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New record and current status of *Nyctalus lasiopterus* in Ukraine (Chiroptera: Vespertilionidae)

Новая находка и современный статус *Nyctalus lasiopterus* в Украине (Chiroptera: Vespertilionidae)

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Abstract. An immature male of the greater noctule, Europe's largest bat species, was netted on the Ilya River (51° 24' N, 29° 37' E) in the Chernobyl Exclusion Zone (northern Ukraine) during the night of 29–30 July 2009. This is the first record of the species in Ukraine in the last 50 years. All available data on the greater noctule obtained within the present borders of Ukraine since 1898 are also analyzed in the paper. Together with the latest finding, the total number of records of the greater noctule in Ukraine is 35 (64 specimens) at 19 localities. The total area used by the species in the breeding season was nearly 200,000 km^2 in the middle of the 20th century and only one specimen has been found there since that. On one hand our review suggests that the population of the greater noctule is in critical state, and needs higher conservation status than it has now, on the other hand it demonstrates a low level of bat research activities in Ukraine.

Key words. *Nyctalus lasiopterus*, faunistic records, range, Chernobyl zone.

INTRODUCTION

The greater noctule *Nyctalus lasiopterus* (Schreber, 1780) is one of the rarest bat species in Europe, especially in the eastern part (Kuzyakin 1980). In Ukraine, the last documented records include an individual taken in 1955 and a mandible found in droppings of a rock marten in the Crimea Peninsula in 1970 (Konstantinov et al. 1974). Since that no other findings of the greater noctule have been made in Ukraine. In the neighbouring countries, this species is also rare. In Russia, there are a few recent records in the northern Caucasus (Gazaryan & Bakhtadze 2002) and in the Middle Volga Province (Smirnov pers. comm.). In Belarus, only an old record from 1930 is available (Kuzyakin 1980). Two records were made in Poland (Sachanowicz et al. 2006), and eight records in Slovakia (Uhrin et al. 2006). A sudden finding of the species in Ukraine in 2009 and the generally poor knowledge on the state and status of the greater noctule prompted us to summarize information for Ukraine, one of the biggest parts of the species' range.

MATERIAL AND METHODS

Survey of bats in the Chernobyl Exclusion Zone (northern Ukraine) was conducted during three consecutive summer seasons in 2007–2009. The animals were caught using mist-nets as the main method on the banks of the Pripyat and Uzh rivers, little rivers and streams, near ponds, at forest edges and on roads, and in abandoned settlements. After examination and ringing, the captured individuals were released at the same sites. Altogether we caught more than 1300 specimens of 12 species (*Myotis daubentonii*, *M. dasycneme*, *M. mystacinus*, *Nyctalus leisleri*, *N. noctula*, *N. lasiopterus*, *Eptesicus serotinus*, *Pipistrellus pygmaeus*, *P. nathusii*, *P. kuhlii*, *Vespertilio murinus*, and *Plecotus auritus*; see also Gashchak et al. 2009).

We also analysed all available data on the greater noctule obtained within the present borders of Ukraine since 1898 (the first record) until the present day (for data details see the Appendix). All records were classified in the following way: type of locality (natural zone), season and status of the record. Only the data on capture or type of evidence of the species were included. The published records of visual observations of flying "very large bats" (Merzlikin & Ledid 1998, Bulahov & Chegorka 1998) were not used in this review and analysis. Records with unspecified numbers of the greater noctule were considered as one specimen.

RESULTS

On the night of 29–30 July 2009, an immature male greater noctule (forearm length 68.7 mm; weight 41.1 g; ring code ET01500) was caught using a mist-net (4×12 m) placed over a little wooden bridge on the Ilya River in the Chernobyl Exclusion Zone (see Appendix). The surrounding habitat consisted of a mixed forest comprised mainly of pine trees that are 60–100 years old. The forest also includes oak, birch, hornbeam, alder, aspen and ash trees. There were also nearby stands of old deciduous forests (oaks up to 150–200 years old and older, hornbeam, aspen, lime and ash trees). The river bed and many parts of the forest were swamped. On that night we caught 113 individuals of six species (besides *N. lasiopterus* also *Nyctalus noctula*, *N. leisleri*, *Pipistrellus pygmaeus*, *Plecotus auritus*, and *Vespertilio murinus*).

Together with the latest finding, the total number of greater noctule records in Ukraine over more than a century is 35 from 19 localities, including 64 specimens. The records can be divided into two conditional groups: northern and southern (Fig. 1). Records from the northern group were obtained in the northern part of the steppe natural zone, in forest-steppe and forest zones, and were related to warm seasons of the year, the earliest annual record being made on 11 April (1948) and the latest on 9 September (1934). Adult females and males, and young-of-the-year were recorded. All records of the species colonies were reported from tree hollows. Therefore, all these locations can be considered as breeding areas for the greater noctule in Ukraine.

The southern group of records was obtained in steppe regions along the Black Sea, mainly in the period of autumn migrations, from the end of August till mid October (Zubko 1937). Some greater noctules were also found in buildings (attics). The records in Crimea could be examined separately (records 5, 33 and 34; locality 4; see Appendix). The bone remains of a greater noctule were found in droppings of a rock marten in winter 1970. This could be an evidence of wintering of the greater noctule in the Crimean mountain forests, or the droppings could have remained from autumn.

One specimen, or unknown numbers, of the greater noctule were found in most of the localities (n=12). The maximum number of individuals caught in the Gomolshansky Forest (locality 3; see Appendix), included 13 adult females in one colony. It was the largest known colony of the species in Eastern Europe (Kuzyakin 1980). Most of the records came from the period 1930–1940.

DISCUSSION

In spite of the fact that the finding of the greater noctule in 2009 was the first for over a half-century, this species was never considered endangered or nearly extinct in Ukraine. However, such contradictory circumstances reflect the absence of corresponding studies rather than the absence of the species, since for a long time there was only one reliable way to identify the greater noctule – to catch it. Modern techniques which are often applied elsewhere in Europe allow identification of the greater noctule using also their echolocation calls (e.g. Вес et al. 2008, Estók & Siemers 2009). However, such equipment is not widely used and available in Ukraine. But even simple mist-netting or trapping at the bat roosts were rare over the last 50 years. Thus there have been no recent studies which could potentially reveal presence of the species, including in those regions where the greater noctule was recorded in the past. In this respect such regions could be divided into three categories: (1) areas where no bat studies have

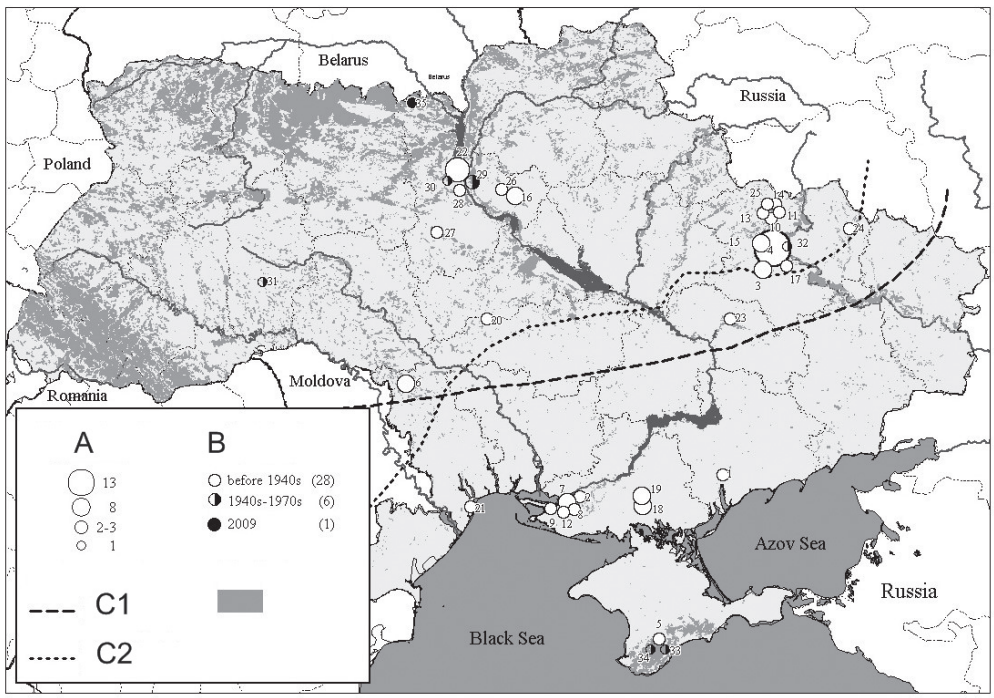

Fig 1. Spatial pattern of records of greater noctules in Ukraine. Numbers in the map correspond to the numbers of the records in the Appendix. A – total number of specimens, B – period of records, C1 – the southern border of breeding range of the greater noctule, C2 – border between the forest-steppe and steppe natural zones, grey colour – woodland areas.

Рис. 1. Распределение находок гигантской вечерницы в Украине. Номера на карте соотвествуют номерам находок в Приложении (Appendix). A – общее число экземпляров, B – период, когда был сделана находка, C1 – южная граница выводковой области гигантской вечерницы, C2 – граница между природными зонами степи и лесостепи, серым выделены лесные территории.

been conducted recently; (2) areas where more or less regular studies have been conducted but catching was not applied too often; (3) areas where mist-netting and tree-roost investigation are the primary methods of collecting bats.

Geographically, areas of category 1 are situated in central and southern continental Ukraine (Fig. 1; localities 1, 2, 5–7, 9–13 and 15–18). The Crimean Peninsula (locality 4) might be also partially included in category 1, as there were no bat studies performed in the mountain forests where the greater noctule had been found in the past. However, bat research has been currently carried out in other parts of Crimea (e.g. Godlevskaya et al. 2009). The areas of category 2 include vicinities of the Kiev and Kharkov cities and the Khmelnitsky region (Fig. 1; localities 8, 14 and 18), where studies are mainly conducted using the simplest ultrasonic detection (heterodyne, without the analysis of spectrograms) and/or aimed at bat survey in hibernacula in buildings or in underground roosts (e.g. Tyshchenko et al. 2005, Godlevskaya 2007, Vlaschenko & Gukasova 2009b). These methods are not appropriate for revealing the greater noctule.

In the last ten years there was only one region of category 3 – the Gomolshansky Forest ("Gomilshansky Lessy National Nature Park), studied since 2004 (Fig. 1; locality 3). In 1915 A. A. Migulin caught fifteen greater noctules including 13 females from one roost at this site. All specimens were processed for museum collections. In the same region five more individuals were caught in 1938 by different researchers (Moskovsky 1941, Lisetsky & Kunichenko 1952). In 1955 A. S. Lisetsky obtained one more female there. Finally, a more doubtful record of the greater noctule presence was made in the 1960s by V. P. Krivolapov (pers. comm.): "students found an ill noctule bat on a tree trunk, and it died soon" (not listed in the Appendix). During the last 10 years (1999–2009), no greater noctules were recorded there, though intensive searches of forest-dwelling bats were carried out, and more than 2000 individuals of 10 species (*Myotis dasycneme*, *M. daubentonii*, *M. brandtii*, *Nyctalus noctula*, *N. leisleri*, *Pipistrellus nathusii*, *P. pygmaeus*, *Vespertilio murinus*, and *Plecotus auritus*) were caught by mist-nets or tree-roost traps (Vlaschenko 2005, Vlaschenko & Gukasova 2009). Thus, over a 40–80-year period, the greater noctule gradually disappeared from the Gomolshansky Forest. Factors that could cause this disappearance may include the collecting of nursery colonies in 1915, extensive harvesting of the forests resulting in habitat destruction, and the use of pesticides that may have been fatal to insectivorous bats. Unfortunately so far no data are available on characteristics of the species nursery roosts in Ukraine. In Hungary, greater noctule females preferred 150–200 year old forests (Estók et al. 2007). If this is a key requirement of the species, it could be the reason of its disappearance in the Gomolshansky Forest since the old forest areas were gradually reduced there. However, this does not seem to be convincing, the total amount of hollow trees was not decreased, providing great opportunities for any tree-dwelling bats including two other noctule species. Moreover, the population of *N. noctula* increased by nine times during the same period (Vlaschenko 2005).

Our knowledge concerning the greater noctule seems even more unclear and controversial since the history of records in neighbouring Hungary is characterized by an opposite trend, both in the number and in the period of the records: there were only 3 records before 1990, and 28 captures by mist-nets thereafter (Estók & Gombkötő, 2007). The available data suggest reduction of the greater noctule's breeding range in Ukraine. However, the finding of a young-of-the-year male in the Chernobyl Exclusion Zone indicates that this species at least still breeds in the old forests of the north of Ukraine. The vast abandoned woodlands and low level (or absence) of human activity are favourable for the greater noctule and other endangered species in the Chernobyl Exclusion Zone (Baker & Chesser 2000, Gashchak et al. 2006).

The distance between the outermost localities in Ukraine where the greater noctule had previously been found in the breeding season is approximately 770 km west-east and 280 km north-south, amounting to nearly 200,000 km^2 in total in the middle of the 20th century. However, only one specimen was found there after that. This suggests that the population of the greater noctule is in critical state, and needs higher conservation status than it has now (global IUCN status: Lower Risk/near threatened, Hutson et al. 2008). It also indicates the need for additional study in Ukraine. Those areas where the greater noctule had been previously recorded (e.g. Dnepropetrovsk and Khmelnitsky regions, vicinity of Kiev, and the south of Ukraine) should be investigated first of all.

РЕЗЮМЕ

Молодой самец гигантской вечерницы, крупнейшего европейского вида рукокрылых, был пойман паутинной сетью на реке Илья (51° 24' с.ш.; 29° 37' в.д.) в Чернобыльской Зоне Отчуждения (Северная Украина) 29–30 июля 2009 года. Это первая находка данного вида на Украине за прошедшие 50 лет. В статье представлен анализ всех доступных данных по находкам гигантской вечерницы в Украине в ее современных границах, начиная с 1898 года. Всего, с учетом находки, представленной в данной статье, в Украине было сделано 35 находок гигантской вечерницы (64 особи) в 19-ти точках. Площадь выводковой части ареала этого вида составляла в Украине не менее 200 000 км^2 в середине XX столетия, в настоящее время была сделана только одна находка. С одной стороны, наш обзор свидетельствует о том, что популяция гигантской вечерницы находится в критическом состоянии и нуждается в более высоком охранном статусе, чем имеет сейчас. С другой стороны, редкость находок этого вида может отражать низкий уровень активности изучения рукокрылых в Украине.

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APPENDIX

List of known records of *Nyctalus lasiopterus* in Ukraine; R – number of record, S – number of site, C – colony, TH – tree hollow, *Nn* – *Nyctalus noctula*, *Nl* – *Nyctalus leisleri*, *Pa* – *Plecotus auritus*, *Ta* P – *Tyto alba* pellets, *Mf* D – *Martes foina* droppings

R	S	date	site	description	author (reference)
1	1	20 Sept. 1898	Melitopol, Zaporozhye Reg. 46° 51' N, 35° 21' E	1♀	(Brauner 1911)
2	2	[1900–1910]	Kherson, Kherson Reg. 46° 37' N, 32° 35' E	1♀	(Brauner 1911)
3	3	4 May 1915	Koropovo, Kharkov Reg. 49° 35' N, 36° 20' E	2♀♀ad	(Migulin 1915)
4	3	5 May 1915	Koropovo	C in old pear TH 13♀♀ad + 6 *Nn*	(Migulin 1915)
5	4	[1920–1930]	Crimean Res., Crimea Reg. 44° 44' N, 34° 12' E	?	(Abelentsev et al. 1956)
6	5	9 Sept. 1934	Elenovka, Odessa Reg. 47° 57' N, 29° 30' E	1♂, 1♀	B. M. Popov (Abelentsev et al. 1956)
7	6	6 Sept. 1935	Hola Prystan, Kherson Reg. 46° 31' N, 32° 31' E	2♂♂	(Zubko 1937)
8	6	6 Oct. 1935	Hola Prystan	C in acacia TH	(Zubko 1937)
9	7	7 Oct. 1935	Rybal'che, Kherson Reg. 46° 28' N, 32° 14' E	1 ind.	(Zubko 1937)

R	S	date	site	description	author (reference)
10	8	24 Sept. 1936	Kharkov env., city forest-park zone, 50° 03’ N, 36° 15’ E	1♂ in oak TH	(Moskovsky 1941)
11	8	19 Aug. 1936	Kharkov env.	1♀ + 1 *Nn* C in oak TH	(Moskovsky 1941)
12	6	28 Aug. 1936	Hola Prystan	1 ind.	(Zubko 1937)
13	8	Summer 1937	Kharkov env.	1 ind. + ∞ *Nn* C in oak TH	(Moskovsky 1941)
14	8	24 June 1937	Kharkov env.	1♂ + 10♀♀ *Pa* C in pear TH	(Moskovsky 1941)
15	3	18 April 1938	KNU Biostation, Kharkov Reg. 49° 37’ N, 36° 19’ E	3♀♀ad + 23♀♀ *Nn* C in aspen TH	(Moskovsky 1941)
16	9	25 June 1938	Semenovka, Kiev Reg. 50° 15’ N, 31° 30’ E	3 inds. in *Ta* P	(Abelentsev et al. 1956)
17	3	26 June 1938	Koropovo	1♂ + 3♀♀ *Nl* C in lime TH	(Moskovsky 1941)
18	10	17 Sept. 1938	Askaniia Nova Res., Kherson Reg., 46° 27’ N, 33° 52’ E	2♀♀ + 1♂, 6♀♀ *Nn* C in lime TH	B. M. Popov (Abelentsev et al. 1956)
19	10	20 Sept. 1938	Askania Nova Res.	1♂, 1♀ + 3 *Nn* C in poplar TH	B. M. Popov (Abelentsev et al. 1956)
20	11	1936/1938(1928)	Kalniboloto, Kirovograd Reg. 48° 45’ N, 30° 59’ E	*Ta* P	I. G. Pidoplychko (Abelentsev et al. 1956)
21	12	1938	Odessa, Odessa Reg. 46° 27’ N, 30° 42’ E	?	(Migulin 1938)
22	13	30 April 1939	Kiev env., Pushcha Voditsa forest 50° 31’ N, 30° 20’ E	8♀♀ + 1 *Nn* C in TH	B. M. Popov (Abelentsev et al. 1956)
23	14	13 July 1939	Samara forest, Dnepropetrovsk Reg., 48° 45’ N, 35° 29’ E	1 ♂ in a building	(Abelentsev et al. 1956)
24	15	[1930–1940]	Dvurechnaya, Kharkov Reg. 49° 51’ N, 37° 40’ E	?	(Kuzyakin 1980)
25	8	[1930–1940]	M. Danilovka, Kharkov Reg. 50° 03’ N, 36° 09’ E	?	(Kuzyakin 1980)
26	16	[1930–1940]	Selychivka, Kiev Reg. 50° 20’ N, 31° 16’ E	?	(Abelentsev et al. 1956)
27	17	[1930–1940]	Alexandria, Kiev Reg. 49° 48’ N, 30° 04’ E	?	(Abelentsev et al. 1956)
28	13	15 May 1941	Golosievskiy forest, Kiev env. 50° 22’ N, 30° 29’ E	1♀	(Abelentsev et al. 1956)
29	13	6 April 1947	Korchuvate, Kiev Reg. 50° 26’ N, 30° 31’ E	2♀♀	(Zagorodniuk & Godlevskaya 2001)
30	13	11 April 1948	Golosievskiy forest	1♀	(Abelentsev et al. 1956)
31	18	11 May 1955	Lugovoe, Khmelnitski Reg. 49° 11’ N, 26° 50’ E	metalic roof of a church	(Abelentsev et al. 1956)
32	3	26 June 1955	KNU Biostation env.	1♀ shot	A. S. Lisetsky (Vlaschenko 2005)
33	4	26 May 1963	Crimean Res.	1♂ ad	A. A. Tkachenko (Dulitskiy & Kovalenko 2003)
34	4	winter 1970	Crimean Res.	1 ind. in *Mf* D	(Konstantinov et al. 1976)
35	19	29–30 July 2009	Chernobyl Exclusion Zone, 51° 24’ N, 29° 37’ E	1♂sad, netted	this paper