

# Guide to identifying long-eared bats in Britain

This guide is intended as an aid to identifying Grey Long-eared Bats (GLEB) and distinguishing them from the more common Brown Long-eared Bat (BLEB). (Note, this ratio is reversed in the Channel Islands). It aims to assist consultants working throughout the Grey Long-eared Bats' range, particularly those that have had limited experience with this species.

There are many areas of crossover between the two species (in colouration, measurements, echolocation frequencies etc) so all identification features are

intended for use in conjunction with others to build a picture of the species. No one identification feature can be deemed definitive and if in any doubt, there is no substitute for DNA analysis. It is important to note that not all bats are accessible (or may be appropriate) to handle and measure. Therefore the overall appearance of the bat (which may be subjective) can be important. In Britain all bat species and their roosts are legally protected, by both domestic and international legislation. This guide is primarily intended for use by licenced bat workers.



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# Visual recognition of GLEB/BLEB

**Primary features:** (Those in **bold** are deemed to be the most reliable diagnostic features).



**GLEB**

<b>Face/head</b>	Generally darker, muzzle wider looking, longer and more horse/dog-like. Flesh colour - dark brown to almost black. Pale ventral fur spreads further up the side of the head towards the ears. Smoother appearance to the muzzle (generally bumps absent). Muzzle broader and squarer.
<b>Thumbs</b>	Shorter, thicker thumbs (generally less than 6.0mm) (range 5.5-6.5mm). Thumb generally shorter than the width of the tragus at its widest point.
<b>Tragus</b>	Broader and longer with anterior edge almost straight and posterior edge strongly convex (generally more than 5.5mm wide); UK average: 5.85mm, range: 5.5-6.25. Almost entirely darkly pigmented.
<b>Thumb(t)/forearm (f) length ratio (r) ( t/f x 10 = r)</b>	14%
<b>Fur</b>	Generally greyer in appearance, with whiter underside. Greater colour <b>contrast</b> between darkness of the face and whiteness of ventral fur, than in BLEB. Ventral and dorsal fur sharply delineated.
<b>Ears</b>	Generally longer but not a useful parameter. Series of white hairs on interior of ears and ring of white hairs around the base.



**BLEB**

<b>Face/head</b>	Generally less contrast in face colour and surrounding fur. Flesh coloured to light brown. (generally considered to be a more useful diagnostic feature than fur colour). Has four bumps on it's face (two below the eye, two more or less parallel to them). Muzzle often tapered. Juvenile BLEB have black faces.
<b>Thumbs</b>	Longer thumbs (generally more than 6.0mm) (range 6.5-8.4mm). Thumb generally longer than the width of the tragus at its widest point.
<b>Tragus</b>	Shorter, narrow and lancet shaped (generally less than 5.5mm wide). Little pigmented.
<b>Thumb(t)/forearm (f) length ratio (r) ( t/f x 10 = r)</b>	17%
<b>Fur</b>	Generally browner in appearance, underside more dirty white/buff. Although juvenile BLEB appear darker and greyer for about 1 year. Ventral and dorsal fur colour changes gradually.
<b>Ears</b>	Generally shorter. Cream hairs in place of white.

## Secondary features:

	GLEB	BLEB				
Posture	Particularly with active bats within large roof voids or shortly before emergence – forearms are often spread wide with the head and upper body raised, making the bat look bigger and bolder.	Can also spread forearms when becoming active in the roost, but less frequently seen				
Overall size	Generally larger and stronger (but not useful diagnostic feature, because of overlap)	Generally smaller but difficult to gauge without direct comparison				
Dorsal hairs	Single dark colour	Light and dark banding				
Feet	Smaller feet (7-8.8mm)	Larger feet (8.2-9.7mm) with long, bristle like hairs				
Toes	Hairs adpressed against the toes	Hairs reflex widely from the toes				
Forearm length (Note there is some overlap).	<table border="1"> <tr> <td>Males &gt;39mm UK average: 39.5 ±0.7mm (range: 38.3-40.7)</td> <td>Females &gt;39.7mm UK average: 41.2 ±0.9 mm (range: 39.6-43.6)</td> </tr> </table>	Males >39mm UK average: 39.5 ±0.7mm (range: 38.3-40.7)	Females >39.7mm UK average: 41.2 ±0.9 mm (range: 39.6-43.6)	<table border="1"> <tr> <td>Males &lt;39mm</td> <td>Females &lt;39.7mm</td> </tr> </table>	Males <39mm	Females <39.7mm
Males >39mm UK average: 39.5 ±0.7mm (range: 38.3-40.7)	Females >39.7mm UK average: 41.2 ±0.9 mm (range: 39.6-43.6)					
Males <39mm	Females <39.7mm					
Behaviour (individual variation prevent this being a diagnostic feature and is a point of contention and may result from varying bat handling techniques).	<b>Generally</b> more aggressive, more likely to persistently bite and struggle	More docile, generally considered to be an easy species to handle				
Penis	Club shaped at the end (not useful parameter as the difference is slight)	Thin, parallel sided and narrows towards the tip				

Other features:

	GLEB	BLEB
In flight	More likely to be in open habitat but may forage in closed habitat in inclement weather. Can forage below 3m, primarily hawking.	More likely to be in woodland/closed habitat. Forages at a range of heights, hawking and gleaning.
Emergence time	Generally late (after dark) 45-55 mins after sunset.	Generally late (after dark) 45-55 mins after sunset.
Roosting behaviour	On ridge beam but more likely to be equidistant between trusses (space roosters). (Although this is not considered to be a diagnostic feature). Within the roof space, either forms clusters between roof beams, hides in wall crevices, in gaps between walls and roof beams, between roof slates or behind roofing felt, or roosts individually hanging freely on roof beams or over roofing felt. Non-volant juveniles only use crevices and gaps.	On ridge beam but up against trusses (fissure roosters).
Roost types	<b>Maternity roosts</b> – large open roof spaces in stone buildings. Crevices used intensively during pregnancy and lactation. Maternity roosts can be formed of just a few bats (3-10). Network of smaller roosts nearby. (night roosts and male roosts). Not known to use trees as maternity roosts, but may be used for night roosting. Not known to use bat boxes except use of a bat box within a roof void (Jersey) (3FN Schwegler).  <b>Hibernation roosts</b> – often use crevices within the roof void but will also use cellars, mines, quarries, caves and rock crevices. Generally found in low numbers. Thought to be fairly active over winter with regular roost shifting. In Jersey, often found in summer roosts, so could be the same in southern England.	<b>Maternity roosts</b> – similar to GLEB, but will roost in trees and bat boxes. Generally larger colony numbers (on mainland).  <b>Hibernation roosts</b> – caves, tunnels, cellars, trees. More likely to be found in enclosed spaces such as gable ends etc.
Droppings	No diagnostic differences in appearance. Small numbers of droppings should not automatically be considered as non-maternity. Scattered throughout the roof space, due to pre-emergence flight.	Scattered throughout the roof space, due to pre-emergence flight. Also likely to be in piles under roosting points (due to larger numbers of bats).

## Recognising GLEB calls from BLEB calls

- General caution is advised with acoustic identification as with whispering bats, calls in the field are likely to be weak and of low quality – **consider only assigning species when better quality recordings are made.**
- Long-eared bats do not always echolocate when in familiar surroundings.
- One possible cause of misidentification is low signal to noise ratio could mean that higher frequencies not captured, or unsuitable spectrogram settings (e.g. too low brightness/contrast) could reduce visibility of higher frequencies, in both cases causing BLEB calls to appear to have lower start frequencies.
- GLEB harmonics tend not to overlap (except in cluttered environment). BLEB harmonics tend to overlap (although occasionally there is a gap).
- There is significant crossover in echolocation frequencies between GLEB and BLEB (as seen below), but it is generally considered that the first harmonic of GLEB would start below 48kHz and the first harmonic of BLEB would start above 48kHz. However, this is not deemed to be definitive so can be used to improve probability of identification in conjunction with foraging habitat preference (species rich grassland/riparian/open habitat more likely to be GLEB; woodland/closed habitat more likely to be BLEB). This information could be used to identify priority areas for trapping surveys to confirm species.

### Echolocation

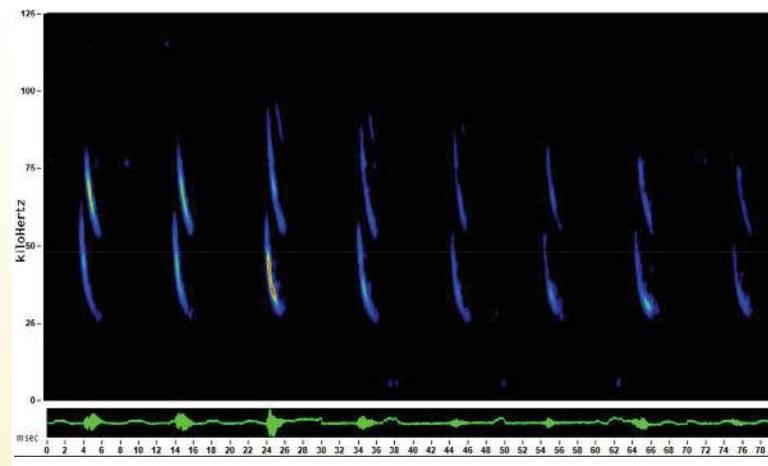
Parameter	Brown Long-eared Bat	Grey Long-eared Bat
	Mean (range)	
Inter pulse interval (ms)	76.8 (21.8 – 172.4)	105.0 (35.8 – 194.0)
Call duration (ms)	.3 (1.2 – 3.8)	3.8 (1.4 – 7.0)
Peak frequency (kHz)	33.1 (25.5 – 42.1)	32.6 (26.3 – 50.5)
Start frequency (kHz)	50.0 (31.9 – 63.8)	43.4 (35.4 – 55.9)
End frequency (kHz)	25.0 (19.1 – 30.9)	23.6 (17.0 – 31.7)

*Adapted from Russ (2012)*

Echolocation call parameters	Brown Long-eared Bat	Grey Long-eared Bat
1st harmonic fmax (kHz)	55.1 ± 4.19	44.0 ± 2.88
1st harmonic fmin (kHz)	24.3 ± 2.13	21.8 ± 1.52
2nd harmonic fmax (kHz)	82.1 ± 6.84	73.3 ± 5.43
2nd harmonic fmin (kHz)	50.7 ± 3.06	45.2 ± 2.09

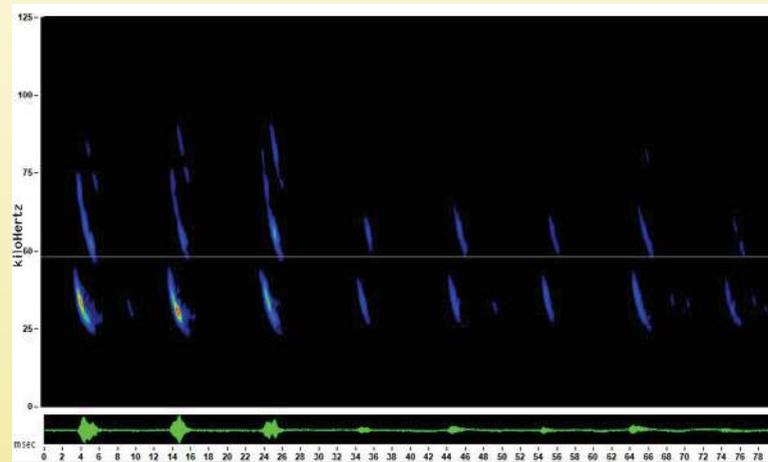
*Adapted from Dahlberg (2004)*

## Some examples of calls



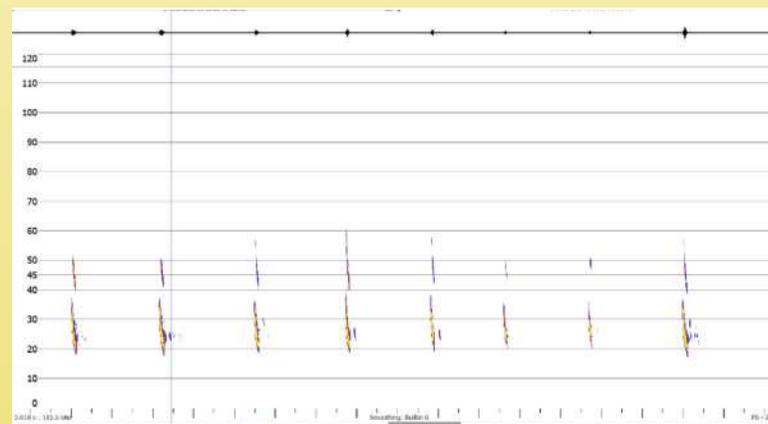
### Brown Long-eared Bat

Echolocation calls recorded outside known maternity roost, Derbyshire. Courtesy of Martyn Cooke. (Ruler at 48kHz).



### Grey Long-eared Bat

Echolocation calls recorded outside known maternity roost, Devon. Courtesy of Martyn Cooke. (Ruler at 48kHz).



### Confusing calls

NSL call harmonic (on playback the tone gives it away). This is one example of a confusing call – there are probably more. Courtesy of Piers Sangon.

## Resources and further reading:

Collins, J (ed). (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Dahlberg, E. (2004) A Comparison of the Social Calls and the Echolocation Calls of Grey Long-eared Bat (*Plecotus austriacus*) and Brown Long-eared Bat (*Plecotus auritus*).

Dietz, C and Keifer, A. (2016) Bats of Britain and Europe. Bloomsbury Publishing Plc.

Dietz, C and von Helversen, O. (2004) Illustrated identification key to the bats of Europe. Christian Dietz and Otto von Helversen.

Razgour, O., Whitby, D., Dahlberg, E., Barlow, K., Hanmer, J., Haysom, K., McFarlane, H., Wicks, L., Williams, C., Jones, G. (2013) Conserving Grey Long-eared Bats (*Plecotus austriacus*) in our landscape: a conservation management plan. University of Bristol/Bat Conservation Trust.

Razgour, O. (2020) Grey long-eared bat, *Plecotus austriacus*, Fischer, 1829. In Handbook of the Mammals of Europe. Springer.

Russ, J. (2019) British Bat Calls: A Guide to Species Identification. Pelagic Publishing.

Stebbing, R.E. (1970) A comparative study of *Plecotus auritus* and *Plecotus austriacus* (Chiroptera, Vespertilionidae) inhabiting one roost. *Bijdragen tot de Dierkunde*, 40(1): 91-94.

Swift, S.M. (1998) Long-eared bats. Poyser Natural History.

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