

**Status of *Nathusius' pipistrelle* (*Pipistrellus nathusii*) in Britain**

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*Nathusius' pipistrelle* (*Pipistrellus nathusii* Keyserling & Blasius) is a small temperate zone vespertilionid bat. It is found throughout northern continental Europe, extending westwards into France, and eastwards into Russia. It is common in the Baltic states and extends into Sweden and Finland. The southern limit to the distribution is the northern coast of the Mediterranean Sea (Stebbing & Griffiths, 1986; Stebbings, 1988). In Britain it is classed as a vagrant (Stebbing, 1988; Greenaway & Hutson, 1990), there being only three documented records up to 1987 (Stebbing, 1970; Banks, Clark & Newton, 1983; Stebbings, 1986), and a fourth record from a North Sea oil platform which was not formally recorded (PAR/JRS unpubl.) but mentioned in Stebbings (1986).

TABLE I  
*Confirmed records and measurements of P. nathusii in Britain*

Record	Location	Sex	Mass	Forearm	V <sup>1</sup>	V/FA	Date	Observer <sup>2</sup>	Reference	Wind <sup>3</sup>
1.	Dorset	M	6.4	33.0	43.5	1.325	06.10.69	RES	Stebbing (1970)	
2.	Herts	M	7.5	33.7	43.2	1.282	17.08.78	CB/MC/RN	Banks <i>et al.</i> (1983)	
3.	Essex	—	—	—	—	—	-01.85	RES	Stebbing (1986)	
4.	North Sea	F	6.3	34.3	—	—	02.09.85	A	unpl <sup>4</sup>	W/SW
5.	Jersey	F	—	34.5	45.4	1.315	14.12.87	BC	Carroll (1988)	
6.	Jersey	F	—	35.0	44.4	1.268	20.02.88	BC	Carroll (1988)	
7.	Jersey	F	—	35.5	45.0	1.267	03.03.88	BC	Carroll (1988)	
8.	North Sea	F	—	35.5	45.7	1.287	05.05.88	A	unpl	W
9.	North Sea	F	—	34.4	45.2	1.314	10.05.88	A	unpl	N/NW
10.	Jersey	—	—	—	—	—	20.07.88	HGY	Young (1989)	
11.	Jersey	F	—	35.7	44.7	1.252	-09.88	HGY	Young (1989)	
12.	Jersey	M	—	33.9	43.5	1.288	-09.88	HGY	Young (1989)	
13.	Guernsey	F	5.0	33.7	44.0	1.305	14.04.89	PC/AMH	unpl	
14.	NE Scotland	—	—	34.7	44.4	1.28	08.05.89	A	unpl	W
15.	North Sea	M	6.3	34.7	45.2	1.304	30.05.89	A	unpl	W
16.	Shetland	—	—	34.6	46.2	1.33	13.09.89	MR/A	unpl	E
17.	Guernsey	M	5.0	—	—	1.30	19.09.89	PC/AMH	unpl	S/SW
18.	NE Scotland	—	—	33.9	42.4	1.25	21.09.89	SP/JRS	unpl	S/SW
19.	North Sea	F	—	33.9	44.3	1.31	23.09.89	A	unpl	SW/W
20.	London	M	6.2	33.8	42.9	1.27	29.09.89	AMH/GB	unpl	SW/W
21.	Cornwall <sup>5</sup>	M	—	—	—	—	17.01.89	RES	unpl	

<sup>1</sup>V = length of fifth digit (mm); FA = length of forearm (mm)

<sup>2</sup>Observers: A—(members of Aberdeen Bat Group—P. A. Racey, J. R. Speakman, P. I. Webb, A. M. Burnett), AMH—A. M. Hutson, BC—B. Carroll, CB—C. Banks, GB—G. Bemment, HGY—H. G. Young, MC—M. Clark, MR—M. Richardson, PC—P. Costen, RES—R. E. Stebbings, RN—R. Newton, SP—S. Pritchard

<sup>3</sup>Dominant wind direction over week previous to record

<sup>4</sup>unpl—unpublished record

<sup>5</sup>One of three bats which were disturbed from a bark fissure in a tree. Two bats flew away.

Over the last two years there has been a marked increase in the number of unpublished identifications of the species, which is superficially very similar to the ubiquitous and common pipistrelle bat (*P. pipistrellus* Schreber). In this paper we summarize all the verified records to the end of 1989, and present some notes on the separation of the species from *P. pipistrellus*, based on measurements of the British specimens.

There are now 21 confirmed British records of *P. nathusii* (Table I). These records span the length and breadth of the UK, from Shetland ( $n=1$ ) in the north, to the Channel Islands ( $n=8$ ) in the south, and from Cornwall ( $n=1$ ) in the west to Essex ( $n=1$ ) in the east. Five records refer to bats on North Sea oil and gas platforms. Of the 21 records, only seven are from mainland Britain (Dorset, Hertfordshire, Essex, Greater London, Cornwall and north-east Scotland ( $n=2$ )), and none is from Wales or Ireland.

The time of year that *P. nathusii* was recorded in Britain shows two significant peaks (G-test,  $G=25.65$ ,  $d.f.=11$ ,  $P<0.01$ ), one around May and another around September (Fig. 1). There are several records in winter, and a single record from July which refers to an individual which was found 'long dead' (Young, 1989). On the continent it is well established that *P. nathusii* is migratory, leaving the Scandinavian and Baltic breeding grounds around late August and migrating south-west into central Europe and France (Strelkov, 1969; Fairon & Jooris, 1980). The British records do not coincide with south-easterly winds (Table I), as might be expected if the bats recorded in Britain were simply blown off their normal migrational course. The temporal distribution of records (Fig. 1) in combination with the spatial pattern (Table I) suggests therefore that some bats migrate into Britain, crossing either the North Sea or the English Channel. The bat found on Jersey in July 1988 (record 11) had been ringed in Plos Holstein, West Germany on the 12 September 1986, demonstrating that the British *P. nathusii* are of continental origin. The winter records suggest these migrants hibernate in Britain, returning to mainland Europe the following spring. Together this evidence suggests the bat should not be classed as a vagrant but as a migrant and winter visitor.

The recent spate of records (Table I) may be due to *P. nathusii* changing its status and expanding westwards (Stebbins, 1988). Alternatively, the increase may reflect the expansion in the number of bat enthusiasts active throughout Britain since the mid-1980s, and the fact that the bat is

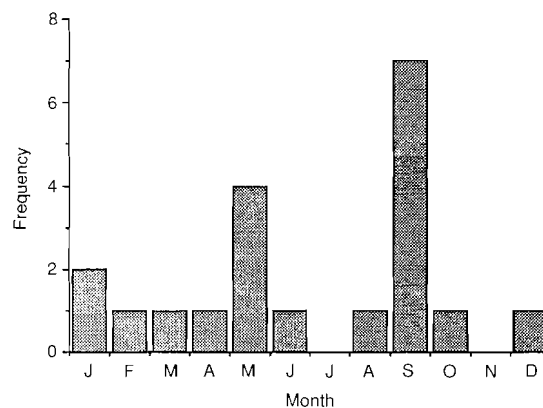


FIG. 1. Temporal distribution of British records of *Pipistrellus nathusii*, excluding one individual found 'long dead' ( $n=20$ ).

superficially very similar to the widespread and common congeneric species *P. pipistrellus*, and has hence previously been overlooked. On the continent there have been similar increases in records (e.g. Judes, 1989 in West Germany) but again whether these reflect true population increases is uncertain, and in the above study probably reflected a change in census methods from roost survey to transect walking with an ultrasound detector.

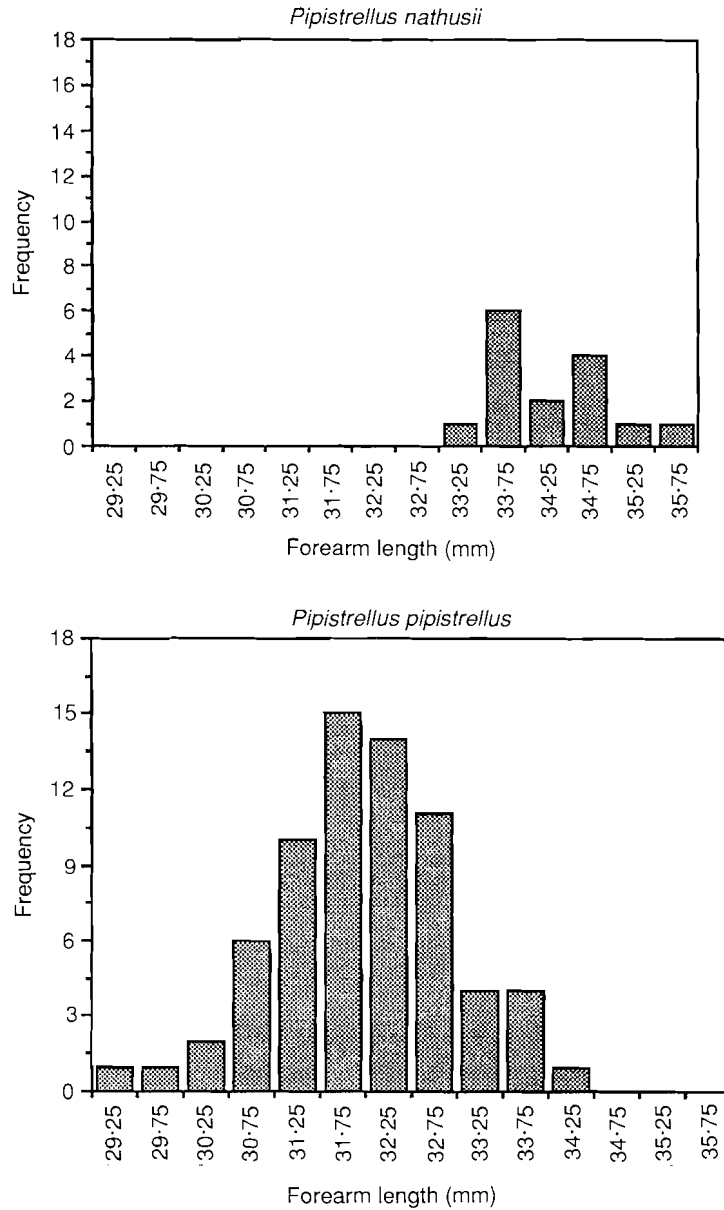


FIG. 2. Forearm lengths for all measured British records of *Pipistrellus nathusii* ( $n = 17$ ), and a sample of *Pipistrellus pipistrellus* from north-east Scotland ( $n = 79$ ).

To facilitate distinction of the species from *P. pipistrellus*, we present here a summary of the diagnostic features based on personal inspection of almost half ( $n=10$ ) of the British specimens, and reported measurements and descriptions of the rest. Externally, the bat is clearly pipistrelle in type. *Pipistrellus nathusii* moults annually between a dark greyish winter pelage, with slightly frosted hair tips to a rich rufous summer pelage. The latter is indistinguishable in colour from the pelage of *P. pipistrellus*, whilst the former is noticeably different. In all seasons the hair is longer

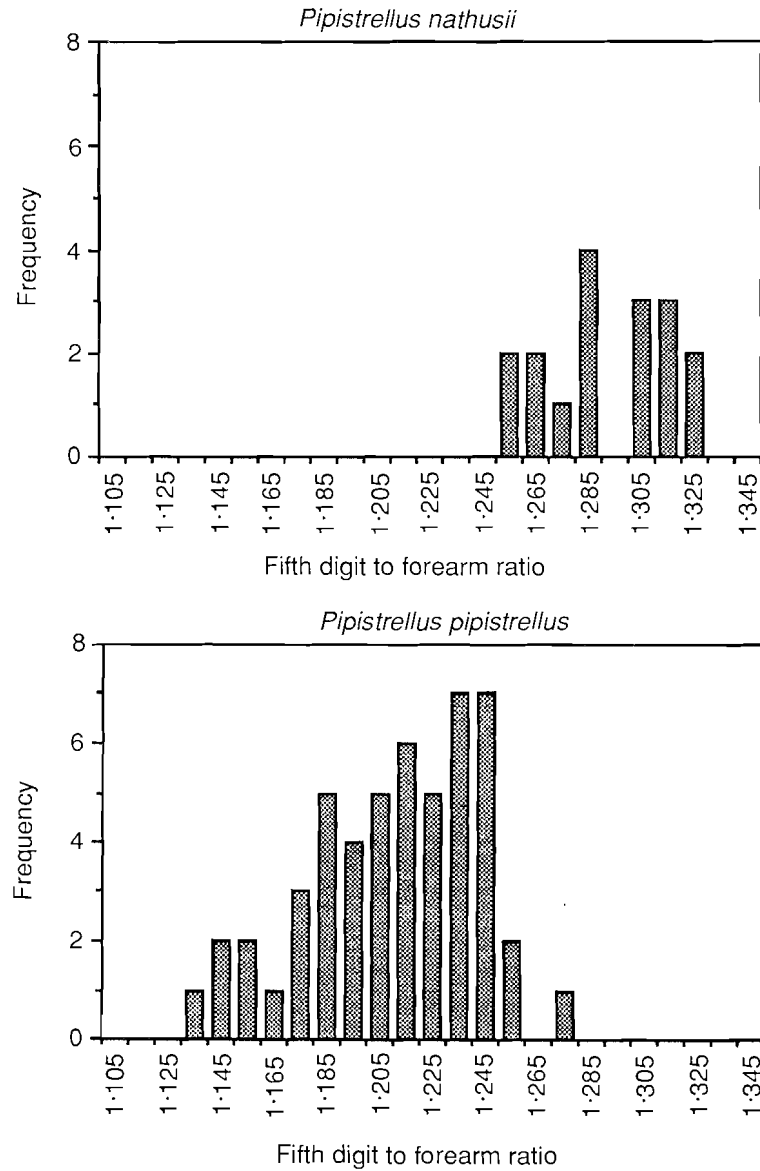


FIG. 3. Ratio of the fifth digit to the forearm length for all measured British records of *Pipistrellus nathusii* ( $n=17$ ), and a sample of *Pipistrellus pipistrellus* from north-east Scotland ( $n=51$ ).

than in *P. pipistrellus* and extends further on to the dorsal surface of the uropatagium. At rest, hanging on a vertical surface, the bat tends to leave the tail extended vertically more than *P. pipistrellus*. Banks *et al.* (1983) suggest that the wider wing of *P. nathusii* extends further back towards the feet than in *P. pipistrellus* and also that the phalanx of the third digit of *P. nathusii* is carried noticeably bent downwards. Toschi & Lanza (1959) suggest the thumb of *P. nathusii* is longer than that of *P. pipistrellus* and is equal to the width of the wrist when folded back against it (see also Haussler & Braun, 1989).

The canines of *P. nathusii* are much taller than those of *P. pipistrellus* (Brink, 1967). The third incisor is noticeably set back relative to the second incisor and the canine in *P. pipistrellus*, but is not so set back in *P. nathusii* (St. Girons, 1973; Banks *et al.*, 1983). Furthermore, the premolar immediately behind the upper canines ( $p^2$ ) sits fully in the tooth row and is taller than the cingulum of the canine in *P. nathusii*. In *P. pipistrellus*,  $p^2$  is very much reduced (Yalden, 1985). The lower canines of *P. nathusii* are more robust: at the level of the cingulum the anterior-posterior length is greater than half the height of the tooth (Greenaway & Hutson, 1990). These dental characteristics are the most important diagnostic features (Haussler & Braun, 1989), particularly dimensions of the lower canines (J. E. Hill, pers. comm.).

A distribution of forearm lengths of all the measured British *P. nathusii*, and a sample of adult *P. pipistrellus* from north-east Scotland, is shown in Fig. 2. All the British *P. nathusii* had forearm lengths in excess of 33.25 mm, whilst such long forearms in *P. pipistrellus* were rare (6% of the bats from north-east Scotland). However, continental *P. nathusii* may have forearms as short as 32 mm

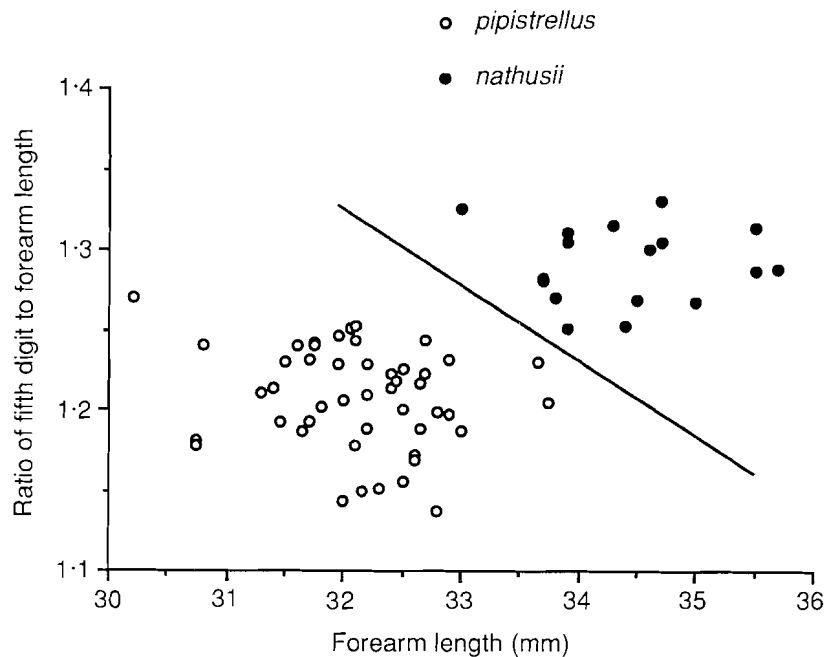


FIG. 4. Ratio of the fifth digit to the forearm length plotted against the forearm length for all the measured British records of *Pipistrellus nathusii* ( $n=17$ ) and a sample of *Pipistrellus pipistrellus* from north-east Scotland ( $n=51$ ). The two species can be separated by using the two measurements in combination.

(Stebbing, 1986), so separation by forearm length alone is not certain. *Pipistrellus nathusii* is clearly indicated for any pipistrelle bat with a forearm exceeding 34 mm, and this would be especially the case for bats found in England where *P. pipistrellus* have shorter forearms than those in Scotland (Stebbing, 1970). In this context it is interesting that a 'pipistrelle' bat recorded on Shetland in 1984, where there are no breeding *P. pipistrellus*, had a forearm of 34.2 mm (Racey, Speakman & Smith, 1985) and so may conceivably have been *P. nathusii*.

Stebbing (1986) suggested that the wing of *P. nathusii* is broader than the wing of *P. pipistrellus*. Consequently, the species may be separated from *P. pipistrellus* by the ratio of the length of the fifth digit (measured from inside the wrist to the end of the terminal phalanx) to the forearm length, which in *P. nathusii* exceeds 1.25. This was indeed the case for all 17 of the British records for which appropriate measurements were made (Table I). In comparing these with a sample of *P. pipistrellus* ( $n=51$ ) captured in north-east Scotland (Fig. 3), however, three of the *P. pipistrellus* also had ratios exceeding 1.25 (6% of the sample). This suggests that the use of the fifth digit to forearm length ratio does not provide a significant improvement over the use of forearm alone for distinguishing the two species. However, a combination of both the forearm measurement and the fifth digit to forearm length ratio was adequate to separate the two species in these samples (Fig. 4). We recommend the use of this combined measure to separate the two species, in combination with observations of the dental characteristics.

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