

Return of *Miniopterus schreibersii* to the northern edge of its historical distribution in Slovakia

Martin CELUCH

Slovak Bat Conservation Society, Andraščíkova 1, 085 01 Bardejov, Slovakia; martin.celuch@gmail.com

Abstract. *Miniopterus schreibersii* is considered a rare bat species in Slovakia. Previously the species occurred only in southern parts of the country and in the Pieniny National Park, with a small population located in the Aksamitka cave. For a long period of time, this site represented the northern edge of the regular distribution of this species. Over the past 39 years no records of its presence were found. However, in autumn 2014 two individuals were mist-netted in the front of the Aksamitka cave and bat-detector records from two other locations in the region (Spišská Magura Mts. and Poprad) confirmed the return of the species to the northern part of Slovakia. Questions related to the conservation of this species and the implications of the human impact with respect to the cave are subsequently discussed.

Schreibers' bent-winged bat, distribution, rediscovery, conservation measures

Schreibers' bent-winged bat, *Miniopterus schreibersii* (Kuhl, 1817), occurs in the south-western Palaearctic. In Europe, it is a typical Mediterranean species; the territory of Slovakia represents the northern edge of its natural distribution (Uhrin et al. 1997, Matis et al. 2012). Previously, the Aksamitka cave in the Pieniny National Park was considered the most northern location where the occurrence of the *M. schreibersii* bat was first documented by Polish researchers in 1867 (Walecki 1881). From 1955 to 1975, a small breeding colony was found (Hanák 1963, Bárta 1978) with the last known hibernating individuals recorded in 1955 (Vachold 1956). There were a few occurrences of several individuals in the summer of 1975, and the last two males were mist-netted in front of the cave in the same year (Bárta 1978). An extensive survey in the area in the period of 1994–1999 (mist-netting on foraging grounds, hibernacula checks, mist-netting in front of the cave during autumn) did not confirm the occurrence of this species (Paskiewicz et al. 1995, Danko et al. 2000). *M. schreibersii* has never been observed further to the north – in Poland (cf. Sachanowicz et al. 2006). On the present the population of *M. schreibersii* occurs in Revúcka vrchovina Mts. and Muránska planina Mts., but the occurrence in the northern localities has not been recorded for 39 years. A similar but solitary finding was documented in the Czech Republic in the area of North Moravian Karst (Bartonička & Jedlička 2011).

As part of the fauna surveys in 2013–2014, signals similar to those indicating the presence of *M. schreibersii* were recorded (Batlogger M, Elekon, Switzerland) in the Hornádska kotlina basin, Popradská kotlina basin, Špišsko-šarišské medzihorie Mts. and Špišská Magura Mts. However, the call characteristics of the species significantly overlap with *Pipistrellus pygmaeus* (Leach, 1825), and thus the species could not be positively identified (Ahlén 2004). Calls of *M. schreibersii* were recorded on 10 September 2014 in the city of Poprad directly above the aqua park “Aquacity” (49.06° N, 20.31° E, 700 m a. s. l.). At least two individuals of this species were hunting around the big lights installed above the pools; the species was positively identified thanks to repeated visual observations. Consequently, on 7 October 2014 a mist-netting was performed for about three hours inside the Aksamitka cave (49.38° N, 20.45° E, 820 m a. s. l.) – the only locality in

this region previously used throughout the year by *M. schreibersii*. Two individuals – a male and female flew into the cave from the outside about two hours after sunset and were successfully captured despite the unsuitable weather conditions and circumstances (full moon shining on the entrance of the cave, strong wind). Moreover, the analysis of the recordings (det. Danilo Russo) also confirmed the presence of *M. schreibersii* with a high degree of confidence in the locality of Malé Osturnianske jazero lake (19 August 2014, 49.34° N, 20.21° E, 930 m a. s. l.) and Veľké osturnianske jazero lake (3 September 2014, 49.34° N, 20.22° E, 850 m a. s. l.) in the Spišská Magura Mts. Recordings with similar characteristics from the Špišsko-šarišské Medzihorie Mts. (28 August 2014, 49.27° N, 20.86° E, 530 m a. s. l.) and Popradská kotlina basin (12 August 2013, 49.09° N, 20.34° E, 670 m a. s. l.) were identified as *P. pygmaeus* calls – which also represents a valuable finding since previously, the species had not been documented north of the 49° N (Danko & Kaňuch 2012).

The rediscovery of *M. schreibersii* on the northern edge of its historical distribution is an interesting finding also from the conservation perspective. Previously, the species had been evaluated as a ‘critically endangered’ species (Štollmann 1997), while its present status on the Carpathian Red List is ‘endangered’ (Urban & Uhrin 2014); in Slovakia, it is considered a rare species. Several authors see the installation of a door at the entrance of the cave and the disturbance by visitors and researchers as the key reason for the disappearance of the species from the Aksamitka cave (Uhrin et al. 1997, Danko et al. 2000). *M. schreibersii* is sensitive to any obstacles in the entrance to the roost (Mitchell-Jones et al. 2007). Previously, the entrance of the cave was grilled, however, it could not be established for how long (Lalkovič 2012). By 1986, when the revision of the cave



Fig. 1. Present days state of the entrance to the Aksamitka cave, Pieniny Mts.



Fig. 2. *Miniopterus schreibersii* netted inside the Aksamitka cave.

was done by the local nature conservation authorities (ÚŠOP), the grille was already destroyed and damage to the cave decoration was also identified, including a number of waste dumps and even several fire pits inside the cave (archives of the Pieniny National Park). Thus, it was decided that a new closure (wall with door) would be supplied, which was installed later in 1989 by a local speleological group from Spišská Belá (Lalkovič 2012). The circle-shaped opening in the door was 12 cm wide (the damaged door can be still found in the cave) and it also featured two openings for amphibians in the walls. By 1994, the door and part of the wall was already destroyed (Danko et al. 2000) and today the opening is 100 cm high and 140 cm wide. The Slovak Cave Administration plans to install a new door because of ongoing damage to the interior of the cave by illegal visitors. However, due to the rediscovery of this species it is important that this plan is reconsidered. The confirmed occurrence of *M. schreibersii* in the Pieniny Mts., Spišská Magura Mts. and also in Poprad point to a larger potential population in the area even though the location

of the actual summer and winter roosts remain unknown. The findings also point to the occurrence of the species very close to the Polish border (Malé Osturnianske jazero – 0.5 km, the Aksamitka cave – 2 km); thus, it is highly probable that because of its large home range, this species occurs also in Poland and soon it will be recorded as a new species of the Polish fauna.

Acknowledgement

I would like to thank the administration of the Pieniny National Park for financing part of the survey. I would also like to thank Milan Hrivňák for his help during the fieldwork.

References

- AHLÉN I., 2004: Heterodyne and time-expansion methods for identification of bats in the field and through sound analysis. Pp.: 72–79. In: BRIGHAM R. M., KALKO E. K. V., JONES G., PARSONS S. & LIMPENS J. G. A. (eds.): *Bat Echolocation: Tolls, Techniques & Analysis*. Bat Conservation International, Austin, TX, 82 pp.
- BÁRTA Z., 1978: Poznámky ke zvüení netopyrü jeskyně Aksamitky v Pieninském národním parku a okolí [Notes on the bat fauna of the Aksamitka cave in the Pieniny National Park and surroundings]. *Sborník Severočeského Muzea, Serie Přírodní Vědy, Liberec*, **10**: 73–80 (in Czech, with an abstract in German).
- BARTONIČKA T. & JEDLIČKA P., 2011: First record of *Miniopterus schreibersii* in the Czech Republic (Chiroptera: Miniopteridae). *Lynx, n.s.*, **42**: 83–89.
- DANKO Š. & KAŇUCH P., 2012: Večer nica Leachova (*Pipistrellus pygmaeus*) [Pygmy pipistrelle – *Pipistrellus pygmaeus*]. Pp.: 383–386. In: KRIŠTOFÍK J. & DANKO Š. (eds.): *Cicavce Slovenska – rozšírenie, bionómia a ochrana [Mammals of Slovakia – Distribution, Life History and Protection]*. Veda, Bratislava, 712 pp (in Slovak, with a summary in English).
- DANKO Š., PJEŇČÁK P. & DANKO Š., 2000: Doterajšie poznatky o faune netopierov slovenskej časti Pienin a blízkeho okolia [Current knowledge of bats in the Slovakian part of the Pieniny Mts and surroundings (NE-Slovakia)]. *Vespertilio*, **4**: 27–36 (in Slovak, with an abstract in English).
- HANÁK V., 1963: Výskyt létavců stěhovavých (*Miniopterus schreibersi*) v jeskyni “Aksamitka” v Pieninách [Occurrence of Schreibers’ bat – *Miniopterus schreibersi* in the Aksamitka cave in the Pieniny Mts.]. *Lynx, n.s.*, **2**: 1–7 (in Czech, with a summary in German).
- LALKOVIČ M., 2012: Z histórie jaskyne Aksamitka [From the history of the Aksamitka Cave]. *Aragonit*, **17**: 30–41 (in Slovak, with an abstract in English).
- MATIS Š., UHRIN M., DANKO Š. & KRIŠTOFÍK J., 2012: Lietavec stahovavý (*Miniopterus schreibersii*) [Schreibers’ bat – *Miniopterus schreibersii*]. Pp.: 294–298. In: KRIŠTOFÍK J. & DANKO Š. (eds.): *Cicavce Slovenska – rozšírenie, bionómia a ochrana [Mammals of Slovakia – Distribution, Life History and Protection]*. Veda, Bratislava, 712 pp (in Slovak, with a summary in English).
- MITCHELL-JONES A. J., BIHARI Z., MASING M. & RODRIGUES L., 2007: *Protecting and Managing Underground Sites for Bats. EUROBATS Publication Series No. 2*. UNEP/EUROBATS, Bonn, 38 pp.
- PASZKIEWICZ R., SZKUDLAREK R., WEGIEL A., WEGIEL J. & WEGIEL W., 1995: Materiały do chiropterofauny Pienin. Zimowe stanowiska nietoperzy [Materials to the bat fauna of the Pieniny Mts. Bat hibernacula]. *Przyroda i Człowiek*, **3**: 43–49 (in Polish).
- SACHANOWICZ K., CIECHANOWSKI M. & PIKSA K., 2006: Distribution patterns, species richness and status of bats in Poland. *Vespertilio*, **9–10**: 151–173.
- ŠTOLLMANN A., URBAN P., KADLEČÍK J. & UHRIN M., 1997: Návrh (červeného) zoznamu cicavcov (Mammalia) fauny Slovenskej republiky [A proposal of the (red) list of mammals (Mammalia) of the Slovakian fauna]. *Ochrana Prírody*, **15**: 201–218 (in Slovak, with an abstract in English).

- UHRIN M., LEHOTSKÁ B., BENDA P., LEHOTSKÝ R. & MATIS Š., 1997: Rozšírenie netopierov na Slovensku. Časť 3, *Miniopterus schreibersi* [Distributional patterns of bats in Slovakia. Part 3, *Miniopterus schreibersi*]. *Vespertilio*, **2**: 113–130 (in Slovak, with an abstract in English).
- URBAN P. & UHRIN M., 2014: Draft of the Carpathian Red List of threatened mammals (Mammalia). Pp.: 221–227. In: KADLEČIK J. (ed.): *Carpathian Red List of Forest Habitats and Species. Carpathian List of Invasive Alien Species*. Štátna ochrana prírody Slovenskej republiky, Banská Bystrica, 234 pp.
- VACHOLD J., 1956: K otázke výskytu a rozšírenia netopierov (Chiroptera) na Slovensku [On the question of occurrence and distribution of bats (Chiroptera) in Slovakia]. *Biologické Práce*, **2**: 1–68 (in Slovak).
- WALECKI A., 1881: Fauna zwierząt ssacych Warszawy i jej stosunek do fauny całego kraju [The mammalian fauna of Warsaw and its relationship to the fauna of the whole country]. *Pamiętnik Fizjograficzny*, **1**: 268–291 (in Polish).

received on 28 November 2014