN & VOHRALÍK 1997).

Based on the typical mounds, occurrence of *M. spicilegus* in southwestern Slovakia was discovered by FERIANC (1956) in a flax field in the surroundings of Gabčíkovo. Later on it was recorded in the vicinity of Čunovo (BAUER et al. 1998), in the surroundings of Komárno (STOLLMANN 1998, STOLLMANN & MACHOLÁN 1999 and LENGYEL et al. 2002) and in the surroundings of Nové Zámky and Komárno (STOLLMANN 2000). KRIŠTOFÍK (2001) caught this species at several localities near Veľký Meder and Medveďov. Occurrence of *M. spicilegus* in the Východoslo-

venská nížina lowland and Košická kotlina basin was recorded by KRISTOFÍK & DANKO (in press), based on observation of its mound and trapping.

The aim of this work was to describe the current occurrence of *M. spicilegus* in the lowland areas of Slovakia.

MATERIAL AND METHODS

According to the presence of its typical mounds with food reserves consisting of weed and grass seeds, occurrence of *M. spicilegus* was mapped in lowland areas of southern and eastern Slovakia in 2001–2002, mostly on the stubbles and fallows grown above all by plant species of the genera *Chenopodium*, *Amaranthus* and *Setaria*. The following areas were visited:

1. south-western Slovakia from 17° 05' E to 19° 15' E and from the Hungarian border to 48° 35' N;
2. lowland parts of the Rimavská kotlina basin from 20° 05' E to 20° 24' E and from the Hungarian border to 48° 25' N;
3. lowland parts of south-eastern Slovakia from 20° 50' E to 21° 20' E and from the Hungarian border to 48° 37' N; and
4. lowland parts of south-eastern Slovakia from 21° 35' E to the Ukrainian border and from the Hungarian border to 48° 30' N (Fig. 1).

In all these areas pellets of *Tyto alba* were also collected.

RESULTS

In south-western Slovakia, occurrence of *M. spicilegus* was recorded in six orographic complexes (Podunajská rovina plain, Nitrianska pahorkatina highlands, Žitavská pahorkatina highlands, Hronská pahorkatina highlands, Ipeľská pahorkatina highlands, Burda hills) at 75 localities given below (Fig. 1).

Podunajská rovina plain: Čunovo (48° 01' N, 17° 10' E, 131 m a. s. l.), a fallow about 3 km SW of the village, 4 mounds; Horná Potôň-Lúky (48° 05' N, 17° 34' E, 119 m a. s. l.), a stubble about 1 km SW of the village, 2 mounds; Veľké Blahovo (48° 02' N, 17° 35' E, 116 m a. s. l.), a fallow about 1 km NE of the village, 3 mounds; Dunajská Streda (47° 58' N, 17° 37' E, 112 m a. s. l.), a fallow about 0.6 km S of the town, 11 mounds; Čierna Voda (48° 07' N, 17° 38' E, 116 m a. s. l.), a fallow about 0.5 km SW of the village, 2 mounds; Sládkovičovo (48° 18' N, 17° 40' E, 120 m a. s. l.), a fallow and maize field about 0.5 km E of the town, 5 mounds; Pataš (47° 53' N, 17° 40' E, 114 m a. s. l.), a stubble about 1.5 km N of the village, 6 mounds; Vozokany (48° 07' N, 17° 41' E, 114 m a. s. l.), a fallow about 1.5 km E of the village, 4 mounds; Čiližská Radvaň (47° 50' N, 17° 41' E, 111 m a. s. l.), a stubble about 0.5 km N of the village, 3 mounds; Bohel'ov (47° 54' N, 17° 42' E, 112 m a. s. l.), a stubble about 2 km S of the village, 4 mounds and Bohel'ov (47° 55' N, 17° 42' E, 112 m a. s. l.), a fallow about 1 km SE of the village, 9 mounds; Horné Saliby (48° 07' N, 17° 44' E, 113 m a. s. l.), a fallow about 0.4 km SW of the village, 5 mounds; Galanta (48° 11' N, 17° 45' E, 116 m a. s. l.), a stubble about 0.5 km E of the village, 7 mounds; Veľký Meder (47° 52' N, 17° 45' E, 112 m a. s. l.), a maize field about 0.6 km N of the town, 11 mounds; Dolná Streda (48° 15' N, 17° 45' E, 122 m a. s. l.), a maize field about 0.2 km SE of the village, 6 mounds; Jánošíkovo na Ostrove, Malá Belá settlement (47° 56' N, 17° 46' E, 112 m a. s. l.), a stubble about 1 km W of the settlement, 2 mounds (leg. J. LENGVEL); Kajal (48° 11' N, 17° 48' E, 116 m a. s. l.), a fallow about 1 km SE of the village, 12 mounds; Kráľov Brod (48° 04' N, 17° 49' E, 112 m a. s. l.), a fallow about 1.5 km NW of the village, 3 mounds; Šoporňa, Štrkovec settlement (48° 12' N, 17° 50' E, 123 m a. s. l.), a maize field about 1 km SE of the settlement, 5 mounds; Tešedíkovo (48° 07' N, 17° 51' E, 115 m a. s. l.), a fallow about 0.5 km N of the village, 4 mounds and Tešedíkovo (48° 06' N, 17° 51' E, 115 m a. s. l.), 2 specimens of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Žihárec (48° 05' N, 17° 52' E, 112 m a. s. l.), a fallow about 1 km N of the village, 5 mounds; Palárikovo (48° 02' N, 18° 02' E, 113 m a. s. l.),

a harvested sunflower field about 1 km W of the village, 7 mounds and (48° 02' N, 18° 05' E, 113 m a. s. l.), 15 specimens of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Jatov (48° 07' N, 18° 02' E, 111 m a. s. l.), a maize field about 0.5 km W of the village, about 1 ha, 10 mounds; Nesvady (47° 55' N, 18° 06' E, 114 m a. s. l.), a maize field about 0.5 km W of the village, 6 mounds; Hurbanovo-Bohatá (47° 54' N, 18° 11' E, 116 m a. s. l.), a stubble about 1.5 km of the town, 15 mounds.

Nitrianska pahorkatina highlands: Šoporňa (48° 16' N, 17° 49' E, 121 m a. s. l.), a stubble about 0.2 km N of the village, 4 mounds; Pereš (48° 13' N, 18° 00' E, 149 m a. s. l.), a field of millet and cereals about 0.1 km N of the village, 3 mounds; Branč (48° 12' N, 18° 09' E, 128 m a. s. l.), 1 specimen of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO).

Žitavská pahorkatina highlands: Nitra-Selenec (48° 18' N, 18° 08' E, 156 m a. s. l.), a stubble about 0.5 km SE of the village, 3 mounds; Horná Malanta (48° 20' N, 18° 09' E, 155 m a. s. l.), a harvested maize field about 0.3 km NE of the village, 3 mounds; Čechynce (48° 15' N, 18° 10' E, 133 m a. s. l.), a pumpkin field about 0.1 km E of the village, 15 mounds; Malý Lapáš (48° 19' N, 18° 10' E, 165 m a. s. l.), a stubble and maize field about 0.2 km N of the village, 2 mounds; Golianovo (48° 16' N, 18° 11' E, 138 m a. s. l.), a pumpkin field and a fallow about 1 km SE of the village, 6 mounds.

Hronská pahorkatina highlands: Dolný Ohaj (48° 05' N, 18° 16' E, 128 m a. s. l.), a fallow about 0.5 km W of the village, 4 mounds; Vráble (48° 14' N, 18° 18' E, 142 m a. s. l.), a fallow about 0.2 km N of the town, 4 mounds; Pribeta (47° 55' N, 18° 18' E, 136 m a. s. l.), a maize field about 1 km N of the village, 2 mounds; Mudroňovo (47° 50' N, 18° 19' E, 145 m a. s. l.), a fallow about 0.1 km N of the village, 4 mounds; Veľká Maňa (48° 10' N, 18° 19' E, 133 m a. s. l.), a fallow about 1.5 km N of the village, 3 mounds; Pozba (48° 07' N, 18° 24' E, 150 m a. s. l.), a fallow about 1.5 km NW of the village, 6 mounds; Čifáre (48° 14' N, 18° 24' E, 175 m a. s. l.), a fallow about 1 km W of the village, 3 mounds; Dubník (47° 58' N, 18° 25' E, 165 m a. s. l.), a fallow about 0.5 km N of the village, 4 mounds; Beša (48° 09' N, 18° 25' E, 103 m a. s. l.), a fallow about 0.5 km E of the village, 3 mounds; Horný Pial (48° 09' N, 18° 26' E, 162 m a. s. l.), a fallow about 0.5 km W of the village, 5 mounds; Bátorove Kosihy (47° 49' N, 18° 26' E, 127 m a. s. l.), a stubble about 0.3 km NE of the village, 3 mounds; Dedinka (48° 02' N,

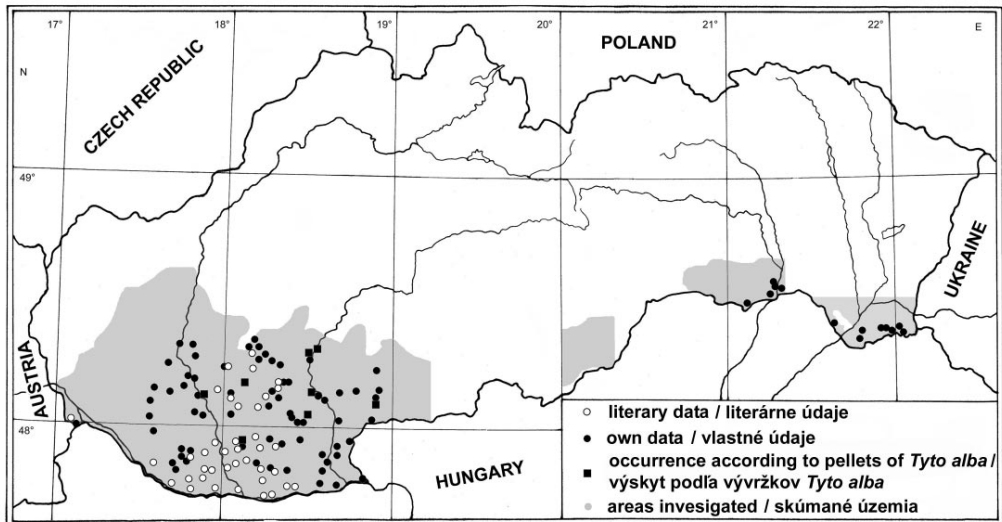


Fig. 1. Distribution of *Mus spicilegus* in Slovakia.

Obr. 1. Rozšírenie myši kopčiariky (*Mus spicilegus*) na Slovensku.

18° 27' E, 160 m a. s. l.), a harvested maize field about 3 km S of the village, 4 mounds and Dedinka (48° 03' N, 18° 27' E, 167 m a. s. l.), a harvested sunflower field about 0.3 km S of the village, 11 mounds; Farná (48° 01' N, 18° 29' E, 150 m a. s. l.), a maize field about 1 km W of the village, 4 mounds and (48° 01' N, 18° 33' E, 155 m a. s. l.), a maize field about 1.5 km E of the village, 3 mounds; Gbelce (47° 51' N, 18° 30' E, 135 m a. s. l.), a fallow about 0.5 km W of the village, 5 mounds; Nýrovce (48° 04' N, 18° 35' E, 150 m a. s. l.), 6 specimens of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Mužla (47° 58' N, 18° 35' E, 121 m a. s. l.), a maize field about 0.1 km W of the village, 5 mounds; Bruty (47° 55' N, 18° 36' E, 161 m a. s. l.), a stubble about 1 km S of the village, 2 mounds (leg. A. DAROLOVÁ); Žemliare (48° 09' N, 18° 36' E, 150 m a. s. l.), 8 specimens of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Belá (47° 50' N, 18° 36' E, 185 m a. s. l.), a fallow 1 km S of the village, 3 mounds; Kamenín (47° 52' N, 18° 38' E, 126 m a. s. l.), a maize field about 0.5 km S of the village, 4 mounds; Šarovce (48° 07' N, 18° 37' E, 146 m a. s. l.), a harvested maize field about 1 km W of the village, 7 mounds and (48° 07' N, 18° 38' E, 146 m a. s. l.) a fallow 0.2 km N of the village, 5 mounds; Štúrovo (47° 48' N, 18° 41' E, 110 m a. s. l.), a fallow about 0.2 m N of the pulp mill, 4 mounds.

Ipeľská pahorkatina highlands: Malé Kozmálovce (48° 16' N, 18° 30' E, 175 m a. s. l.), 1 specimen of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Starý Tekov (48° 15' N, 18° 33' E, 165 m a. s. l.), a harvested maize field about 0.1 km E of the village, 4 mounds; Rybník (48° 17' N, 18° 34' E, 180 m a. s. l.), 2 specimens of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Pavlová (47° 55' N, 18° 41' E, 136 m a. s. l.), a harvested maize field about 5 km N of the village, 4 mounds and Pavlová (47° 53' N, 18° 41' E, 143 m a. s. l.), a fallow about 0.5 km S of the village, 3 mounds; Hontianska Vrbica (48° 07' N, 18° 42' E, 151 m a. s. l.), a harvested maize field and a fallow about 0.3 km S of the village, 5 mounds; Šalov, the co-operative farm Jarok (48° 03' N, 18° 42' E, 138 m a. s. l.), a harvested maize field and a fallow about 0.5 km E of the farm, 9 mounds; Pastovce (47° 57' N, 18° 45' E, 115 m a. s. l.), a fallow about 2 km S of the village, 6 mounds; Demandice (48° 07' N, 18° 47' E, 134 m a. s. l.), a fallow about 0.5 km W of the village, 12 mounds; Vyškovce nad Ipeľom (48° 04' N, 18° 51' E, 120 m a. s. l.), a meadow about 1.5 km NE of the village, 2 mounds; Tupá-Luciná (48° 07' N, 18° 52' E, 130 m a. s. l.), a fallow about 0.3 km from the motorest, 2 mounds; Sudince (48° 13' N, 18° 54' E, 210 m a. s. l.), a fallow about 1.5 km SW of the village, 3 mounds; Hrkovce (48° 05' N, 18° 54' E, 127 m a. s. l.), 1 specimen of *M. spicilegus* as prey of *T. alba* (leg. M. SÁROSSY, det. Š. DANKO); Horné Semerovce (48° 07' N, 18° 55' E, 130 m a. s. l.), a fallow about 0.1 W of the village, 7 mounds.

Burda hills: Chľaba (47° 50' N, 18° 50' E, 101 m a. s. l.), a fallow about 1 km SW of the village, 3 mounds.

In the eastern Slovakia, *M. spicilegus* was recorded in three orographic complexes (Košická kotlina basin, Zemplínske vrchy hills and Východoslovenská rovina plain) at 13 following localities (Fig. 1).

Košická kotlina basin: Nižný Lánec (48° 32' N, 21° 06' E, 210 m a. s. l.), a maize field about 0.5 km E of the village, 8 mounds; Kechnec (48° 33' N, 21° 15' E, 205 m a. s. l.), a stubble about 0.5 km W of the village, about 1 ha, 12 mounds; Hanická (48° 37' N, 21° 16' E, 197 m a. s. l.), a fallow about 0.3 km E of the village, 1 mound; Belža (48° 35' N, 21° 16' E, 185 m a. s. l.), a stubble and fallow about 0.6 km N of the village, 5 mounds; Trstené pri Hornáde (48° 35' N, 21° 20' E, 210 m a. s. l.), a fallow about 0.2 km N of the village, 1 mound.

Zemplínske vrchy hills: Čerhov, Chotárny mlyn settlement (48° 26' N, 21° 39' E, 115 m a. s. l.), a stubble about 0.3 km S of the settlement, 1 mound.

Východoslovenská rovina plain: Veľký Kamenec (48° 23' N, 21° 48' E, 100 m a. s. l.), a maize field about 1 km N of the village, 3 mounds; Nová Vieska pri Bodrogu (48° 25' N, 21° 50' E, 100 m a. s. l.), a maize field about 1.5 km SE of the village, 2 mounds; Svätušce (48° 26' N, 21° 54' E, 98 m a. s. l.), a stubble about 1.2 km W of the village, 5 mounds and (48° 25' N, 21° 55' E, 98 m a. s. l.), a stubble about 1.7 km S of the village, 2 mounds; Pribeňík (48° 24' N, 21° 59' E, 100 m a. s. l.), a maize field about 0.2 km W of the village, 3 mounds; Boťany-Kolónia (48° 26' N, 22° 04' E, 100 m a. s. l.), a harvested sunflower

field about 1 km W of the village, 2 mounds; Velké Trakany (48° 23' N, 22° 05' E, 103 m a. s. l.) a harvested sunflower field about 0.5 km SW of the village, 4 mounds.

DISCUSSION

During the mapping we have found out that colonies of *M. spicilegus* prefer mainly fallows and cereal and maize fields with undergrowth of grasses and weeds.

Occurrence of *M. spicilegus* has been recorded in south-western Slovakia from 17° 34' E to 18° 55' E and from the Hungarian border to 48° 20' N. The population in vicinity of the Čunovo village near Bratislava probably represents a part of a larger population in adjacent Austria. Occurrence of *M. spicilegus* in eastern Slovakia has been recorded in two areas: a) from 21° 06' E to 21° 20' E and from the Hungarian border to 48° 37' N; b) from 21° 39' E to the Ukrainian border and from the Hungarian border to 48° 26' N. In the Rimavská kotlina basin, occurrence of *M. spicilegus* has not been recorded, in spite of the fact that it occurs near the Izsófalva town in Hungary at a distance of about 25 km (BIHARI in litt.).

The systematics of the genus *Mus* was very complicated until the mid-1980s, because of lack of visible external morphological characters separating individual taxa. For example, FERIANCOVÁ-MASÁROVÁ & HANÁK (1965), summarising older data, mentioned only one species to live in Slovakia which included three subspecies, *M. m. domesticus*, *M. m. musculus* and *M. m. spicilegus*, the latter subspecies occurring in suitable sites throughout Slovakia. Only on the base of biochemical (BONHOMME et al. 1984) and morphological (AUFRAY et al. 1990, MACHOLÁN 1996) methods it has been proved that five independent species of the genus *Mus* live in Europe. For this reason, all older data on the occurrence of *M. spicilegus* in Slovakia (e. g. TURČEK 1948, 1949, FERIANC 1949, SALAJ 1964, MOŠANSKÝ 1995, etc.) are probably incorrect. In 2002, L. MOŠANSKÝ (in litt.) revised an extensive material of mice in the collections of the East-Slovakian Museum in Košice being originally identified as *M. musculus spicilegus* and he found out that all these individuals belong to the species *M. musculus*.

Our investigations show that the range of *M. spicilegus* in southern Slovakia has probably spread from the Podunajská rovina plain and Hronská pahorkatina highlands to the Žitavská pahorkatina and Ipeľská pahorkatina highlands in the last years. We suppose that this species spread to eastern Slovakia from Hungary also only in the last years. Our hypothesis is confirmed by the fact that we have not recorded *M. spicilegus* in the pellets of *Tyto alba*, which were collected in the early 1970s in the southern part of the Košická kotlina basin (in 1975 at the villages of Belža, Gyňov, Kechnec, Milhost', Seňa, Trstené pri Hornáde and Vyšná Myšľa, see DANKO & ŠTOLLMANN 1978). A revision of this material has confirmed that all individuals belong to the species *M. musculus*. It is interesting that we have not found *M. spicilegus* either after a revision of the material collected in 1997 at the villages of Budulov, Janík, Nižný Lánec, Seňa and Trstené pri Hornáde, see OBUCH & MATIS (1998).

SÚHRN

V rokoch 2001–2002 sme robili mapovanie výskytu *M. spicilegus* v nížinných oblastiach Slovenska na základe výskytu typických kopčekov hlíny so zásobami plodových častí burín a tráv. Zistili sme, že *M. spicilegus* sa vyskytuje na južnom Slovensku od 17° 34' v. d. po 18° 55' v. d., od hraníc s Maďarskom po 48° 20' s. š. Populácia nachádzajúca sa v katastri dediny Čunovo pri Bratislave pravdepodobne predstavuje časť rozšírenia populácie prenikajúcej z Rakúska. Výskyt *M. spicilegus* na východnom Slovensku bol

zistený v dvoch oblastiach: (a) od 21° 06' v. d. po 21° 20' v. d., od hranice s Maďarskom po 48° 37' s. š.; (b) od 21° 39' v. d. po hranice s Ukrajinou, od hranice s Maďarskom po 48° 26' s. š.

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