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BATS HIBERNATING IN UNDERGROUND SHELTERS OF MAŁE PIENINY MOUNTAINS (THE CARPATHIAN MOUNTAINS, SOUTHERN POLAND)

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Abstract. Six bat species were observed during winter censuses in years 2005-2009: Lesser horseshoe bat, Mouse-eared bat, Daubenton's bat, Whiskered/Brandt's bat, Northern bat and Brown long-eared bat. *Rhinolophus hipposideros* was most numerous (67% of all bats recorded). Largest hibernaculum on Polish side of range was mine Bania w Jarmucie, with maximum 29 bats during a single control, through the years of research number of species and individuals was increasing. Rarely seen in Outer Carpathians *Eptesicus nilssonii* winter roost was found in Homole Ravine Reserve.

Résumé. Six espèces de chauve-souris ont été observées pendant les recensements d'hiver au cours des années 2005-2009: petit rhinolophe, chauve-souris murine, vespertilion de Daubenton, murin de Brandt, sérotine boréale et oreillard. *Rhinolophus hipposideros* a été la plus nombreuse (67% de toutes les chauve-souris observées). Le plus grand hibernaculum de la zone investiguée en Pologne a été la mine de Bania w Jarmucie, avec un maximum de 29 chauve-souris pendant un seul contrôle, le nombre d'espèces et d'individus croissant au cours des années de recherches. Bien que rarement vu en-dehors des Carpates, un point d'hivernage de *Eptesicus nilssonii* a été découvert dans la réserve de Homole Ravine.

Key words: Southern Poland, Małe Pieniny Mountains, hibernation, *Rhinolophus hipposideros*, six species.

INTRODUCTION

Małe Pieniny is a mountain range in South-East of Poland and northern Slovakia, 14 km long and 4 km broad (Nyka, 2008). Highest point is Wysoka Mt. – 1050 m a.s.l., whole range is formed mainly by limestones with small amount of rocks of volcanic origin (andesite). On the Polish side 48 caves and 3 old mines were found so far (Gubała, 2006 a; Gubała & Urban, 2007), only few of them have right conditions for hibernation of bats.

First report about bats from Pieniny Mountains comes from Sitowski (1922). He described 7 species from this region. Next study also comes from Sitowski (1948), describing 13 species. Following publications only repeated Sitowski's species list or mentioned single observations (e.g. Kowalski, 1953; Ruprecht, 1983; Postawa et al., 1994). Since 1991, Bat Protection Group proNatura conducting their research, in years 1991-1995, they carried out winter censuses in caves and old mines (Paszkiwicz et al., 1995) and several summer studies and observations in Właściwe and Małe Pieniny Mountains (Paszkiwicz et al., 1998; Szkudlarek & Paszkiwicz, 2001). Since 2004 winter censuses and swarming activity are conducted by members of Chiropterological Information Centre and Pedagogical University of Krakow (Gubała, 2006 b).

METHODS

All sites were checked for bats twice in winter: in December, at the beginning of hibernation period and in February/March. Bats were identified to species level without pulling off the walls, due to problems of proper identification whiskered/Brandt's bat. Those species were count together as *M. mystacinus/ brandtii*. Only electric LED-light was used.

RESULTS AND DISCUSSION

During winter censuses within the period 2005-2009, six bat species were observed: Lesser horseshoe bat (*Rhinolophus hipposideros*), Mouse-eared bat (*Myotis myotis*), Daubenton's bat (*Myotis daubentonii*), Whiskered/Brandt's bat (*Myotis mystacinus/brandtii*), Northern bat (*Eptesicus nilssonii*) and Brown long-eared bat (*Plecotus auritus*) - 33% of bat fauna recorded in whole Pieniny Mountains (18 species) (Wołoszyn & Gałosz, 2000; Szkudlarek & Paszkiewicz, 2001).

Rhinolophus hipposideros was the most numerous, the species representing 67% of all recorded bats (Fig. 1); more than 20 individuals were observed during a single census. Largest hibernaculum on Polish side was old mine – Bania w Jarmucie - up to 29 individuals during control (Fig. 2). In that site four more species were found: *M. myotis*, *M. daubentonii*, *M. mystacinus/brandtii* and *P. auritus*. Low number of horseshoe bats, despite large maternity roost in the attic of church in village Jaworki - over 120 individuals (Paszkiewicz et al., 1998), is probably caused by existence of a bigger hibernaculum on the Slovak side of range - Aksamitka cave, where up to 270 bats were recorded (Gubała, unpublished data) or unknown site on Polish side of range. Through years of research, significant increase of number of bats and species was observed, from maximum 3 bats in 1994 (Paszkiewicz et al., 1995) to almost 30 in Bania w Jarmucie in discussed period. It is hard to tell if this increase was caused by growth on maternity roosts or is an effect of protection (“grill” type steel bars in entrance of the mine), nevertheless - works implemented for protection and adjusting microclimate of some undergrounds should improve bat populations' status (Gubała & Urban, 2007). Many new sites, mainly caves in natural reserves in the area, were found throughout the years (Gubała, 2006 a; Gubała & Urban, 2007). These sites are very important for rare and endangered species during hibernation period but probably several shelters are still unknown – it could be indicated based on number of individuals on maternity roosts in whole Pieniny Mountains (unpublished data, Paszkiewicz et al., 1998).

Acronyms used in figures: RHH – *Rhinolophus hipposideros*, MYM – *Myotis myotis*, MDA – *Myotis daubentonii*, MSB – *Myotis mystacinus/brandtii*, ENI – *Eptesicus nilssonii*, PAR – *Plecotus auritus*.

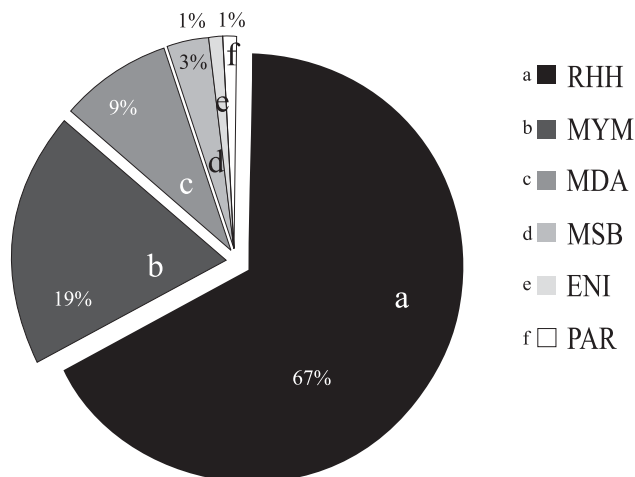


Fig. 1 - The share of the bat species from the total number of bats observed during the winter censuses within the period 2005 - 2009.

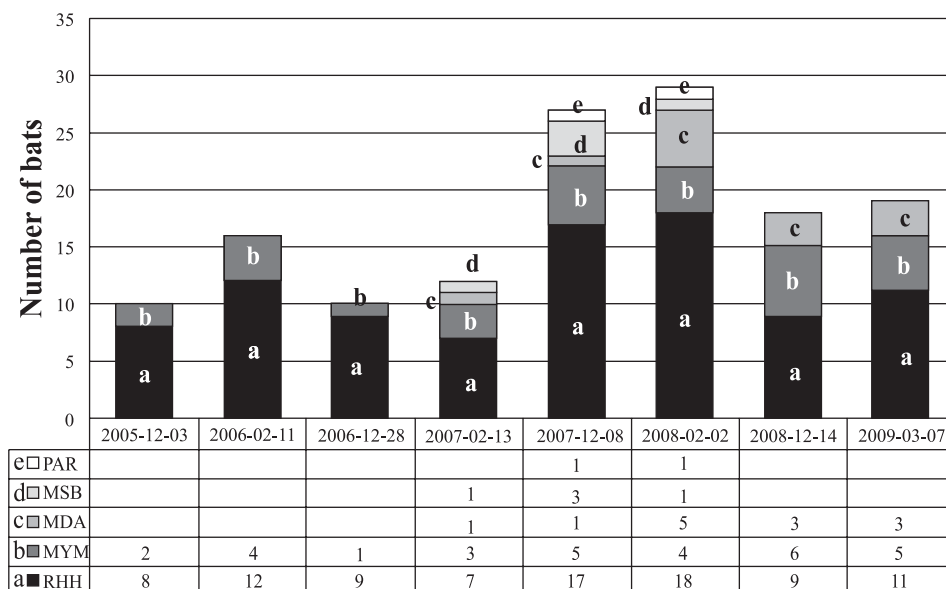


Fig. 2 - The abundance of the bat species observed during winter censuses within the period 2005 - 2009.

In Szczelina Naciekowa cave in Homole Ravine Natural Reserve one individual of northern bat *Eptesicus nilssonii* was recorded twice – this cave, with static cold microclimate, is considered to be a constant site of this species which is rarely seen in winter in undergrounds of Outer Carpathians (Sachanowicz et al., 2006). Two more species, *Rhinolophus ferrumequinum* and *Myotis emarginatus*, observed during winter in Slovak caves in Haligovskie Skaly (Danko et al., 2000, own data) can be found on Polish side.

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HIBERNAREA LILIECILOR ÎN ADĂPOSTURILE SUBTERANE DIN MUNȚII MAŁE PIENINY (MUNȚII CARPAȚI, SUDUL POLONIEI)

REZUMAT

În perioada inventarierii efectuate între 2005 și 2009, au fost observate șase specii de lilieci: liliacul mic cu potcoavă, liliacul comun, liliacul de apă, liliacul mustăcios, liliacul nordic și liliacul urecheat. *Rhinolophus hipposideros* a fost cel mai numeros (67% din toate semnalările). Cel mai mare hibernaculum din partea poloneză a arealului a fost mina Bania w Jarmucie, cu maximum 29 de lilieci în timpul unui singur control. De-a lungul anilor de cercetare numărul speciilor și al indivizilor a crescut. Observat mai rar în Carpații Exteriori, *Eptesicus nilssonii* a fost raportat în adăpostul pentru iernat din Rezervația Homole Ravine.

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