

New occurrence and the first breeding record of *Nyctalus lasiopterus* in Belarus

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Abstract. In June–July 2015, bat surveys were conducted by mist-netting at the Stary Žadzien Ramsar Site in Belarus. During this period, two adult lactating females and two subadults (male and female) of the greater noctule (*Nyctalus lasiopterus*) were caught there. Later on, two nursery colonies of *N. lasiopterus* were found by radio-tracking of subadults and roost characteristics of the species were described. Using mist-netting, 12 bat species were recorded in the area, five of which are listed in the Red Data Book of the Republic of Belarus: *Barbastella barbastellus*, *Myotis brandtii*, *M. nattereri*, *Eptesicus nilssonii*, and *Nyctalus leisleri*. Besides the first record of breeding of *N. lasiopterus* in Belarus, the large number of rare bat species recorded suggests significance of the forest-mire complexes of Polesie (Pripät River valley) for conservation of biological diversity in the region.

Greater Noctule, breeding, nursery colony, Ramsar Site, Belarus

Introduction

The greater noctule, *Nyctalus lasiopterus* (Schreber, 1780), is the largest and the least studied bat species in Europe (Dietz et al. 2009). Currently, the species distribution has a scattered pattern (often only some isolated records) and the closest sites of its regular occurrence to Belarus are known in northern Hungary and central Slovakia (Uhrin et al. 2006, Estók 2011). In the middle of the 20th century, breeding of *N. lasiopterus* was registered in Ukraine and the European part of Russia (Kuzâkin 1980). Recent records of the species in the neighbouring countries to Belarus are very rare and attributed to non-breeding individuals (Sachanowicz et al. 2006, Vlaschenko et al. 2010). For Belarus, there is only one published record of *N. lasiopterus*: an adult male was shot on 3 August 1930 in the Brahlin District of the Homiel Region (Seržanin 1961). The species was included in the first editions of the Red Data Book of the Republic of Belarus (Sušenja et al. 1981, Dorofeev 1993), but then it was excluded from the list of protected species in further editions (Paškov 2004, Kačanovskij et al. 2015) due to absence of any confirmed recent records.

Record and Discussion

Mist-netting and acoustic surveys of bats have been carried out at the Stary Žadzien Ramsar Site [Стары Жадзен] (area 170.5 km²; 51.9 N; 27.6 E) in the Žytkavičy (Жыткавічы) District of the Homiel [Гомель] Region (Fig. 1). The site is located in the area of the Pripät water-glacial alluvial plain with large mires and numerous dunes, islands of terminal moraines and kames. Wetlands located on the wavy waterlogged lowland with extensive development of aeolian relief forms are covered predominantly by pine forests. Mires consist of several separate elongated mire-tracts,

Table 1. Measurements of *Nyctalus lasiopterus* individuals caught at the Stary Žadzien Ramsar Site (southern Belarus) in 2015; W = weight [g], FA = forearm length [mm], 5F = length of the 5th finger [mm], 3F = length of the 3rd finger [mm], RS = reproduction status

Tab. 1. Rozměry jedinců netopýra obrovského (*Nyctalus lasiopterus*) odchycených na ramsarské lokalitě Stary Žadzien v jižním Bělorusku v roce 2015; age = věk, sex = pohlaví, W = hmotost [g], FA = délka předloktí [mm], 5F = délka 5. prstu křídla [mm], 3F = délka 3. prstu křídla [mm], RS = reprodukční stav

age	sex	W	FA	5F	3F	RS
ad	F	58.0	65.1	73.3	115.8	lactating
ad	F	54.6	64.0	70.6	110.6	lactating
sad	M	36.0	66.0	67.7	100.2	–
sad	F	34.0	65.2	65.1	99.6	–

which extend over tens of kilometres. This wetland is typical for the Belarusian Polesie complex of nemoral fens, combined with sphagnum transitional mires of boreal type and sphagnum bogs (Grummo et al. 2012).

During eight nights (23–28 June and 17–20 July 2015), surveys were conducted in the central, most difficult to access and least transformed part of the reserve, where old-growth pine and alder forests are scattered amidst waterlogged fen mires. On 23 June 2015, next to a small pond at the edge of a sedge mire we mist-netted two adult lactating females of *Nyctalus lasiopterus*. Two more subadult individuals, a male and a female, were caught on 19 July 2015, when mist-netting 2 km away from the previous site, at a natural small river flowing through a fen mire (Table 1).

Both subadult bats were fitted with LB-2X Transmitters for Bats (Holohil Systems Ltd.) and released on 20 July in the evening. The transmitters were glued onto the back of the bats between the scapulae using medical glue BF-6. All animals were in good condition and the transmitter's weight (0.32 g) was far below the 5% load limit (Aldridge & Brigham 1988). Roost search was done using Alinco DJ-X11 receiver equipped with three element Yagi antennae. On the next day

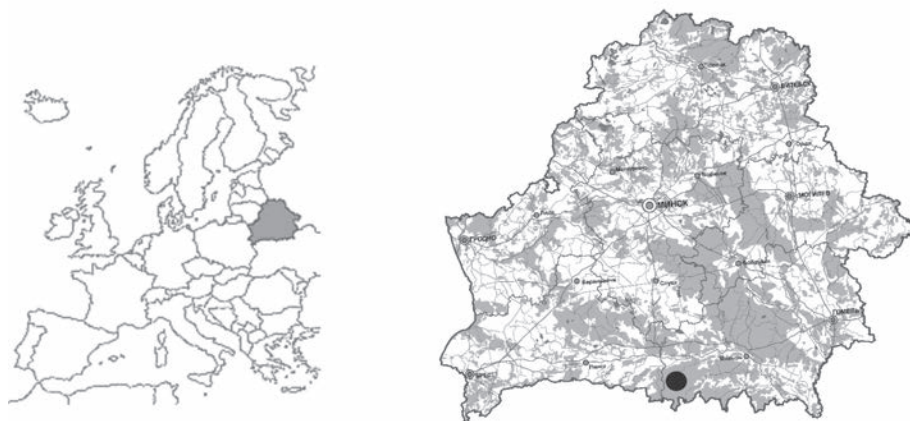


Fig. 1. Location of the study area, the Stary Žadzien Ramsar Site, Belarus.

Obř. 1. Geografická police studovaného území, ramsarská lokalita Stary Žadzien, Bělorusko.

Table 2. Roost characteristics of two *Nyctalus lasiopterus* individuals, radiotracked at the Stary Žadzien Ramsar Site (southern Belarus) in 2015; RN = roost No., DS = distance from the catching site [km], A = age [years], DBH = diameter at breast height [cm], AHE = above ground height of entrance [m], EX = exposure [° from N]

Tab. 2. Charakteristika úkrytů dvou jedinců netopýra obrovského (*Nyctalus lasiopterus*) sledovaných pomocí vysílačů na ramsarské lokalitě Stary Žadzžen (jižní Bělorusko) v roce 2015; RN = číslo úkrytu, DS = vzdálenost od místa odchyty [km], TC = charakteristika stromové vegetace, species = druh, age = věk [roky], RC = charakteristika úkrytu, DBH = průměr ve výši prsou [cm], AHE = výška vchodu od země [m], EX = expozice [° od severního směru]

RN	DS	tree vegetation species	tree vegetation characteristics (TC)			roost characteristics (RC)		
			A	DBH	other	AHE	EX	type
1	1.7	<i>Pinus sylvestris</i>	~100	50	numerous woodpecker holes	20	27	woodpecker hole
2	4.5	<i>Pinus sylvestris</i>	~100	45	numerous woodpecker holes, dry tips	18	283	woodpecker hole

after the release, the roost (No. 1) of the subadult male was found (Table 2). The roost tree was located at the edge of a small patch of pine forest (200 m long, 20 m wide), surrounded by an open transitional mire. On the same evening, visual observations of bats leaving the roost were conducted, and calls of bats recorded using a real-time ultrasound system (Batlogger M, Elekon AG). Altogether, six bats left the roost, the first one at 21:34 (7 min after sunset) and the last one (radio-tagged) at 21:46. All bats were identified as *N. lasiopterus* by their size and call sonograms. On 22 July the tagged male was using the same tree-hole for roosting. The signal from the second tagged bat (subadult female) was received several times on 21 July, but the roost (No. 2) was localized only on 22 July (Table 2). The roost tree was situated in an old sphagnum pine stand at the edge of a large pine forest island (1300 m long, 500 m wide) surrounded by an extensive raised bog with dwarf pines. In the evening of 22 July, four bats left the roost, the first one at 21:23 (two minutes before sunset) and the last one (radio-tagged) at 21:45. This time the calls were not

Table 3. Bat species composition at the Stary Žadzien Ramsar Site in June–July 2015 as recorded by mist-netting. Species included in the National Red Data Book of the Republic of Belarus (2015) are given in bold. Tab. 3. Odchytem do sítě zjištěné druhové složení společenstva netopýrů na ramsarské lokalitě Stary Žadzžen v červnu až červenci 2015. Druhy zařazené do běloruské národní červené knihy (2015) jsou vyznačeny tučnou sazbou

species / druh	males / samci		females / samice		total	comments / poznámky
	adult	subadult	adult	subadult		
<i>Pipistrellus pygmaeus</i>	2	12	69	15	98	68 lactating females
<i>Nyctalus noctula</i>	5	7	14	6	32	12 lactating females
<i>Vespertilio murinus</i>	3	2	13	3	21	12 lactating females
<i>Plecotus auritus</i>			14	1	15	12 lactating females
<i>Barbastella barbastellus</i>			12		12	12 lactating females
<i>Myotis brandtii</i>	2		3		5	1 lactating female
<i>Nyctalus leisleri</i>			5		5	2 lactating females
<i>Nyctalus lasiopterus</i>		1	2	1	4	2 lactating females
<i>Pipistrellus nathusii</i>		2	1		3	1 lactating female
<i>Myotis nattereri</i>	1		2		3	2 lactating females
<i>Myotis daubentonii</i>		1			1	
<i>Eptesicus nilssonii</i>			1		1	non breeding
total	13	25	136	26	200	

recorded due to equipment failure, furthermore, poor light conditions under the forest canopy did not allow to make accurate visual observations of bats leaving the roost.

Parallel to the radio-tracking, we conducted recording of bat calls using real time systems at four open sites of the mire. During over 90 hours of recording, 169 records of calls of *N. lasiopterus* were made. The distribution of the species activity was concentrated (95%) at the site where subadult bats were caught. Later, between 31 July and 3 August we attempted to confirm the presence of the tagged bats at the site. The tagged bats were not found, possibly due to battery failure or their movement outside of the study area, however, ultra-sound surveys at the site of earlier catching of two subadults showed that the species was still present there.

During this research we mist-netted altogether 200 bats belonging to 12 species, of them 10 species with indication of breeding. Five species are listed in the Red Data Book of the Republic of Belarus, four of them with confirmed breeding (Table 3). Our data confirm, for the first time for Belarus, the breeding of *N. lasiopterus* along with the records of two tree roosts, which were located 0.7 and 3.5 km from the place of catching of lactating females, and 1.7 km and 4.5 km from the place of catching of subadults. Based on the results of real time ultrasound recordings, we suggest presence of an important breeding population of *N. lasiopterus* in the central part of the Polesie region (Southern Belarus). Breeding records of other rare bat species, and in particular the barbastelle which has a high national conservation status (Kačanovskij et al. 2015), confirm the significance of forest-mire complexes of Polesie for the conservation of biological diversity in the region. Nursery colonies of *N. lasiopterus* were located in old-growth forests. Species preference for this habitat was noted also in other breeding areas in Europe (Uhrin et al. 2006, Estók 2011). Such forests require protection, and the loss of old trees has been identified as a likely cause of population decline of this species by IUCN (Hutson et al. 2008). However, since *N. lasiopterus* is not formally included in the list of protected species of the Republic of Belarus, it is currently not possible to enforce any special conservation measures for the identified breeding area. At the same time, taking into account its extreme rarity in the region and in the whole Europe, *N. lasiopterus* deserves being listed in the 1st category (critical endangered) of the Belarus National Red List, and this process needs to be initiated. Thus the research on distribution, density and ecology of this species in Belarus should continue.

Souhrn

Nový nález a první záznam rozmnožování netopýra obrovského (*Nyctalus lasiopterus*) v Bělorusku. V průběhu června a července 2015 byl na ramsarské lokalitě Stary Žadzžen v Bělorusku prováděn výzkum netopýrů pomocí odchytů do sítí. Během tohoto studia byly odchyceny dvě laktující samice a dva subadultní jedinci (samec a samice) netopýra obrovského (*Nyctalus lasiopterus*). Později byly objeveny dva úkryty mateřských kolonií *N. lasiopterus* za pomoci použití vysílačů aplikovaných na subadultní jedince; byly tedy popsány charakteristiky těchto úkrytů. V celém území bylo za pomoci odchytů do sítí odchyceno celkem 12 druhů netopýrů, pět z nich je zaneseno národní červené knihy Běloruska: *Barbastella barbastellus*, *Myotis brandtii*, *M. nattereri*, *Eptesicus nilssonii* a *Nyctalus leisleri*. Mimo prvního záznamu rozmnožování netopýra obrovského v Bělorusku, vysoký počet dalších vzácných druhů netopýrů naznačuje význam komplexů lesnatých bažin Polesí (niva řeky Pripjať) pro ochranu biologické rozmanitosti dotyčné oblasti.

Acknowledgements

The study was carried out thanks to a grant from the Rufford Small Grant Programme (Study and conservation of rare and endangered forest-dwelling species in natural forest-mire complexes of Southern Belarus). The authors also thank Markus Dietz from the Institut für Tierökologie und Naturbildung (Laubach, Germany) for providing us with radio-tags, the Mammal Research Institute PAS (Białowieża, Poland) and the Bavarian Ornithological Society (Germany) for radio-

-tracking equipment as well as the Frankfurt Zoological Society (Germany) for equipment for radio-tracking and acoustic surveys. We also thank Petr Benda and the anonymous reviewer for useful comments on earlier drafts of the manuscript.

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received on 23 September 2015