# Developing a novel bioacoustic monitoring for Garden Dormice using passive sound recorders and machine learning

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## Abstract

One of the challenges of small mammal conservation is to be able to find the target species in the field. This is especially true for small nocturnal hibernators like dormice. Passive bioacoustic monitoring, as a non-invasive method, can be a useful tool to more efficiently find vocalizing animals in the field. However, bioacoustic methods produce a large amount of data, of which the manual analysis is highly time consuming. Therefore, there is need for an automatized process for identifying animal vocalization in acoustic data. Two types of recorders, audiomoths and BAR-LT recorders, were installed at a total of 10 locations of known Garden Dormouse *(Eliomys quercinus)* activity in Germany and were left recording in the field from June to September, producing a total of 3.54 TB of data. Based on our own and volunteers' observations, Garden Dormouse vocalizations were manually identified in a subset of the sound files produced. These vocalizations, as well as ambient sound samples, were labelled and extracted to train a TensorFlow model, which was then tested on new subsets of the complete dataset. Comparing sound quality and acquisition costs of the two recorder types shows the potential for large-scale monitoring applications using the less expensive and open source audiomoth. Next steps include a time analysis of Garden Dormouse calls to find out when they are vocally more active during the study period. Such knowledge can help narrow the temporal scale of future bioacoustic studies on this species.

## Keywords

In Search of the Garden Dormouse, conservation, small mammals, vocalization, animal communication

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## Conflicts of interest