# Sound Based Predator-Prey Interactions Between European Bats and Bush-Crickets

By

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# Summary

Predator-prey interactions play a crucial role in shaping the diversity and abundance of species in terrestrial ecosystems (Abrams, 2000). These interactions involve a range of sensory-based adaptations that allow predators to pursue and capture their prey, while prey species have developed sophisticated mechanisms to evade capture (Stevens, 2013). Examples include prey species with olfactory or taste-based defences, rendering them unpalatable or toxic to predators, and those using bright coloration or sound signals to warn potential predators (Caro, 2005; Leavell et al., 2018; Krivoruchko et al., 2021). Predators, on the other hand, rely on diverse sensory mechanisms to detect, track, and capture their prey (Stevens, 2013).

In this intricate web of sensory-based interactions, my thesis hones in on a specific yet critical channel – the acoustic sense. Sound perception and emission in predator-prey interactions are instrumental, shaping the behaviour and evolution of both predators and prey (Fletcher, 2014). Understanding sound perception is crucial for comprehending various aspects of animal life, including foraging, navigation, mate selection, territorial defence, and predator avoidance (Fenton et al., 2016). The aim of this thesis is to elucidate the sensory and behavioural mechanisms of prey detection by predators and of defence strategies by prey in the complex predator-prey system between the lesser and greater mouse-eared bats (*M. myotis* and *M. blythii*) and the bush-crickets of the family Tettigoniidae. The thesis focuses specifically on sound-based predator-prey interactions between European bats and bush-crickets, exploring the diet of bats through DNA metabarcoding, tracking the movements and foraging behaviour of bats using miniature tags, and investigating the antipredator strategies of bush-crickets through behavioural experiments.

The findings of the thesis shed light on the intricate mechanisms and evolutionary forces driving predator-prey interactions in complex ecosystems. They also underscore the potential of combining different disciplinary approaches, like molecular techniques, biologging, and behavioural experiments, to enhance our comprehension of the natural world. The following chapters will further delve into these explorations, their key findings, and their implications, all contributing to a better understanding of the ecology and evolution of predator-prey interactions in natural communities.