Looking up to the sky: using high resolution remote sensing to characterise hibernaculum locations of the Hazel Dormouse

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Abstract

The Hazel Dormouse is predominantly an arboreal species that moves down to the ground to hibernate in the autumn in temperate parts of its distributional ranges at locations not yet well understood. In this study, we tested whether environmental characteristics surrounding Hazel Dormouse hibernacula can be identified using high-resolution remote sensing and data collected *in situ*. We modelled remotely sensed variables, including canopy height and cover, topographic slope, sky view, solar radiation and cold air drainage around 83 dormouse hibernacula in England (n=62) and the Netherlands (n=21), and identified environmental characteristics that may be favoured by pre-hibernating dormice. We also collected and analysed data on leaf litter depth, temperature, canopy cover and distance to the nearest tree collected *in situ* at hibernaculum locations in England. We found that remotely sensed data were effective in identifying attributes surrounding the locations of dormouse hibernacula and, when compared to *in situ* information, provided more conclusive results. Our study suggests that remotely sensed topographic slope, canopy height and sky view have an influence on animals choosing suitable locations to hibernate; whilst *in situ* data suggested that average daily mean temperature at the hibernaculum may also have an effect. Remote sensing proved capable of identifying localised environmental characteristics in the wider landscape that may be important for hibernating dormice. We also propose that this method can provide a novel progression from habitat modelling to conservation management for the Hazel Dormouse, as well as other species using habitats where topography and vegetation structure influence fine-resolution favourability.

Keywords

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Ethics and security

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Author contributions

The manuscript was created by LG. Fieldwork in the UK was planned by LG, FM and RW and conducted by LG and in the Netherlands, it was planned by PL, MLH and RF and

carried out by PL and RF. Data was analysed by LG, with advice from FM, JB, RM and RW. The manuscript was written by LG and reviewed and revised by FM, JB, RM, RW, PL, and RF.

Conflicts of interest

None.