

New Distributional Records and Some Notes for Greater Noctule, *Nyctalus lasiopterus* (Mammalia: Chiroptera) from Turkey

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Abstract: The greater noctule, *Nyctalus lasiopterus* is one of the least known vespertilionid bats in Turkey, and more information is needed to evaluate its presence in Turkey. In this study, we report the species from Anatolia and the European part of Turkey. This is the first record from the European part of Turkey with an unusual roosting site. The recent records of *N. lasiopterus* from Turkey indicate that the species has a wide range in Turkey as a resident species, and its roosting habitats are represented by mainly mountainous and coniferous forests in Turkey.

Key words: *Nyctalus lasiopterus*, distribution, habitat, Turkey

Introduction

The vespertilionid genus *Nyctalus* is represented by three species in Europe (MITCHELL–JONES *et al.* 1999, DIETZ AND VON HELVERSEN 2004, SIMMONS 2005), all of which occur in Turkey. The greater noctule, *Nyctalus lasiopterus* (Schreber, 1780) is the largest and the least known species of all. Although *N. lasiopterus* is a widespread species which ranges from Northwestern Africa to Central Europe and Western Europe to Central Asia (KOOPMAN 1994, HORÁČEK *et al.* 2000, IBÁÑEZ *et al.* 2004, SIMMONS 2005), there is little information on distribution and habitat preference of the species.

N. lasiopterus is known as a typical tree–dwelling bat, roosting in tree cavities in mixed forests, mainly deciduous forests (IBÁÑEZ *et al.* 2004, ESTÓK *et al.* 2007, POPA–LISSEANU *et al.* 2008, LÓPEZ–GARCÍA *et al.* 2009). Also, the species is reported from unusual roosts, in a cave (TVRTRKOVIC AND BALTIC 1996), in a cellar of castle (BECK AND GEBHARD 2000), and in an offshore platform (KARATAŞ *et al.* 2007).

In many European countries, there are only several known distribution localities of *N. lasiopterus* (IBÁÑEZ *et al.* 2004). Until now the species had only been known from three localities in Turkey from Anatolia, Bursa (KAHMAN 1962), Rize (KARATAŞ *et al.* 2007), and Antalya (YIĞIT *et al.* 2008). The occurrence of the species in Turkey is still questionable, and more information is needed to evaluate its distribution and abundance in Turkey.

The aim of the present study is to present new distributional records of *N. lasiopterus* from Turkey and to contribute to understand the presence and the habitat preference of the species in Turkey.

Material and Methods

The study represents new records of *N. lasiopterus* from Turkey (Fig. 1). On the 24th of August 2007, a male specimen (2007/71) was mist–netted with other species (*Nyctalus noctula*, *Nyctalus leisleri*, *Myotis*

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daubentonii, *Myotis alcathoe*, *Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*) near a small stream in the Forest of Mount Ağı in Çan – Çanakkale (39°52' N; 26°54' E; 437 m). This mountainous region is represented with a mixed forest which contains mainly *Abies nordmanniana*, *Pinus nigra* and *Quercus petraea* tree species. A female record (2008/2) on the 26th of April 2008 was captured when it was in torpor in the cellar of a building in Keşan – Edirne (40°49' N; 26°39' E; 201 m). This area is mountainous and covered by *Pinus brutia* forest. In addition, in April of 2006, we observed the foraging animals of *N. lasiopterus* above Meriç River in Edirne.

N. lasiopterus is a rather large species with a forearm length (61–70 mm) (DIETZ AND VON HELVERSEN 2004) and body weight (41–76 g) (MACDONALD AND BARRETT 1993, SCHÖBER AND GRIMMBERGER 1993) and is clearly identified from the other European species of the genus *Nyctalus* by using forearm length. The recorded animals were measured and examined in their morphological characteristics (Table 1, 2). The specimens were skinned and stuffed in a standard museum manner and deposited at the Department of Biology, Trakya University.

Results and Discussion

Until now the greater noctule was recorded from only Anatolia in Turkey, and all records were collected in the summer period (KAHMAN 1962, KARATAŞ *et al.* 2007, YİĞİT *et al.* 2008). The earlier data of *N. lasiopterus* were not sufficient to prove the hibernation



Fig. 1. The localities of *N. lasiopterus* records in Turkey. (closed symbols: recorded animals, open symbols: observed flying animals, 1–Bursa, 2–Rize, 3–Antalya, 4–Çanakkale, 5 and 6–Edirne).

of the species in Turkey. The present study represents the records of *N. lasiopterus* from Anatolia and the European part of Turkey. This is the first record from the European part of Turkey with an unusual roosting site which is the cellar of a building. It was a female in torpor and light in weight (32 g) in the middle of spring, so we can assume that it might hibernate in there, or be a migrating bat for nursing period. YİĞİT *et al.* (2008) recently reported 4 female specimens of *N. lasiopterus* from Anatolia in August of 2006. The female records which were in the spring and summer period could support the possibility of breeding of *N. lasiopterus* in Turkey, although there are no records of pregnant, lactating females, and juveniles. It has been suggested that *N. lasiopterus* is a migratory species (BENDA *et al.* 1998, IBÁÑEZ *et al.* 2004). Because there was only one record about the occurrence of *N. lasiopterus* in Turkey until 2000s, it was considered as a migratory vagrant (BENDA *et al.* 1998, KARATAŞ *et al.* 2007). The recent records

Table 1. The body measurements of *Nyctalus lasiopterus* specimens (in mm). Abbreviations: TBL–total body length, TL–tail length, TiL–tibia length, FAL–forearm length, D5–fifth digit length, D3–third digit length, WSP–wingspan length, W–weight (g).

No	Date	Locality	Sex	Age	TBL	TL	TiL	FAL	D5	D3	WSP	W
2007/71	24.08.2007	Çanakkale	♂	adult	154	59	22.8	65.6	72	109	445	53
2008/2	26.04.2008	Edirne	♀	adult	149	61	22.4	64.1	68	108	432	32

Table 2. The cranial measurements of *Nyctalus lasiopterus* specimens (in mm). Abbreviations: ZW–zygomatic width, IC–interorbital constriction, GLS–greatest length of skull, CBL–condylobasal length, RW–rostrum width, MAW–mastoid width, WB–width of braincase, HB–height of braincase, MAL–mandible length, CM³–upper tooth row, CM₃–lower tooth row.

No	ZW	IC	GLS	CBL	RW	MAW	WB	HB	MAL	CM ³	CM ₃
2007/71	15.4	5.9	21.8	22.4	10.1	14.3	11.2	8.5	17.6	9.3	9.9
2008/2	15.3	5.9	21.5	22.3	10.0	14.0	11.4	8.2	17.4	9.0	9.7

of *N. lasiopterus* from Anatolia could strengthen the wide range and the presence of local populations of the species in Asia.

The habitat preference of *N. lasiopterus*, which largely seem to depend on the development of mature forests, where hollow trees may provide day roosts (LÓPEZ-GARCÍA *et al.* 2009). The species roosts in tree cavities including both deciduous and coniferous species (IBÁÑEZ *et al.* 2004, UHRIN *et al.* 2006, ESTÓK *et al.* 2007, POPA-LISSEANU *et al.* 2008, LÓPEZ-GARCÍA *et al.* 2009). We collected the species from mixed and pine forests in mountainous regions. Moreover, YİĞİT *et al.* (2008) reported the species from a mountainous area covered by cedar forest in Turkey. At present, the records of *N. lasiopterus* from Turkey indicate that its habitat is linked to mountainous forest regions which contain mostly coniferous trees (*Abies nordmanniana*, *Pinus nigra*, *Pinus brutia*, *Cedrus libani*). Despite the fact that *N. lasiopterus* has been observed at high altitude flights in open spaces it has not been documented for foraging (DONDINI AND VERGARI 2000, ESTÓK *et al.* 2007, POPA-LISSEANU *et al.* 2007, ESTÓK AND SIEMERS 2009). On the other hand, DONDINI and VERGARI (2000) indicated that the greater noctule could forage close to the ground because of the presence of terrestrial arthropods such as Opiliones and Araneae in its diet. Besides, the species has been captured and observed in low flights close to the ground (AHLEN 1990, VERGARI *et al.* 1997). The male specimen in Çanakkale was mist-netted when it was flying low in a narrow corridor which is completely covered by trees in forest. According to these records, *N. lasiopterus* could forage inside the forest, and this may

mean that it needs the large extensions of forest. However, when considered the species can also fly low in narrow corridors, the large forest extensions it needs may not as much as considered.

Even though the number of localities in Turkey increased to six with the last records of *N. lasiopterus*, the number of records of the species in Turkey is fairly few compared with the data from Bulgaria and Greece (BENDA *et al.* 1998, 2003, HANÁK *et al.* 2001). In addition, the presence of the species in Bulgaria has been largely recorded from Strandzha Mountain which is continued with the same features in Turkey (BENDA *et al.* 2003). It is interesting, that the species has not been recorded from the Turkish part of Strandzha Mountain where the other species of the genus *Nyctalus* were recorded in (BENDA *et al.* 1998, PAKSUZ AND ÖZKAN 2008). The greater noctule is a fast and agile flier, adapted for high altitude foraging in open space, so mist-netting of the species could be rather difficult. LÓPEZ-GARCÍA *et al.* (2009) stated that the specific requirements of *N. lasiopterus* are probably responsible for the low densities and patchy distribution records that characterize this species, in spite of its relatively wide geographical range. Besides, the low densities and patchy distribution records can be a result of the difficulty in recording of the greater noctule.

In conclusion, there are not enough records yet to determine the seasonal population size and the roost use of *N. lasiopterus* in Turkey, however our findings indicate that *N. lasiopterus* ranges in the whole territory of Turkey as a resident species. Further studies should be conducted in ecology of the populations of *N. lasiopterus* in Turkey.

References

- AHLEN I. 1990. Identification of bats in flight. Swedish Society for Conservation of Nature & The Swedish Youth Association for Environmental Studies and Conservation, Sollentuna/Stockholm, 50 p.
- BECK A., J. GEBHARD 2000. Riesenabendsegler (*Nyctalus lasiopterus*) im Schloss Hallwyl, Kanton Aargau, gefunden. – *Pro Chiroptera*, **1**: 1-3.
- BENDA P., I. HORÁČEK 1998. Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 1. Review of distribution and taxonomy of bats in Turkey. – *Acta Societatis Zoologicae Bohemicae*, **62**: 255-313.
- BENDA P., T. IVANOVA, I. HORÁČEK, V. HANÁK, J. ČERVENÝ, J. GAISLER, A. GUEORGUIEVA, B. PETROV, V. VOHRALÍK 2003: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 3. Review of bat distribution in Bulgaria. – *Acta Societatis Zoologicae Bohemicae*, **67**: 245-357.
- DIETZ C., O. VON HELVERSEN 2004. Illustrated identification key to the bats of Europe. Tuebingen and Erlangen (Germany), Electronic publication Version 1, 72 p.
- DONDINI G., S. VERGARI 2000. Carnivory in the greater noctule bat (*Nyctalus lasiopterus*) in Italy. – *Journal of Zoology, London*, **251**: 233-236.
- ESTÓK P., B. M. SIEMERS 2009. Calls of a bird-eater: echolocation behaviour of the enigmatic greater noctule, – *Nyctalus lasiopterus*. *Acta chiropterologica*, **11** (2): 405-414.
- ESTÓK P., P. GOMBKOTÓ AND T. CSERKESZ 2007. Roosting behaviour of the greater noctule *Nyctalus lasiopterus* Schreber, 1780 (Chiroptera, Vespertilionidae) in Hungary as revealed by

- radio-tracking. – *Mammalia*, **71**: 86-88.
- HANÁK V., P. BENDA, M. RUEDI, I. HORÁČEK, T. S. SOFIANIDOU 2001. Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 2. New records and review of distribution of bats in Greece. – *Acta Societatis Zoologicae Bohemicae*, **65**: 279-346.
- HORÁČEK I., V. HANÁK, J. GAISLER 2000. Bats of the Palearctic region: a taxonomic and biogeographic review. Pp.: 11-157. – In: WOŁOSZYN B. W. (Ed.): Proceedings of the VIIIth European Bat Research Symposium. Vol. I. Approaches to Biogeography and Ecology of Bats. Kraków: Chiropterological Information Center, Institute of Systematics and Evolution of Animals PAS, 280 p.
- IBÁÑEZ C., A. GUILLÉN, W. BOGDANOWICZ 2004. *Nyctalus lasiopterus* (Schreber, 1780) – Riesenabendsegler. Pp: 695-716. – In: KRAPP F. (Ed.): Handbuch der Säugetiere Europas. Band 4: Fledertiere. Teil II: Chiroptera II. Vespertilionidae 2, Molossidae, Nycteridae. Wiebelsheim: Aula-Verlag, x+605-1186 p.
- KAHMANN H. 1962. Neue Ergebnisse in der Säugetierforschung in der Türkei. – *Säugetierkundliche Mitteilungen*, **10**: 112-116.
- KARATAŞ A., Ş. ÖZKURT, D. KOCK 2007. The recovery of *Nyctalus lasiopterus* (Schreber, 1780) (Chiroptera: Vespertilionidae) in Turkey. – *Acta Zoologica Cracoviensia*, **50A**: 53-56.
- KOOPMAN K.F. 1994. Chiroptera: Systematics. Pp. 1-217. – In: J. NIETHAMMER, H. SCHLIEMANN and D. STARK (Eds.): Handbook of Zoology, Vol. VIII Mammalia, Part 60. Walter de Gruyter, Berlin, New York.
- LÓPEZ-GARCÍA J.M., P. SEVILLA and G. CUENCA-BESCÓS 2009. New evidence for the greater noctule bat (*Nyctalus lasiopterus*) in the Late Pleistocene of western Europe. – *Comptes Rendus Palevol*, **8**: 551-558.
- MACDONALD D.W., P. BARRETT 1993. Mammals of Britain and Europe. Harper Collins, London, 448 p.
- MITCHELL-JONES A. J., G. AMORI W. BOGDANOWICZ B. KRYŠTUFEK P. J. H. REIDERS F. SPITZENBERGER M. STUBBE J. B. M. THISSEN V. VOHRALÍK, J. ZIMA 1999. The Atlas of European Mammals. T & A D Poyser, Academic Press, London.
- POPA-LISSEANU A. G., F. BONTADINA O. MORA and C. IBÁÑEZ 2008. Highly structured fission-fusion societies in an aerial-hawking, carnivorous bat. – *Animal Behaviour*, **75**: 471-482.
- POPA-LISSEANU A.G., A. DELGADO-HUERTAS, M. FORERO, A. RODRÍGUEZ, R. ARLETTAZ, C. IBÁÑEZ 2007. Bats' conquest of a formidable foraging niche: the myriads of nocturnally migrating songbirds. – *PLoS ONE* **2**(2): e205. doi:10.1371/journal.pone.0000205.
- SCHOBER W., E. GRIMMBERGER 1993. Bats of Britain and Europe. 2nd ed. Hamlyn, London, 224 p.
- SIMMONS N.B. 2005. Order Chiroptera. Pp.: 312-529. – In: WILSON D. E. & REEDER D. M. (Eds.): Mammal Species of the World. A Taxonomic and Geographic Reference. Third Edition. Volume 1. Baltimore: The John Hopkins University Press, xxxviii+743 p.
- TVRTKOVIC N., M. BALTIC 1996. Giant noctule (*Nyctalus lasiopterus* Schreber, 1780), first refinding in Croatia (Mljet Island) after 69 years. – *Natura Croatica*, **5**: 89-93.
- UHRIN, M., P. KAŇUCH, P. BENDA, E. HAPL, H. D. J. VERBEEK, A. KRISTIN, J. KRISTOFIK, P. MAŠAN, M. ANDREAS 2006. On the greater noctule (*Nyctalus lasiopterus*) in central Slovakia. – *Vespertilio*, **9-10**: 183-192.
- VERGARI S., G. DONDINI, P. AGNELLI 1997. Supplementary records of Greater Noctule (*Nyctalus lasiopterus* Schreber, 1780) in Italy. – *Myotis*, **35**: 111-112.
- YIĞIT N., Ş. BULUT, A. KARATAŞ, P. ÇAM, F. SAYGILI, E. ÇOLAK 2008. Contribution to distribution, morphological peculiarities and karyology of the Greater noctule *Nyctalus lasiopterus* (Chiroptera: Vespertilionidae) in Southwestern Turkey. – *Turkish Journal of Zoology*, **32**: 53-58.

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