

Supplementary notes on the distribution of *Pipistrellus pipistrellus* complex in the Balkans: first records of *P. pygmaeus* in Albania and in Bosnia and Herzegovina (Chiroptera: Vespertilionidae)

Uzupełnienia do rozmieszczenia nietoperzy z kompleksu *Pipistrellus pipistrellus* na Bałkanach: pierwsze stwierdzenia *P. pygmaeus* w Albanii oraz w Bośni i Hercegowinie (Chiroptera: Vespertilionidae)

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received on 28 April 2006

Abstract. Two males *Pipistrellus pygmaeus* were captured in August 2003 near Qafëmal (northern Albania) and identified on the basis of morphological characters. Hunting individuals of this species were observed and detected also in a riparian forest of the Vjosës valley near Tepelenë (southern Albania) in April 2004. They represent the first records of this species from Albania. *P. pygmaeus* is reported for the first time also from Bosnia and Herzegovina, where echolocation calls of the species (lowest frequencies 52–57 kHz) were recorded near Miljevina and in Dobro Polje.

INTRODUCTION

Since the time of recognition of the pygmy (soprano) pipistrelle *Pipistrellus pygmaeus* (Leach, 1825) within the *P. pipistrellus* complex (BARRATT et al. 1997, JONES & BARRATT 1999), its distribution has been intensively surveyed across Europe. Soon, it was discovered that the species ranges widely from Portugal to western part of Russian Federation and the Caucasus, and from Great Britain, southern Scandinavia and Estonia to Greece and Turkey (HORÁČEK et al. 2000, LIMPENS 2000, MAYER & VON HELVERSEN 2001, BENDA et al. 2003a, HULVA et al. 2004, WERMUNDSEN & SIIVONEN 2004, VIERHAUS & KRAPP 2004).

Although widespread, the range of this species in the Balkans is known only fragmentary due to the low intensity of bat surveys there in general. Actually, its presence has been confirmed for most of the Balkan countries (LIMPENS 2000, 2001, PRESETNIK et al. 2001, DIETZ et al. 2002, BENDA et al. 2003b, DECU 2003, HULVA et al. 2004). As *P. pygmaeus* was found at numerous localities in Greece (HANÁK et al. 2001), including its northern parts, it was expected to occur also in Albania and in the countries of former Yugoslavia, where it has not been recorded yet. Hence, taking into account the present state of knowledge, the range of pygmy pipistrelle in southern Balkans, depicted by VON HELVERSEN & HOLDERIED (2003) and reprinted by VIERHAUS



Fig. 1. Male of *Pipistrellus pygmaeus* captured on 10 August 2003 near Qafëmal, northern Albania (K. SACHANOWICZ).

Rys. 1. Samiec *Pipistrellus pygmaeus* odłowiony 10 sierpnia 2003 w pobliżu Qafëmal w północnej Albanii (K. SACHANOWICZ).

& KRAPP (2004) is misleading as giving an impression of its confirmed occurrence in southern half of Albania and in Macedonia. This tentative range also covers a belt of southern Bulgaria although only one record was known by then from southernmost part of the country (DIETZ et al. 2002).

Single old records of bats belonging to small *Pipistrellus* complex are known from Macedonia, Montenegro as well as from Bosnia and Herzegovina (e.g. BOLKAY 1926, ĐULIĆ & MIRIĆ 1967, KRYŠTUFEK et al. 1992, JONES 1999). The only record for Albania, published recently without any details – a male captured in a flat in Tirana – has to be assigned to *P. pipistrellus* sensu lato (UHRIN et al. 1996).

In addition to the present knowledge of *P. pygmaeus* distribution, herein we report first data on the species presence in Albania and in Bosnia and Herzegovina.

MATERIAL AND METHODS

Data were collected in the Balkans during the trips in 2003–2004. Hunting bats were detected using a heterodyne detector Pettersson D100 and recorded with broadband Pettersson D980 detector and SONY

WM-D6C tape recorder. Recordings were analysed using BatSound 3.1 computer software (Pettersson Elektronik AB, Sweden). For identification of the time-expanded calls we relied on characters given by ZINGG (1990), RUSSO & JONES (2002) and OBRIST et al. (2004), while for determination of captured individuals – we followed HÄUSSLER et al. (1999), SENDOR et al. (2002), VON HELVERSEN & HOLDERIED (2003), and DIETZ & VON HELVERSEN (2004).

RECORDS

P. pygmaeus was recently recorded at two localities in Albania (1–2) and at two sites in Bosnia and Herzegovina (3–4):

(1) On 10 August 2003, two adult, sexually active males were mist-netted over a small artificial pool (42° 06' N, 20° 06' E), 731 m a. s. l., in a bed of a mountain stream, east of the Qafëmal village, along the road Shkodra–Kukës (northern Albania, Pukë district). The habitat around the site comprised a small settlement, cultivations and overlogged mountain forest of the black pine *Pinus nigra* and the beech *Fagus sylvatica*. More individuals of *P. pygmaeus* were observed and detected (Pettersson D100) at dusk when hunting over the stream and sparse vegetation covering surrounding mountain slopes.

Measurements of two males were as follow: forearm length – 31.0 and 29.6 mm, fifth finger length – 39.0 and 38.1 mm and weight – 5.5 and 5.0 g, respectively. Their pelage was light brown with yellowish tinge on the back and with weak contrast between dorsal and ventral side, which was whitish-grey with yellowish tinge. The muzzle and ears (7.9 mm) were relatively short (Fig. 1), light brown but slightly

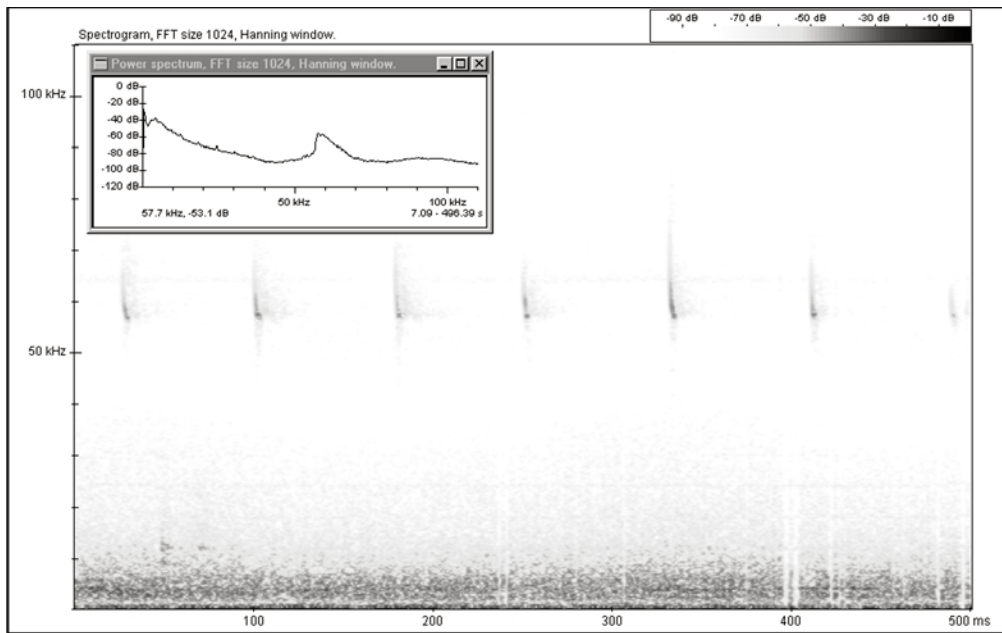


Fig. 2. The sonogram and power spectrum graph of time-expanded echolocation calls of *P. pygmaeus* recorded near Tepelenë, southern Albania, on 19 April 2004.

Rys. 2. Sonogram i wykres widma mocy sygnałów echolokacyjnych *P. pygmaeus* nagranych w okolicy Tepeleny w południowej Albanii, 19 kwietnia 2004.

darker than the pelage; the skin was lighter, pinkish particularly around the eyes and in the basal part of the ears. Both individuals had pronounced small ridge between the nostrils. Penis was yellowish without paler medial stripe. Glandular bumps inside of mouth were of similar yellowish colour. Basal part of the uropatagium was densely covered with fur on dorsal side, a condition usually seen in *P. nathusii* (Keyserling et Blasius, 1839). After being identified, sexed, measured and photographed the bats were released.

(2) *P. pygmaeus* was also recorded in the Vjosës valley, ca 1 km south of Tepelenë (40° 17' N, 20° 02' E), 114 m a. s. l. Soon before the dusk (19.10 p.m.), on 19 April 2004, several individuals were observed and detected with Pettersson D980 (Fig. 2), while hunting above a small branch of the river and near the tree crowns in an old stand of oriental planes *Platanus orientalis* and poplars *Populus* sp. Apparently, these bats were shortly after leaving their roost, which could be located in a tree hole or crevice, since no other type of shelters was available nearby.

The mean parameters of recorded calls were: frequency of maximum intensity: 57.2 kHz (range 55–60 kHz, n=12), highest frequency: 78.8 kHz (range 67–99 kHz, n=8), lowest frequency: 55.4 kHz (range 54–57 kHz, n=9), pulse length: 5.5 ms (range 4–7 ms, n=8), interval length: 74.4 ms (range 61–78 ms, n=10).

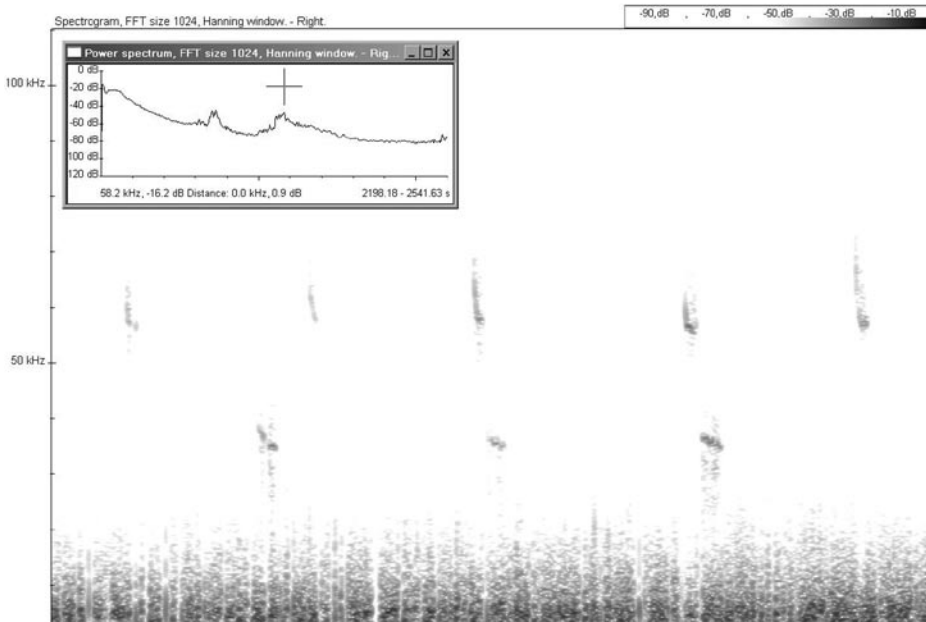


Fig. 3. The sequence of time-expanded search calls of *P. pygmaeus* (upper row of signals), recorded near Miljevina, Bosnia and Herzegovina, on 2 May 2004. Frequency of maximum intensity shown in a power spectrum graph is marked with a cross. Lower row of signals illustrates echolocation calls of *Hypsugo savii* recorded simultaneously. High background noise level caused by turbulent water.

Rys. 3. Sekwencja sygnałów echolokacyjnych *P. pygmaeus*, nagranych w okolicach Miljewiny, w Bośni i Hercegowinie, 2 maja 2004 (górny szereg). Krzyżyk na wykresie widma mocy wskazuje częstotliwość maksymalnego natężenia dźwięku. Poniżej, na sonogramie, nagrane jednocześnie sygnały *Hypsugo savii*. Wysoki poziom szumów tła powodowany był przez płynącą wodę.

(3) Miljevina (43° 31' N, 18° 39' E), 599 m a. s. l., approximately 2.5 km south of the village, in a rocky canyon of Bistrica river (100–150 m in depth) on the Dinarian Mts, eastern Bosnia. The site was surrounded by almost vertical limestone walls and steep slopes, partially overgrown with sparse mixed forest (spruces and beeches). At sunset on 2 May 2004, a search calls of hunting individuals of *P. pygmaeus* were detected and recorded with Pettersson D980 bat detector and the tape recorder.

The signals were FM-qcf calls (Fig. 3) of the following mean parameters: frequency of maximum intensity: 57.2 kHz (range 55–62 kHz, n=12), highest frequency: 72.4 kHz (range 64–85 kHz, n=9), lowest frequency: 54.2 kHz (range 52–57 kHz, n=9), pulse length: 5.8 ms (range 5–7 ms, n=9), interval length: 76 ms (range 70–90 ms, n=11).

(4) Later, in the same night as above, echolocation and social calls of *P. pygmaeus* (composed of three elements at frequency of 18 kHz) were recorded near Dobro Polje (43° 35' N, 18° 31' E), 1008 m a. s. l., ca. 0.5 km west of the village, at a bridge over Bistrica river, eastern Bosnia.

DISCUSSION

Individuals captured near Qafëmal fitted well into the range of morphological variation of *P. pygmaeus*, given by the most recent authors (HÄUSSLER et al. 1999, VON HELVERSEN & HOLDE-RIED 2003, DIETZ & VON HELVERSEN 2004), thus their identification, in this case also supported by detector observation, appeared unambiguous. More attention should be paid to the species determination based on recorded echolocation calls. Although in the northern Europe, acoustic identification of *P. pygmaeus* is one of the easiest among vespertilionid bats, it is much more complicated in the Mediterranean zone, where the species occurs sympatrically with *Miniopterus schreibersii* (Kuhl, 1817) and both these species often share the same hunting habitats (RUSSO & JONES 2003). Noteworthy, although *M. schreibersii* is taxonomically distant and belongs to a different family (Miniopteridae), it reveals echolocation calls surprisingly similar to those emitted by *P. pygmaeus*. Its structure (FM-qcf) strongly resembles typical pipistrelle signals. Mean value of its frequency of maximum intensity (53.9 kHz) is slightly lower than that recorded in *P. pygmaeus* (56.2 kHz), similarly as the lowest frequency (47.4 and 51.5 kHz, respectively – OBRIST et al. 2004). However, ranges of these parameters overlap (frequency of maximum intensity: *M. schreibersii* 49–62 kHz, *P. pygmaeus* 53–63 kHz; lowest frequency: 47–55 kHz and 53–60 kHz, respectively – RUSSO & JONES 2002), thus large portion of their calls from southern Europe can be determined only with multivariate statistical methods, e.g. discriminant function analysis (RUSSO & JONES 2002) or synergetic pattern recognition (OBRIST et al. 2004). Identification of pygmy pipistrelle with narrowband heterodyne detectors is widely practised in Europe (e.g. LIMPENS 2000, 2001, WERMUNDSEN & SIIVONEN 2004), but in the Mediterranean it might be reliable only when supported with visual determination (flight and hunting style, size of the bat and its wings shape – short and moderately broad in *P. pygmaeus* vs. long and narrow in *M. schreibersii*). The lowest frequencies of some *P. pygmaeus* signals recorded in Albania and in Bosnia were higher than the upper range of this parameter in *M. schreibersii* (see also ZINGG 1990), so the determination may be regarded as unambiguous. In the second Bosnian locality (Dobro Polje), the pygmy pipistrelle was also confirmed by recorded social calls with their typical, three-element structure (BARLOW & JONES 1997).

The range of *P. pygmaeus* covers most likely the whole territory of the Balkan Peninsula. Its relatively numerous localities are known only from Slovenia (PRESETNIK et al. 2001, KRYŠTUFEK & DONEV 2005) and from Greece (HANÁK et al. 2001, MAYER & VON HELVERSEN 2001), that both belong to fairly well studied countries. For other Balkan states, mostly single records are available, mainly due to the insufficient recording and low intensity of acoustic surveys. Therefore,

several localities, scattered over southern and western regions, were published for Romania (LIMPENS 2000, DECU 2003, HULVA et al. 2004). Single records are known also for Croatia and Serbia (LIMPENS 2001), Bulgaria (DIETZ et al. 2002, 2005, BENDA et al. 2003b) and for the European part of Turkey (BENDA et al. 2003a). Supplementing the picture of *P. pygmaeus* distribution in this part of Europe, we found the species in the least surveyed countries: Albania and Bosnia and Herzegovina (this paper). Recently, the species was recorded also in Montenegro, where two foraging bats were observed and detected on 10 July 2004 near the old fortress of Budva, located on the Adriatic coast (C. DIETZ – pers. comm.). At present, only Macedonia has no presence of this species confirmed on its territory, for which only records of *P. pipistrellus* (Schreber, 1774) s. str. are known (KRYŠTUFEK et al. 1992, B. KRYŠTUFEK – pers. comm.).

Data on habitat use by the species in the Balkans are also scarce. In Slovenia, *P. pygmaeus* was observed hunting mainly in riparian habitats, over ponds, lakes and rivers, below 650 m a. s. l. (PRESETNIK et al. 2001). In all cases described above, *P. pygmaeus* was recorded in the vicinity of water, over small pool and in forested river valleys, what is in accordance with its habitat preferences in other parts of Europe (RUSSO & JONES 2003, BARTONIČKA & ŘEHÁK 2004).

Finally, the presence of both small pipistrelles has been confirmed for Albania, as *P. pipistrellus* s. str. was recorded recently for the first time at several localities (authors' unpublished data). It is obvious that both these *Pipistrellus* species live in sympatry also in other Balkan countries, as it was reported for Slovenia, Croatia, Serbia, Romania, Bulgaria and for Greece (LIMPENS 2000, 2001, HANÁK et al. 2001, MAYER & VON HELVERSEN 2001, PRESETNIK et al. 2001, BENDA et al. 2003, DECU 2003, KRYŠTUFEK & DONEV 2005). However, relevant data on *P. pygmaeus* abundance are available only for Slovenia, where it appears less frequent (44 localities) than *P. pipistrellus* (99 sites) (KRYŠTUFEK & DONEV 2005). On the other hand, HANÁK et al. (2001) suggest that in Greece the former species is more abundant, but this conclusion is based on small number of records (15 and 6, respectively), hence it may be misleading due to the insufficient recording.

STRESZCZENIE

Dwa samce *Pipistrellus pygmaeus* odłowiono w sierpniu 2003 w pobliżu miejscowości Qafëmal (północna Albania). Żerujące osobniki tego gatunku obserwowano w nadrzecznym łągu w dolinie Vjosa w okolicach Tepeleny (południowa Albania) w kwietniu 2004. Są to pierwsze stwierdzenia karlika drobnego w Albanii. *P. pygmaeus* został także po raz pierwszy stwierdzony w Bośni i Hercegowinie, gdzie w maju 2004, w okolicach Miljewiny i Dobrego Polja nagrano sygnały echolokacyjne tego gatunku.

ACKNOWLEDGEMENTS

Authors express cordial thanks to Boris KRYŠTUFEK for valuable information on *P. pipistrellus* distribution in Macedonia, giving an access to some hardly available publications and comments on the manuscript, while to Christian DIETZ for his own unpublished observation from Montenegro.

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