SHORT NOTES

First recordings of the soprano pipistrelle *Pipistrellus pygmaeus* (Leach, 1825) in Belgium

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Microchiropteran bats species can be discriminated according to morphometrical, behavioural and genetical features (1) (2). In addition, as bat species often emit distinct echolocation calls, the analysis of signal characteristics is a good identification tool and can even lead researchers to the discrimination of sibling species. In 1993, JONES & VAN PARIJS (3) showed a bimodal distribution in the echolocation calls of the common pipistrelle *Pipistrellus pipistrellus* (Schreber, 1774) with individuals emitting calls with maximum energy peak around 45kHz and others around 55kHz. Subsequent works have shown that the two phonic types also showed differences in diet, habitat use (4) and social calls (5) (6). Genetic analysis finally separated the two phonic types into different cryptic species *P. pipistrellus* and *P. pygmaeus* (Leach, 1825), the common name given to the latter species being soprano pipistrelle (7). The distribution of *P. pygmaeus* is poorly known because of the recent distinction between the two phonic types. To date, it seems that soprano pipistrelles occur in Portugal, Sweden (8), Norway (9) and Denmark (7) (9) (10), whereas its sibling species, *P. pipistrellus,* does not. In other countries : Greece (11), Great Britain (3), Switzerland (12) (13), Northern Ireland (14), Germany (15) (16), France (17), Italy (18), and Spain (19) (16), the two species (*P. pipistrellus* and *P. pygmaeus*) are sympatric. Despite its presence in bordering countries, *P. pygmaeus* has never been identified in the Benelux so far. Two species of pipistrelles are known to occur in Belgium (20) : *P. pipistrellus* is widely distributed in Europe whereas *P. nathusii* (Keyserling & Blasius, 1839) is much less frequent and usually found around forest edges and riparian habitats (21). Here, we present the first acoustic records of the soprano pipistrelle in Belgium.

Echolocation calls were recorded by means of time expansion bat detectors (D-240(x) and D-980, Pettersson Elektronik AB, Sweden) and stored on a Mini-disc recorder (Sony) or a DAT (Sony). They were then analysed with Bat Sound software (Pettersson Elektronik AB, Sweden). The shape of the signal and maximum energy frequency were used to identify the species. Pipistrelles all use FM-qCF echolocation calls (22), a Frequency Modulated signal that ends up in a quasi Constant Frequency. However, as illustrated (Fig. 1), the different species can be discriminated according to the ending frequency of the qCF : *P. nathusii* around 35kHz, *P. pipistrellus* around 45kHz and *P. pygmaeus* around 55kHz (8) (23).

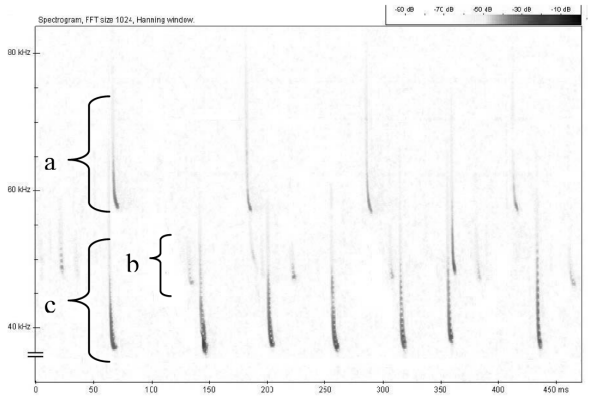

Fig. 1. – Sonagram of three *Pipistrellus* species recorded simultaneously at the Silex pond : a/ *P.pygmaeus*, b/ *P.pipistrellus*, c/ *P.nathusii*.

The first records of the soprano pipistrelle in Belgium came from different locations in the **Flemish Region** : Ieper (May 1998), Moen (June 1999) and Beernem (July 2000) in the Province of West-Flanders, in Zoersel (February 2002 and May 2003) and Merksem (May 2004) in the Province of Antwerp and, in Bree (September 2003) in the Province of Limburg. In April and June 2002 the species was first recorded in the **Brussels Region** respectively in the Silex domain (natural reserve in Boitsfort) and the Rouge Cloître domain (Auderghem). In the **Walloon Region** no confirmed observations were made until now (F. Forget, pers. comm.). Results are presented Table 1. In the Silex Domain (Brussels), soprano pipistrelles were recorded by chance in 2002 on two occasions. In 2003 a sustained monitoring experiment was performed during 50 nights, from April to September. The species was noted on 38 nights throughout the activity season. In summer 2004 and 2005 additional recordings confirmed that the species was still present on the site.

In the Flemish Region, despite an increasing sampling effort, in places where signals of *P. pygmaeus* had been recorded, the species has never been identified again. So far, all our recordings referred to single bats, most of which were recorded during spring (Table 1). This might suggest a temporally presence of the species in the Flanders, as a result of migration or accidental transportation.

TABLE 1

First records of the soprano pipistrelle in Belgium

Date	Location	Recorded (R) Observed (O)	Terminal QCF frequency (kHz)	Peak frequency (kHz)	N recorded signals	Habitat description
May 17, 1998	Ieper	R	54.3	55.2	15	Bank of a moat
June 06, 1999	Zwevegem (Moen)	R/O	57.9	58.7	10	Near a bridge, over a canal
July 02, 2000	Beernem	R/O	55.8	56.4	9	Ruins of a castle in a private woodland
February, 2002	Zoersel forest	R	56.7	59.6	7	Forest path
May, 2003	Zoersel forest	R	55.0	59.4	17	Forest path
September 3-4, 2003	Zuid-Willemsvaart Beek (Bree)	R	59,2	60,6	5	Near a bridge, over a canal
May 6 & 9, 2004	Fort Merksem	R	55,7	56,7	18	Bank of a moat
April 4, 2002	Boitsfort (Brussels)	R/O	56,0	57,8	16	Bank of a pond
June 20, 2002	Auderghem (Brussels)	R/O	56,9	57,6	7	Bank of a forest pond

Terminal QCF frequency = terminal frequency of the signal derived from spectrogram analysis (BatSound) (average calculated from N recorded signals)
Peak frequency = frequency of the highest peak derived from power spectrum (BatSound) of the selected signal (average calculated from N recorded signals)

A recent study has shown that *P. pipistrellus* and *P. pygmaeus* are sometimes mis-identified because of intraspecific variation, with some individuals using frequencies above or below the mean value (13). These authors found that false identification occurred in 50%, based on echolocation calls only. Is it possible that *P. pygmaeus* does not occur in Belgium and that we misidentify the species? It seems not likely. First of all, it is generally admitted that the frequency at maximum intensity of the search phase calls is the parameter showing the lowest inter-specific overlap and that best discriminates those two sibling species (1) (3) (4) (11) (18) (23). Second, Wicht et al. (2003) (13) only compared genetic and acoustical data of four soprano pipistrelles, which is a rather small sample to make any valuable interpretation. Third, they recorded their signals from hand-released animals, which could influence the emission of sounds (24). Finally, the distribution range of *P. pygmaeus* is particularly large in comparison with that of other European bat species ranging from Scandinavia to the Mediterranean area (1). The species is present in France, Germany and England and it would be surprising if the species was absent in the Benelux.

Our recordings suggest that *P. pygmaeus* is not widely distributed in Belgium but present. However, many areas have not been intensively surveyed. It is also likely that this species has been overlooked in the past years, because bat researchers did not expect and thus did not look for pipistrelles with maximum peak frequencies over 50kHz.

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