

On the presence of bats (Chiroptera) at the mouths of Kamchiya and Shkorpilovska Rivers, Bulgarian Black Sea Coast

HELIANA DUNDAROVA*, IVAN PANDOURSKI**

Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of sciences, 1, Tsar Osvoboditel, 1000 Sofia, Bulgaria, heliana.dundarova@iber.bas.bg, pandourski12@gmail.com***

Abstract. Eight bat species was identified using acoustic survey in the territories of Kamchiya and Shkorpilovska Rivers. The majority of records belong to *Myotis* cf. *daubentonii*, *Pipistrellus nathusii* and *Nyctalus noctula*. *Plecotus austriacus* was found only at the mouths of Kamchiya river. Both sites have high conservation priority as the Black Sea wetlands.

Key words: bat sound analysis, species composition, frequency of occurrence

Introduction

Kamchiya (244.5 km long) and Shkorpilovska (27 km long) Rivers belongs to the Black sea catchment area and drain the most of the territory of Eastern Stara Planina Mts. The specific climatic and hydrologic conditions of lower Kamchiya River during the period after the last glaciations till now, contributed to formation of old floodplain forests of the type of “longoz”. The mouths of both rivers are at a distance of seven kilometers, separated by vast sand dunes.

We found the first data about bats in lower Kamchiya River in Heinrich (1936). The author reports seven species: *Myotis bechsteinii* (Kuhl, 1817), *M. daubentonii* (Kuhl, 1817), *Eptesicus serotinus* (Schreber, 1774), *Pipistrellus pipistrellus* (Schreber, 1774), *Nyctalus noctula* (Schreber, 1774), *Nyctalus leisleri* (Kuhl, 1817) and *Barbastella barbastellus* (Schreber, 1774). Till the beginning of XXIst Century no other studies have been performed.

Here we summarize recent data about presence of bats at lower Kamchiya River and the first data about bat community at Shkorpilovska River mouth by the method of registration of ultrasounds.

Material and Methods

The fieldwork was carried out from 2003 to 2020 at six points with following coordinates and dates of bat call recordings:

Lower Kamchiya River: N 43.036785 E 27.887080: 04.08.2020 - 9 min continuous recordings; N 43.022461 E 27.888946: 05.08.2020 - 19 min continuous recordings; N 43.022016 E 27.884321: 06.08.2020 - 11 min continuous recordings; N 42.997066 E 27.888432: 26.05.2003 – 123 recordings with duration of 1.6 sec each, 07.09.2003 – 108

recordings, 31.05.2008 – 4 recordings; N 42.990308 E 27.888132: 17.06.2005 – 7 recordings.

Shkorpilovska River mouth: N 42.957594 E 27.897829: 05.08.2004 – 17 recordings, 07.08.2004 – 32 recordings, 08.08.2004 – 13 recordings, 29.08.2006 – 28 recordings, 30.08.2006 – 50 recordings, 01.09.2006 – 53 recordings, 03.09.2006 – 86 recordings, 04.09.2006 – 18 recordings, 03.09.2010 – 13 recordings.

Echolocation and social bat calls were recorded using Pettersson D240X detector (recordings with duration of 1.6 seconds, time expansion 10X) and M500-384 USB Ultrasound Microphone (continuous recordings) and BatSound Touch recording program that saves the recordings as 16-bit .wav files. Sound analysis was performed using BatSound 3.1 for Windows (FFT size 512, Hanning window) taking into account the main sound characteristics: frequencies with minimum, maximum and most energy (KHz), pulse duration and interpulse interval (msec) and the shape of call sonograms. The recordings started 20 to 30 minutes after the local time of sunset.

The frequency of occurrence represents the number of recordings with duration of 1,6 sec with presence of each species to number of all recordings at the site in percentage (Fig. 1 and 2).

Results

A total of eight species were identified:

- ✓ *Pipistrellus nathusii* (Keyserling & Blasius, 1839): One of the most frequent species at both sites. Groups of dozen individuals were observed to hunt above the water surface at a time. Characteristic social calls were recorded.
- ✓ *Pipistrellus pygmaeus* (Leach, 1825): Species with the most flying activity at Shkorpilovska River Mouth. Frequently emits typical social calls. More frequent above the dunes close to Kamchiya River.
- ✓ *Pipistrellus pipistrellus* (Schreber, 1774): Relatively rare species at both sites. It appears both in the spring and during the autumn migration with single individuals.
- ✓ *Myotis* cf. *daubentonii* (Kuhl, 1817), (45 KHz phonetic type): The registered echolocation calls have characteristics of middle sized *Myotis* 45 KHz phonetic type and with great certainty we can consider that the observed species is Daubenton's bat.
- ✓ *Eptesicus serotinus* (Schreber, 1774): The Serotine bat appears regularly during the whole study period with low flying activity. Only single individuals were detected.
- ✓ *Nyctalus noctula* (Schreber, 1774): Highest flying activity was registered in September 2006 at Shkorpilovska River. Characteristic social calls were recorded.
- ✓ *Nyctalus leisleri* (Kuhl, 1817): Demonstrates relatively low activity at both sites and occurs throughout the whole period of study.
- ✓ *Plecotus* sp.: Only a single individual was registered at Lower Kamchiya River. The occurrence of the *P. austriacus*, seems to be expected taking into account its habitat and foraging preference (Dietz *et al.* 2009).

Discussion

The study region is characterized by mild climate, floodplain forests, alluvial and mixed riparian forests which served roosting and resting habitats for migrant and forest-dwelling bat species (Măntoiu *et al.* 2020). Therefore, it is not surprising that the species with high activity are *Myotis* c.f. *daubentonii*, *Pipistrellus* spp. and *Nyctalus noctule* (fig. 1 and 2). Daubenton's bats displayed dominant presence which could be explained by the feeding activity close to the water surface (Heinrich, 1936) and the fact that the species is one of the most frequent in wetlands along the Bulgarian Black sea coast (Pandourski 2004). *Pipistrellus nathusii* and *Nyctalus noctula* are a frequent migratory along the Western Black Sea coast (Hutterer *et al.* 2005; Gashchak *et al.* 2015). *Eptesicus serotinus* is a

common species in the wetlands (Pandourski 2004) and demonstrates regular activity at the mouths of Kamchiya and Shkorpilovska Rivers. During the study *Nyctalus leisleri* shows relatively low activity, while *Plecotus austriacus* was found once at Kamchiya River Mouth.

Both studied sites belong to the Black Sea wetlands and have high conservation value for the European biodiversity.

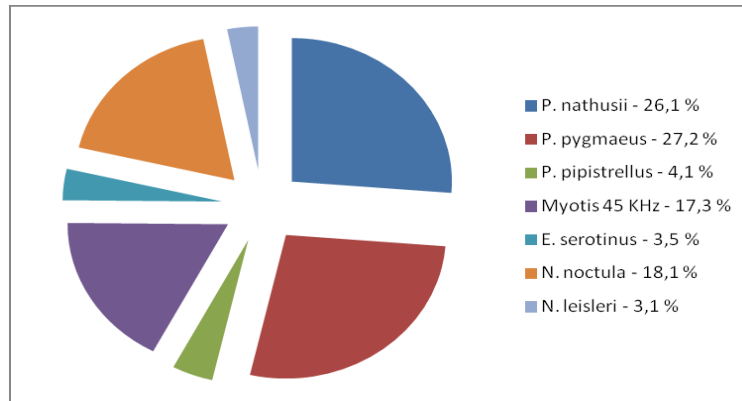


Fig. 1. Frequency of occurrence of bats registered at the mouth of Shkorpilovska River.

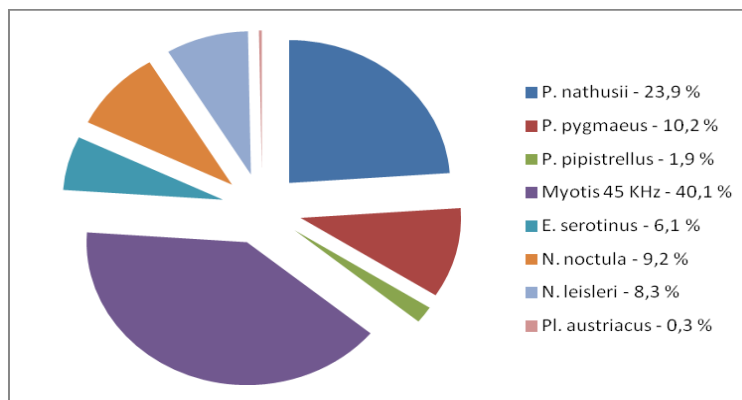


Fig. 2. Frequency of occurrence of bats registered at the mouth of Kamchiya River.

Aknowledgements

This work has been carried out in the framework of the National Science Program "Environmental Protection and Reduction of Risks of Adverse Events and Natural Disasters", approved by the Resolution of the Council of Ministers № 577/17.08.2018 and supported by the Ministry of Education and Science (MES) of Bulgaria (Agreement № D01-363/17.12.2020). Additionally, in 2020 the study was supported by the Bulgarian Ministry of Education and Science under the National Research Program "Young scientists and postdoctoral students" approved by DCM # 577/17.08.2018. We are very grateful to Dr. Vasil Popov (IBER-BAS), Dr. Sirma Zidarova (IBER-BAS), Pavlinka and Jiří Dundarovi for the teamwork in the field.

References

- Benda, P., Ivanova, T., Horáček, I., Hanák, V., Červený, J., Gaisler, J., Gueorguieva, A., Petrov, B. & Vohralík V. (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., Helversen, O. & Nill, D. (2009) *Bats of Britain, Europe & Northwest Africa*. English edition, London: A & C Black Publishers Ltd, pp 400.
- Gashchak, S., Vlaschenko, A., Eštok, P. & Kravchenko, K. (2015) New longdistance recapture of a noctule (*Nyctalus noctula*) from Eastern Europe. *Hystrix, the Italian Journal of Mammalogy*, 26 (1): 59–60.
- Heinrich, G. (1936) Ueber die von mir im Jahre 1935 in Bulgarien gesammelten Säugetiere. *Bulletin de l'Institut Royale d'Histoire Naturelle, Sofia*, 9: 33–48.
- Hutterer, R., Ivanova, T., Meyer-Cords, C. & Rodrigues, L. (2005) Bat migration in Europe, a review of banding data and literature. *Landwirtschaftsvlg Münster*, pp 162.
- Măntoiu, D., Kravchenko, K., Lehnert, L., Vlaschenko, A., Moldovan, O., Mirea, I., Stanciu, R., Zaharia, R., Popescu-Mirceni, R., Nistorescu, M. & Voigt, C. (2020) Wildlife and infrastructure: impact of wind turbines on bats in the Black Sea coast region. *European Journal of of Wildlife Research*, 66 (3): 1-13.
- Pandourski, I. (2004) Bats (Mammalia, Chiroptera) of the Burgas Wetlands, Bulgarian Black Sea Coast. *Acta Zoologica Bulgarica*, 56 (3).