

Common pipistrelle (*Pipistrellus pipistrellus* Schreber, 1774) in the bat fauna of the Białowieża Primeval Forest

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Abstract. The occurrence of the Common pipistrelle in the bat fauna of the Białowieża Primeval Forest was expected, because the taxon *P. pipistrellus* was previously comprised of two separate species. Earlier observations of *P. pipistrellus* in the Białowieża area can mostly be counted for by the new species Soprano pipistrelle, which is considered equally widely distributed in the area. In this study, we were able to record and distinguish several passes of the Common pipistrelle by means of bat detecting techniques. Bats were found in two locations, the first one being the Białowieża village, whereas the second one is the woodland in close proximity of the Czerlonka village. It is very likely, that this species is more widely distributed in the Białowieża area, especially in the vicinity of human settlements.

Keywords: bat, Common pipistrelle, *Pipistrellus pipistrellus*, Białowieża Primeval Forest

1. Introduction

The detection of two different phonic types in terms of echolocation frequency (45 kHz and 55 kHz) in the common pipistrelle *Pipistrellus pipistrellus* by Jones and Van Parijs (1993), was the first indication suggesting genetic diversity within this far and wide distributed bat species. Six years later, Jones and Barratt (1999) confirmed the existence of 2 species within *Pipistrellus pipistrellus*, i.e.: *P. pipistrellus* and *P. pygmaeus*. Since then, the range of the species *P. pipistrellus* (as now determined) has required necessary adjustment.

In Poland, when the concurrence of *P. pipistrellus* and *P. pygmaeus* was verified by Rachwald and Szkudlarek (2001), existing then descriptions of Poland's bat fauna became obsolete. The Białowieża Primeval Forest used to be one of numerous Poland's areas which were considered as having a comprehensive catalog of bat species (Ruprecht 1983). However, since the 1980s, the list of bat species observed in this region has been broadened by inclusion of two more species (Rachwald, Szkudlarek 2001; Ruprecht 2004). Before the separation into 2 taxa, *P. pipistrellus* was

often reported as occurring within the Białowieża region (Ruprecht 1983; Rachwald, Nowakowski 1994; Rachwald, Labocha 1996).

The study carried out by Rachwald et al. (2001) contained no information on the existence of *P. pygmaeus*. Even so, it should be assumed on the whole that nearly all documentation concerning Białowieża region bats and published before 2001, actually comprised information on the occurrence of two of a kind: *P. pipistrellus* and *P. pygmaeus* treated as one species (with the exception of the studies on bat echolocation indicating the existence of 55 kHz phenotype, e.g. Rachwald and Labocha [1996], which indirectly pointed out the existence of *P. pygmaeus*).

Based on the recordings carried out in the 1990s, echolocation frequency 55 kHz was assigned to *P. pipistrellus*, however in view of new data, this acoustic feature should be attributed to *P. pygmaeus*. The recordings of 38–45 kHz frequency treated before as distinctive for *P. nathusii* could indicate the presence of both *P. nathusii* and *P. pipistrellus*. The results of the study carried out with the use of ultrasound detectors after 2001, showed relatively abundant population of newly discovered bat species *P. pygmaeus* within the Bia-

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łowieża Primeval Forest (Rachwald et al. 2004). Then the authors noted that in the area, there also occurred the common pipistrelle, however a precise locality of this species was not fully recognized. Further recordings and catchers were needed so as to explicitly verify *P. pipistrellus* occurrence in the Białowieża area.

2. Methods

Sound analyses were based on field recordings of bat calls using Pettersson D-980 ultrasound detectors with frequency division and time expansion (x10) systems as well as analogue magnetic tape recorders Sony WM-D6C with chrome cassettes. Pettersson BatSound software (for PC computer) was used in spectral sound analysis. The software also allowed for identifying bat species. The results were elucidated on the basis of published information on bat echolocation (e.g. Jones, Van Parijs 1993) and own experience. It was assumed that within the area of the Białowieża Forest, FM-quasi CF signals with the highest frequency of the call (F_{Max}) below 52 kHz (most often 45 kHz) and pulse intervals 90 μs would be attributed to *P. pipistrellus* specimens (Fig. 1). The recordings were carried out in the years 1999–2005, at different spots within in the Białowieża Forest, for the duration of the studies on bat activity in fresh coniferous forests as well as during occasional hearings within the Białowieża Forest.

3. Results

The data obtained comprise altogether 10 recorded sequences of *P. pipistrellus* signals. These were detected at 2 lo-

cations: (1) on the forest road in the vicinity of Czerlonka village (Jagielloński Tryb route) – 8 passes (52°40'30.4"N, 23°45'30.4"E, Fig. 2) and (2) at the measurement point situated on the edge of the Palace Park in the village Białowieża – 2 passes (52°42'14.1"N, 23°50'56.4"E, Fig. 2). All analyzed sounds represent parameters characteristic for *P. pipistrellus* and differ from those observed in *P. pygmaeus*. The results of sound sequence examination are presented in Fig. 1.

4. Discussion

In the 1980s, 12 species were reported in the bat fauna of the Białowieża Forest (Ruprecht 1983). The greater mouse-eared bat *Myotis myotis* (Borkhausen 1797) was not included in the list, but likely occurrence of this species in the region was taken into consideration. The presence of *M. myotis* in the Białowieża Primeval Forest was reported in Russian subject literature (Kurskov 1958, 1981). Ruprecht (1971) challenged the credibility of such declarations and then again Kurskov (1981) validated own statement inaccurately based on the results reported by Roerig (1918) and Ognev (1928). In fact, Roerig did not observe the greater mouse-eared bat in the Białowieża Forest, whereas Ognev gave no details and just mentioned that “it may also be encountered in (...) Belovezh forest” (cit.: the paper by Ognev translated into English and published in 1961). Furthermore, the closest *M. myotis* occurrence was documented in 1920s in the city of Grodno (more than 110 km away from the Białowieża Forest) (Ruprecht 1971). In the last 20 years, no occurrence of *M. myotis* was observed in the Białowieża Forest, however, 2 other bat species have been added to its catalog of the bat fauna, and now the

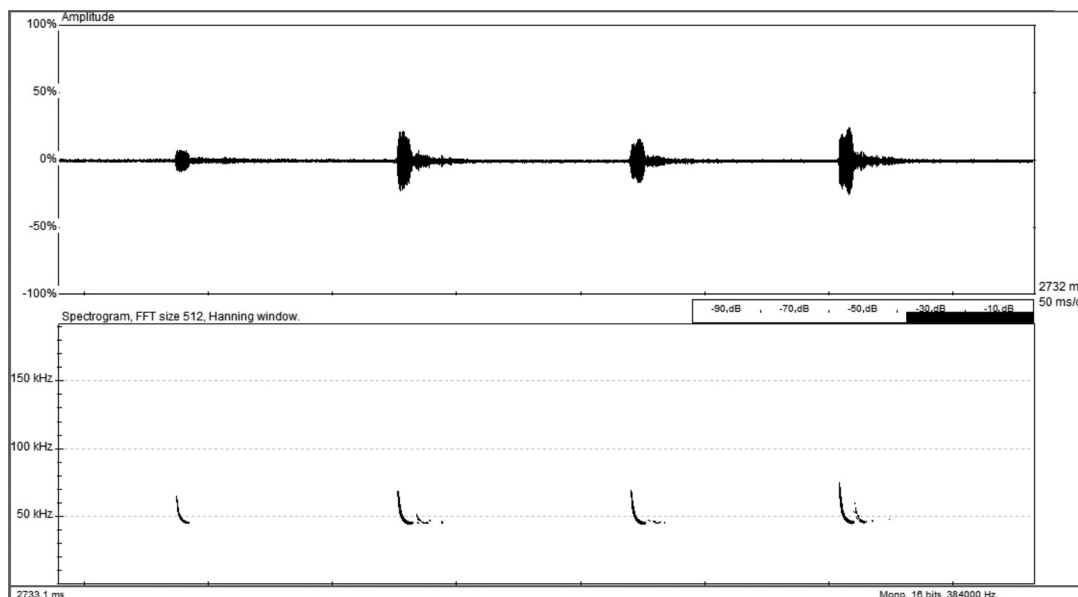


Figure 1. Sequence of common pipistrelle signals recorded in the Białowieża Palace Park

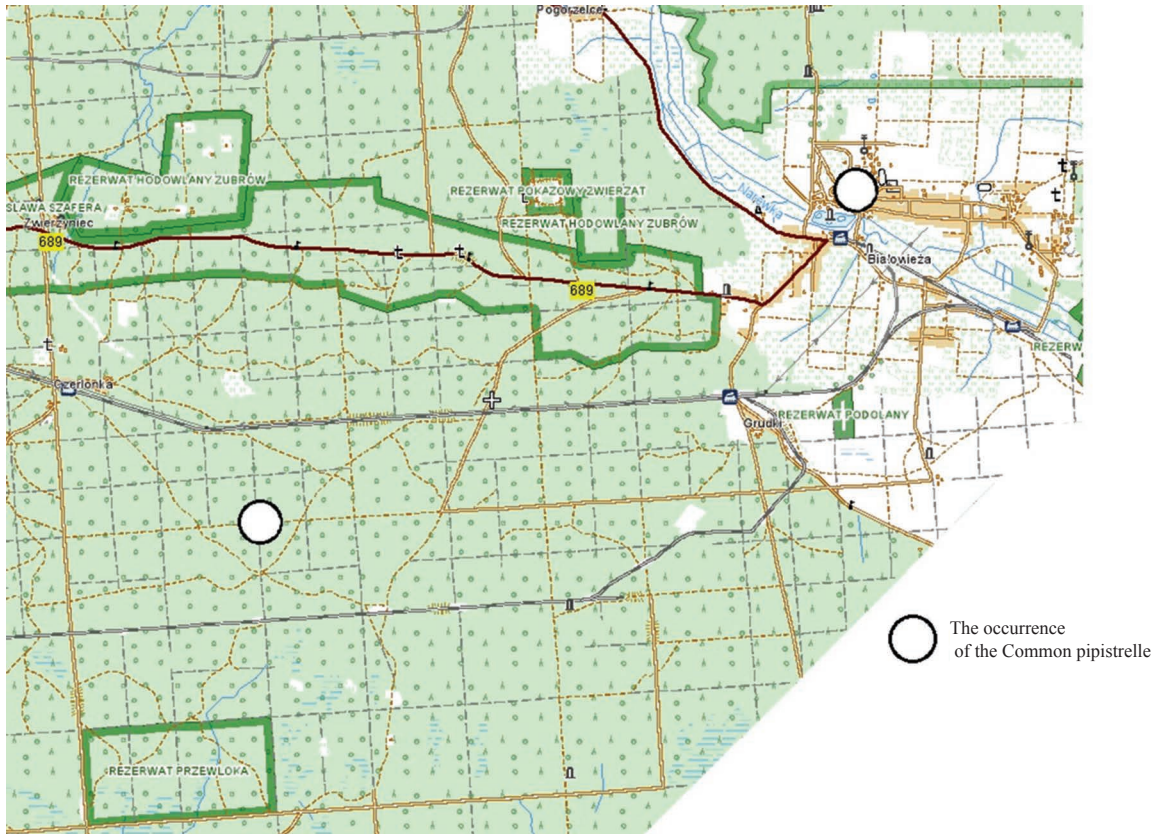


Figure 2. The occurrence of the Common pipistrelle in the Białowieża Primeval Forest

list comprises 14 species including *P. pipistrellus* (Kurskov 1958; Ruprecht 1976; Rachwald; Szkudlarek 2001; Ruprecht 2004). It is worth noting, that the first publication indicating the occurrence of *P. pygmaeus* in the Białowieża Primeval Forest was the paper by Rachwald and Labocha (1996). The authors reported data on detected echolocation frequency 55 kHz - then attributed to *P. pipistrellus*, whereas in fact, this phonic type is distinctive for *P. pygmaeus*.

Even if the observations in the present study were carried out on quite a lot of research plots (mostly situated in forest stands within protected areas), there was detected a small number of *P. pipistrellus* specimens (approximately 1% of all observed passes in now managed Białowieża Forest stands; Rachwald – not published data). The presence of the common pipistrelle was observed next to built-up areas (Białowieża Forest Clearing and Palace Park edge) as well as on forest roads leading to forest buildings (Czerlonki village vicinity). No presence of the common pipistrelle was observed in the area of Białowieża National Park (BNP). Having thus far scarce information, it should not be prejudged that *P. pipistrellus* regularly occurs in the Białowieża Primeval Forest. However, taking into consideration ecological preferences of this species as well as re-

gular occurrence of *P. pygmaeus* in BNP stands (Rachwald, Labocha 1996; Rachwald 1998), there can be put forward that in the region, *P. pipistrellus* inhabits different ecological niche than its “twin species” and shelters in built-up areas. The works by Nicholls and Racey (2006a, 2006b) show that *P. pygmaeus* is associated with forest and water areas and *P. pipistrellus* is an eutopic and synanthropic species. In order to verify this postulation, there is needed further and all-embracing research throughout the Białowieża Forest, especially in managed stands and in those with roads leading to built-up areas and used by bats as routes of entry into forests.

Conflict of interests

The authors declare no potential conflicts.

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Author’s contribution

A.R. – research conception, field works, material analyses, manuscript preparation; I. R. – research conception, field works, manuscript edition.