A Guide to the identification of pipistrelle bats

Pipistrelle Identification

BACKGROUND

In 1992 Gareth Jones and his student Sophie van Parijs undertook an investigation into the common pipistrelle, *Pipistrellus pipistrellus*. The work had been prompted by observations of Phil Richardson and others that the pipistrelle appeared to occur in two morphologically different forms with slight differences in the peak frequencies of their echolocation calls, Phil described them as 'bandits' and 'browns'. The study by van Parijs and Jones found that the two forms of the pipistrelle used separate maternity roosts and had peak frequencies of, on average, 46 kHz and 55 kHz respectively. Further studies by John Altrinham, Gareth Jones and Kirsty Park into the mating behaviour of pipistrelles provided evidence that the two forms were reproductively isolated, as they did not share mating roosts.

Work into the morphology, echolocation calls and roosting ecology of the two forms, by Kate Barlow, showed that there were clear overall differences between the forms. The 45 kHz form (bandit) was slightly larger and had smaller sized maternity colonies than the 55 kHz form (browns). There were also clear differences in their social calls. Additional work by Nancy Vaughan suggested that 45 kHz pipistrelles tended to forage over a wide range of habitats, including over rivers and lakes, in woodland and over grassland. In contrast, 55 kHz pipistrelles foraged almost exclusively over habitats associated with water. Kate Barlow found the differences in their foraging habitats were reflected in their prey type. Although both species take a wide range of small insects such as flies and midges, soprano pipistrelles eat mainly those that have an aquatic larval stage.

A study into the DNA of the two forms was suggested by Paul Racey and Gareth Jones, and was undertaken at London Zoo by Mike Bruford and Elizabeth Barratt.

This confirmed the suspicion that the two forms were cryptic species. Interestingly they were genetically much more different than was initially suspected, and had probably separated as distinct species between 5 – 10 million years ago. This made them much less closely related than species such as brown and grey long-eared bats, or whiskered and Brandt's bat. Further DNA analysis of the pipistrelle type specimen showed it to be one of the 45 kHz types. This has retained the scientific name *Pipistrellus pipistrellus*, and is known as the common pipistrelle. The 55 kHz form has been given the name *Pipistrellus pygmaeus*, and as its echolocation call has a higher frequency, is known as the soprano pipistrelle.

Unfortunately for those of us who work in the field, although statistically there are clear differences between many aspects of the two species, there is a great deal of overlap between them. Morphologically there is no single feature in their dentition or biometric measurements that can be used to separate them. In some individuals, there is also an overlap in the peak frequencies of their echolocation calls. On top of this there is a suggestion that the overall appearance of the two species may vary geographically (as it does in whiskered and Brandt's bat) making them easier to separate in some areas of the country than others.

This document attempts to outline the key identification features we can use in the field, however, in some cases we just have to accept that we cannot separate them, and will have to record them as *Pipistrellus sp*.

ECHOLOCATION CALLS

Heterodyne detectors

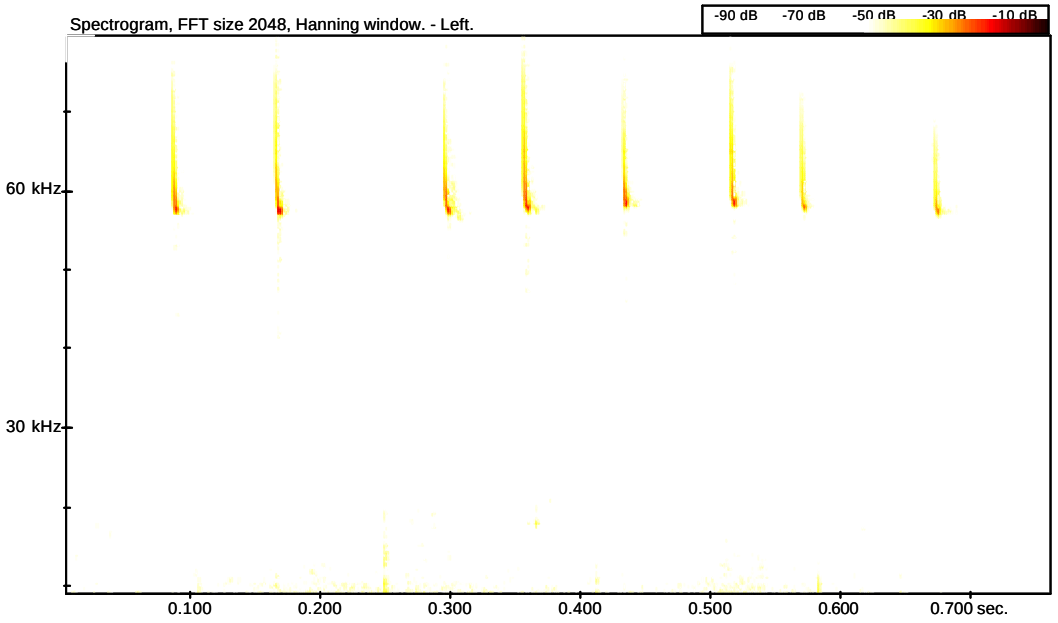
These are pretty much hopeless in the field unless a bat is flying in a restricted area. However, they are useful at roosts when you have a good number of bats emerging. The detector is tuned to about 45 then 55 kHz and back. The loudest response will give a good indication of which species is occupying a roost. I have found that by tuning into the harmonic of the call (double the frequency)- 90 and 110 kHz may help

to confirm the species. This worked well with the S25 detector which has a pretty flat frequency response, but it may not be so good for equipment such as the Bat Box that has its best response around 40 kHz.

Time expansion detectors

These are much more useful in all situations, although you may have to return to your office to download the calls and analyse them, which is a pain if you want to make an on the spot identification.

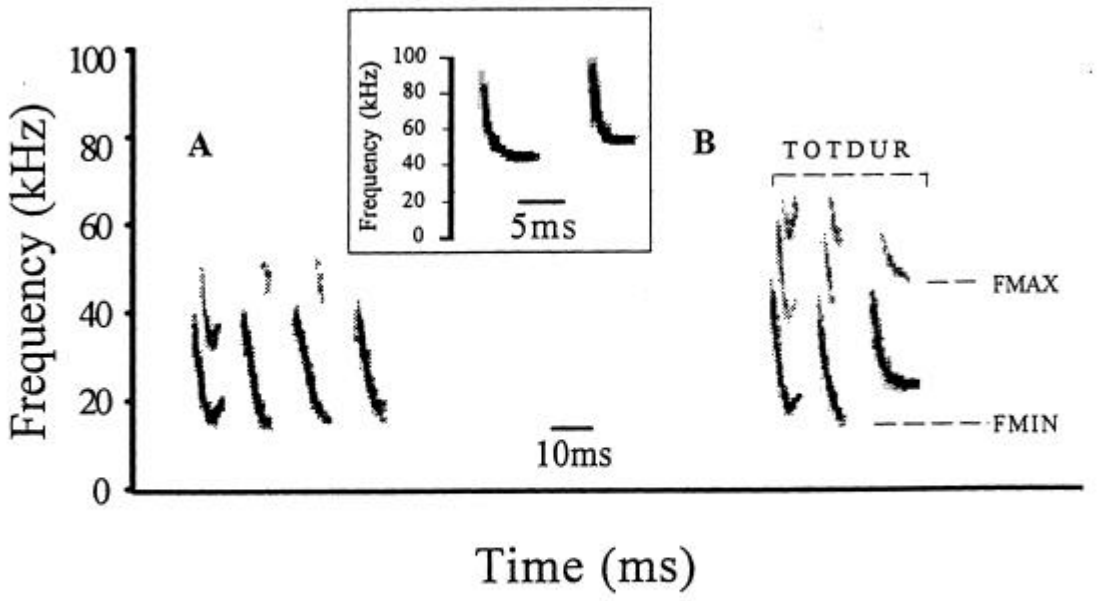
The calls of all pipistrelles are usually a reversed J-shape. Below are the calls of a soprano pipistrelle, the peak frequency at 55 kHz is shown by the darker colour on the sonogram in the lower window.



The echolocation calls of pipistrelles can usually easily be ascribed to one of the two species. However, occasionally I have recorded pipistrelles echolocating at around 50 kHz and it is not possible to identify these animals.

The social calls of the two species also vary. Typically common pipistrelles (A) have four (sometimes five) components to their calls, whereas soprano pipistrelles (B) have

three or less. The social calls of soprano pipistrelles are higher in frequency than those of common pipistrelles.



Social calls of (A) common pipistrelle and (B) soprano pipistrelle

ROOSTS AND COLONIES

Although there is a great deal of overlap in the size of common and soprano pipistrelle maternity colonies, generally common pipistrelles have smaller colonies of less than 100 bats, whereas those of soprano pipistrelles frequently number over 200. Common pipistrelles are also more mobile, so when colonies appear to be shifting roosts fairly regularly this may indicate the presence of common pipistrelles. In addition, as soprano pipistrelles tend to feed over water courses more than the common pipistrelle, roosts close to water may well be sopranos.

IDENTIFICATION IN THE HAND

As I've already mentioned a note of caution, there may well be regional variations in the morphology of the two species. Soprano pipistrelles are small, usually a uniform brown colour. The main difference that I've used to identify them is the face. The muzzle is pointed and the face often light brown or pinky.

Soprano pipistrelle (photography by Frank Greenaway)

Illustration of a Soprano pipistrelle by Denys Ovenden

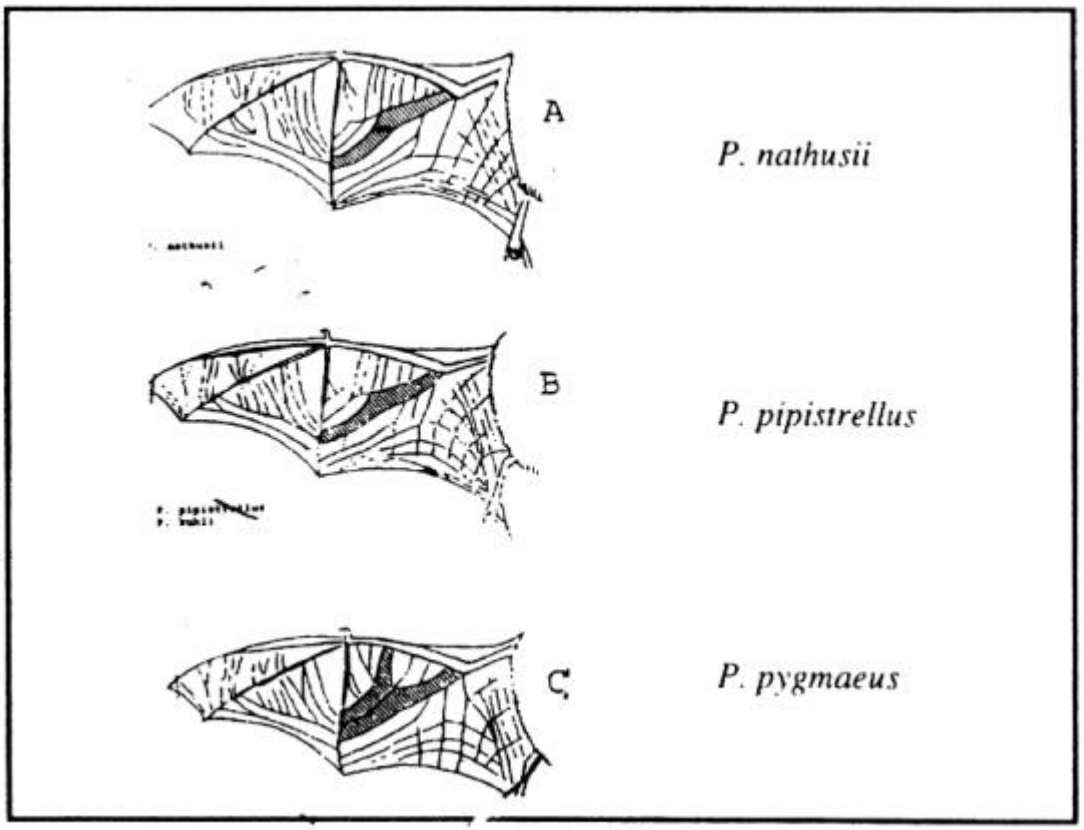
In contrast the common pipistrelle has a darker face, hence the name bandit. The muzzle has better developed glands that can appear to be quite bulbous.

Common pipistrelle (photography by Frank Greenaway)

Illustration of a common pipistrelle by Denys Ovenden

WING PATTERNS

A technique suggested by Gareth Jones is to use differences in the pattern of the venation in the wing membranes to separate them. However, as with the other identification methods it does not appear to be foolproof. Scarring on the wings may confuse the issue, and the feedback I've had suggests that it may work better for soprano pipistrelles than common pips.



Some people have suggested that the two species smell different. This is something I've never followed up!

Henry Schofield
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