Supplementary Material

**Supplementary Material Table 1:** **Bat call analysis criteria to assign species/sonotypes**

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| Species/Sonotype | Characteristic criteria for certain assignment of species/sonotype |
| *Nyctalus noctula* →  Preanalysis in Batexplorer\* | - Regular peak alternation- Peak <= 21 kHz (QCF)- End frequency <20 khz (QCF)- (Addition: when FM-QCF peak and end <22 kHz) |
| *Nyctalus leisleri* | - Softer peak alternation- Peak 22-26 kHz (Qcf)- Clear when QCF end-frequency 23-27 kHz - call length under 11ms  |
| *Eptesicus serotinus* | - No peak alternations- FM-QCF calls- Clear when high bandwith >30 kHz- Peak 25- 35 kHz (FM-QCF)- Clear when end-frequency in FM calls >29khz |
| *Eptesicus nilssonii* – not identified in this study  | - No peak alternations- Peak >28 kHz -31 (Qcf)- End >27 kHz and >11ms (Qcf)- Long calls |
| Nyctaloid(*Nyctalus noctula, Nyctalus leisleri, Eptesicus serotinus, Vespertilio murinus*) | - Irregular peak alternations- No clear QCF calls- Peak 22 – 28 kHz in QCF |
| *Pipistrellus pygmaeus*→  Preanalysis in Batexplorer\* | - Peak 52.1 - 63 kHz - QCF – FM-QCF- Clear when end-frequency >52 kHz |
| *Pipistrellus*\_high(*Pipistrellus pipistrellus, Pipistrells pygmaeus*)→  Preanalysis in Batexplorer\* | - Peak 51 -52 kHz- QCF – FM-QCF |
| *Pipistrellus pipistrellus*→  Preanalysis in Batexplorer\* | - Peak 43< – 50.9 kHz- QCF – FM-QCF- Clear when end-frequency 45-50 kHz |
| *Pipistrellus*\_low(*Pipistrellus pipistrellus, Pipistrellus nathusii*)→  Preanalysis in Batexplorer\* | - Peak 42 – 43 kHz- QCF – FM-QCF |
| *Pipistrellus nathusii*→  Preanalysis in Batexplorer\* | - Peak 34 – 41.9kHz- QCF – FM-QCF- Clear when end-frequency <40kHz |
| *Myotis myotis* | - Typical FM-dominated calls and knee around 30 kHz- Start <90 (100) kHz, end 20 - 23 kHz |
| *Myotis nattereri* – not clearly identified in this study due to strong attenuations. Likely fell into the *Myotis* spp. category. | - Typical rather straight FM-calls with very wide bandwidths.- Start >100 kHz; end often <21 kHz |
| *Myotis* spp.(*Myotis bechsteinii, Myotis dasycneme, Myotis daubentonii, Myotis mystacinus / Myotis brandtii, Myotis nattereri*) | - Typical FM-calls with wide bandwiths with shapes including knee and heels  |
| *Plecotus* spp. (*Plecotus auritus/ Plecotus austriacus*) | - Typical FM-dominated call shapes, first and second harmonics visible \*\* |
| *Barbastella barbastellus* | - Alternating call types A and B- Peaks A: (30) 33-35 (37) kHz; B: (35)39 – 43 (45) kHz |

\* Please refer to Supplementary Material Datasheet S1to see the process of semi-automatic pre-analysis in Batexplorer.

\*\* In the case of *Plecotus* spp., we also counted in the recordings the characteristic and loud low-frequency social calls emitted during hunting flights. Their true function is not fully understood yet and they have a better detection range compared to the very quiet whistle-calls in echolocation (Ahlén, 1981; Skiba, 2009; Murphy, 2012).

Bat call analysis criteria have been summarized from the following sources: Parsons and Jones (2000), Russo and Jones (2002), Pfalzer and Kusch (2003), Obrist et al. (2004), Skiba (2009) and Barataud (2020).

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