Hystrix It. J. Mamm (n.s.) 16 (2) (2005):179-183

ALTITUDINAL DISTRIBUTION OF THE COMMON LONG-EARED BAT *PLECOTUS AURITUS* (LINNAEUS, 1758) AND GREY LONG-EARED BAT *PLECOTUS AUSTRIACUS* (J. B. FISCHER, 1829) (CHIROPTERA, VESPERTILIONIDAE) IN THE TATRA MOUNTAINS (SOUTHERN POLAND)

KRZYSZTOF PIKSA

Cracow Pedagogical University, Institute of Biology, Podbrzezie 3, 31-054 Cracow, Poland; E-mail: krzychu@ap.krakow.pl

RIASSUNTO - ***Distribuzione altitudinale di Orecchione bruno (*Plecotus auritus*) e Orecchione meridionale (*Plecotus austriacus*) nei Monti Tatra (Polonia meridionale)***. Vengono riportati nuovi dati relativi alla distribuzione altitudinale nei Monti Tatra (Polonia meridionale) di *Plecotus auritus* e *P. austriacus*. Tali segnalazioni incrementano le conoscenze relative alla presenza di questi chirotteri a quote elevate, in particolare per la Polonia. In inverno *P. auritus* è stato rinvenuto a 1921 m s.l.m. mentre in estate è stato rinvenuto a 2250 m s.l.m.; in aggiunta, sono stati ritrovati resti ossei a 1929 m s.l.m. *P. austriacus* è stato segnalato in ibernazione a 1294 m s.l.m.

Key words: Chiroptera, *Plecotus auritus*, *P. austriacus*, altitudinal distribution, hibernation, Poland

The Tatra mountains, spanning across southern Poland and northern Slovakia, are the highest of the whole Carpathian Massif. Although the Tatras (the highest peak: Gerlach 2663 m a.s.l.) are much lower than the Alps, they show truly alpine character and landscape (Mirek, 1996). The data here presented were collected between 1999 and 2004 in the Polish part of the Tatras. Of the five species of genus *Plecotus* inhabiting Europe (Kiefer, 2004) only two occur in Poland: the common long-eared bat *Plecotus auritus* and the grey long-eared bat *P. austriacus* (Kowalski, 1964). The former is found throughout Poland and the latter is restricted to central and southern Poland (Ruprecht, 1983), but some records for north-eastern Poland are known (Kowalski and Lesiński, 1988; Kowalski *et al.*, 1997). Both species were recorded in the Polish part of the Tatras (Piksa, 1998), while in the Slovakian part, only *P. auritus* was observed (Pjenčak *et al.*, 2004). In winter *P. auritus* was more numerous and frequently recorded in the Tatra caves than *P. austriacus*, which was rarely observed (Piksa and Nowak, 2000). Both species were regularly observed at the foothills of the Tatras (Kowalski *et al.*, 1957; Ruprecht, 1983; Harmata, 1990; Pjenčak *et al.*, 2004).

This communication reports on the outcome of a survey carried out in the

Tatra mountains, which led to several new records from high-altitude sites.

Plecotus auritus was found at the following sites:

1. Wyżnia Litworowa Cave 1921 m a.s.l. The length of known corridors is 61 m with 42 m of denivelation (Luty, 1999a). A hibernating specimen was observed only once, on 18th December 2000. During the following year it was not re-observed.
2. Dziura w Grzędzie I Cave 1927 m a.s.l. The length of known corridors is 20 m with 9 m of denivelation (Luty, 1999b). On 14th December 2000 subfossil remains identified as *P. auritus* were collected.

Both these caves are located in the western Tatra mountains.

3. Northern slope of the Świnica Mountain. A dead male common long-eared bat was found on 18th September 2004 at an altitude of 2250 m a.s.l. The site is situated in the High Tatra mountains.

Plecotus austriacus was recorded in:

Czarna Cave (3 openings: 1326 m, 1294 m, 1404 m a.s.l.) in the Organy Massif (the Kościelisko Valley). The length of known corridors is about 6500 m, with 303.5 m of denivelation (Grodzicki *et al.*, 1995). It was observed during the following surveys: on the 13th December 1996 (Postawa T., pers. comm.) 11th February 1997, 3rd February 1999, and 11th February 2000 (Piksa, unpub. data). The cave is situated in the western Tatra mountains.

When describing which species the bats belong to, a number of characteristics were used, enabling one to differentiate these two species from other bats in Europe (differences in colour, length of thumb and thumb claw, length of CM^3, and presence and character of the triangular pad at the lower lip etc.).

P. auritus is a species of relatively great vertical range of occurrence in Europe. Wyżnia Litworowa Cave 1927 m a.s.l. (hibernation period) and the locality on the slope of the Świnica Mountain 2250 m a.s.l. (season of activity) are the highest records for this species in Poland, as well as for the whole Carpathians. In the Polish part of the Tatra mountains, before 2000 it had been observed up to an altitude of 1456 m a.s.l. (Piksa, 1998). In the Slovak Tatras, so far the highest recorded locality is at 1559 m a.s.l. (Pjenčak *et al.*, 2004). Aforementioned localities are among those of the highest elevation in Europe. A higher elevation for *P auritus* during hibernation. was recorded only in the Austrian Alps at 1960 m a.s.l. (Spitzenberger *et al.*, 2002). Information given by Horáček and Đulić (2004) about the occurrence of this species in Europe up to 2350 m a.s.l. in winter (quoted after Arlettaz *et al.*, 1997) is misleading. In fact, at this elevation in the cave, only its remains were found. Hibernation was not observed at this height (c.f. Arlettaz *et al.*, 1997). In the French Alps, in summer, *P. auritus* was observed up to an altitude of 1720 m a.s.l. (Aellen and Strinatti, 1962), and in the Swiss Alps up to 1964 m a.s.l. (Furrer after Aellen, 1961), and in the Dinaric Alps – up to 1600 m a.s.l. (Pavlinić and Tvrtković, 2004). Recently, the highest record in Europe was observed in the Pyrenees during the active season at 2260 m a.s.l. (Bertrand, 1992) and in the Bulgarian mountains – up to 2300 m a.s.l. (Benda

and Ivanova, 2003). Remains of this species were collected at much higher altitude in caves: in the Ligurian Alps in the Abisso dei Caprosci Cave at an altitude of 2435 m a.s.l. (Amelio and Bonzano, 1986), in Jungfrau Massif in the Rottalhöhle at an altitude of 2480 m (Jordi, 1978) and in a Bulgarian cave: Vihrenska Propast (Benda *et al*., 2003) where the entrance is situated at an altitude of ca. 2500 m. Hitherto in the Tatra mountains its subfossil remains have been found at the highest altitude of 1873 m in Małołącka Cave (Piksa and Wołoszyn, 2001).

Plecotus austriacus is a species that lives in the lowlands of Europe. It has a narrower vertical spectrum of occurrence. Hibernating in the foothills of the Slovak Tatra mountains, it was found at 800 m a.s.l. (Pjenčak *et al*., 2004). In the Polish Tatras, it was observed at 1294 m (Piksa, 1998). In the Alps, hibernating *P. austriacus* was observed at an altitude of 1390 m a.s.l. (Spitzenberger and Bauer, 2001). In summer, in the Bulgarian mountains, it reaches up to 1500 m a.s.l. (Benda and Ivanova, 2003), in the Alps up to 1638 m a.s.l. (Deuchler, 1964), and in Poland up to 1036 m (Harmata, 1990). In this same season one specimen of the grey long-eared bat was observed even at an elevation of 2450 m in a Slovenian ice cave (Ivačičeva Jama; Kryštufek, 1989). However, one cannot exclude the possibility that it may be assigned to a newly described species from Europe (c.f. Kiefer, 2004).

ACKNOWLEDGEMENTS

I am grateful to Adriano Martinoli and Danilo Russo for their helpful comments on the manuscript. This work was partly supported by a grant from the State Committee for Scientific Research.

REFERENCES

Aellen V. 1961. Le baguement des chauves-souris au col de Bretolet (Valais). *Arch. Sc*., 14(3): 365-392.

Aellen V. and Strinatti P. 1962. Nouveaux matériaux pour une faune cavernicole de la Suisse. *Rev. suisse Zool*., 69: 25-66.

Amelio M. and Bonzano C. 1986. Osservazioni sui crani di chirotteri raccolti in alcune grotte delle Alpi liguri. Atti del Convegno Int.le sul Carso di alta montagna, Imperia, 2: 283-298.

Arlettaz R., Lugon A., Sierro A. and Desfayes M. (1996) 1997. Les chauves-souris du Valais (Suisse): statut, zoogéographie et écologie. *Le Rhinolophe*, 12: 1-42.

Benda P. and Ivanova T. 2003. Long-eared bats, genus *Plecotus* (Mammalia: Chiroptera), in Bulgaria: a revision of systematic and distributional status. *J. Nat. Mus., Nat. Hist. Ser*. 172(1-4): 157-172.

Benda P., Ivanova T., Horáček I., Hanák V., Červený J., Gaisler J., Gueorguiewa A., Petrov B., and Vohralík V. 2003. Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 3. Review of bat distribution in Bulgaria. *Acta Soc. Zool. Bohem*., 67: 245-357.

Bertrand A. 1992. Données préliminaires sur les chauves souris de la haute chaîne pyrénéenne (Pyrénées ariégoises). *Mammalia*, 56(2): 290-292.

Deuchler K. 1964. Neue Fledermausfunde aus Graüburden. *Rev. suisse Zool*., 71: 559-560.

Grodzicki J., Kondratowicz R., Kotarba S., Luty I., Recielski K. and Zyzańska H.

1995. Czarna cave. In: Grodzicki J. (ed.), The Caves of the Polish Tatra Mountains. Great Caves of the Kościeliska Valley. PTPNoZ, TPN, Warszawa, Vol. 5, 101-126.

Harmata W. 1990. Researches on occurrence, ethology and ecology of the bats *Chiroptera* on Gubałówka Elevation in the Carpathians. *Studia Ośr. Dok. Fizjogr.*, 18: 263-273.

Horáček I. and Đulić B. 2004. *Plecotus auritus* Linnaeus, 1758 – Braunes Langohr. In: Niethammer J. and Krapp F. (eds), Handbuch der Säugetiere Europas, Vol. 4/II, Krapp F. (ed.), Fledertiere (Chiroptera) II. *Aula-Verlag*, Viebelsheim, 953-999.

Jordi M. 1978. Die Rottalhöhle (Jungfraugebiet). *Stalactite*, 28(2): 88-92.

Kiefer A. 2004. Gattung *Plecotus* Geoffroy, 1818 – Langohrfledermäuse. In: Niethammer J. and Krapp F. (eds), Handbuch der Säugetiere Europas, Vol. 4/II, Krapp F. (ed.), Fledertiere (Chiroptera). *Aula-Verlag*, Viebelsheim, 943-952.

Kowalski K. 1964. Bats - Chiroptera. In: Kowalski K., (ed.), Keys to the Vertebrate of Poland. Part V. Mammals – Mammalia. PWN, Warszawa, 83-113.

Kowalski K., Krzanowski A. and Wojtusiak R. 1957. Report on bat-banding in Poland in the years 1939-1953. *Acta Theriol.*, 1(5): 109-158.

Kowalski M. and Lesiński G. 1988. The locality of the grey long-eared bat, *Plecotus austriacus* (Fischer, 1829) in north-eastern Poland. *Przegl. Zool.*, 32(1): 91-94.

Kowalski M., Lesiński G. and Sachanowicz K. 1997. The occurrence of grey long-eared bat *Plecotus austriacus* (Fischer, 1829) on the Podlasie and Mazovia Lowlands and diagnostic characters of the Polish members of the genus *Plecotus* Geoffroy, 1818. *Przegl. Zool.*, 61(1-2): 95-100.

Kryštufek B., 1989. Distribution of bats in Slovenia (Yugoslavia). In: Hanák V., Horáček I. and Gaisler J. (eds), European Bat Research 1987. Charles University Press, Praha, 393-397.

Luty I. 1999a. Dziura w Grzędzie I Cave. In: Grodzicki J. (ed.), The Caves of the Polish Tatra Mountains. The caves of the Miętusia Valley. PTPNoZ, TPN, Warszawa, Vol. 7, 144-146.

Luty I., 1999b. Wyżnia Litworowa Cave. In: Grodzicki J. (ed.), The Caves of the Polish Tatra Mountains. The caves of the Miętusia Valley. PTPNoZ, TPN, Warszawa, Vol. 7, 148-150.

Mirek Z. 1996. The Tatra mountains and the Tatra National Park – general information. In: Mirek Z., Głowaciński Z., Klimek K. and Piękoś-Mirkowa H. (eds), Nature of the Tatra National Park. TPN, Kraków-Zakopane, *Tatry i Podtatrze*, 3: 17-26.

Piksa K. 1998. The chiropterofauna of the Polish Tatra Mountains. *Vespertilio*, 3: 93-100.

Piksa K. and Nowak J. 2000. The bat fauna of the Polish Tatra Caves. In: Wołoszyn B. W. (ed.), Proc. VIIIth EBRS. Approaches to Biogeography and Ecology of Bats. CIC ISEZ PAN, Kraków, Vol. 1, 181-190.

Piksa K. and Wołoszyn B.W., 2001. Postglacial bat remains from the Polish Tatra Caves. *Lynx*, n. s., 32: 301-311.

Pavlinić I. and Tvrtković N. 2004. Altitudinal distribution of four *Plecotus* species (Mammalia, Vespertilionidae) occuring in Croatia. *Nat. Croat.*, 13: 393-401.

Pjenčak P., Danko Š. and Matis Š. 2004. Bats of the Tatra National Park and its wider surroundings (northern-central Slovakia). *Vespertilio*, 7: 139-160.

Ruprecht A. 1983. Bats (Chiroptera). In: Pucek Z. and Raczyński J. (eds), Atlas of Polish Mammals. PWN, Warszawa, 27-82.

Spitzenberger F. and Bauer K. 2001. Graues Langohr *Plecotus austriacus* (J. B. Fischer, 1829). In: Spitzenberger F. (ed.), Die Säugetierfauna Österreichs. Grüne Reihe des Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft Bd. 13. Wien, 302-308.

Spitzenberger F., Haring E. and Tvrtković N., 2002. The genus *Plecotus* in Austria. Abstracts of IXth European Bat Research Symposium, Le Havre, 3.