

Title: Conservation and ecology of the hazel dormouse, *Muscardinus avellanarius*: Take only photographs leave only footprints: Novel applications of non-invasive survey methods for small arboreal animals and Keeping track of hazel dormice: an objective method for discriminating small mammal footprints. *PhD Thesis, University of Exeter, 2012*

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Background to study

Current methods for monitoring hazel dormouse populations are invasive and have limitations such as low detection rates, habitat dependence and are prolonged and seasonal. As such the development of alternative, rapid techniques to establish dormouse presence may be fruitful for promoting effective and efficient monitoring in the future.

Method

- Camera traps (5) and tracking cages (5) were erected between July and October 2010 in two dormouse sites (Cabilla and Red Moor) in Cornwall, currently monitored using nestboxes.
- Infrared Scoutguard camera traps were erected 2.5 m above ground and 1-1.5 m from a baited station and set to 20 minute video mode to allow for species identification.
- Tracking cages were designed to collect small animal prints in the tree canopy and adapted from 8" squirrel blocking cages. They included a tracking card surrounding a bait station and polythene weather protected cover. Footprints were identified from reference prints.
- Camera traps and tracking cages were located > 60 m apart within monitoring areas and were baited with sunflower seeds, peanuts, apple, and honeysuckle fragrance.
- The performance of both techniques was assessed based on field data. An aid for footprint identification was developed using reference wild captured prints, by obtaining random morphometric measurements and developing a rule based method to confidently identify dormouse prints from other small mammal species.

Key results

- Arboreal small mammals were attracted to bait and camera traps provided sufficient images to identify species with 8% of video images captured dormice and 38% captured wood mice.
- It took on average 10.6 nights (2-21 nights) for dormice to detect and utilise bait stations and dormice on average visited stations 6.2 times and 2.3 times per session at Cabilla and Red Moor respectively. Wood mice visited the bait stations more frequently than dormice.
- Dormice were more frequently detected as time since installation of camera increased.
- Tracking cages were adequate for identifying species presence and for excluding grey squirrels. 65% of tracking cards had >1 identifiable print and on average 4 prints per card were obtained.
- Tracking cages and camera traps failed to detect visiting small mammals in 7% and 11% of trapping sessions respectively.
- Obtaining print measurements: Width/height ratio (A); middle/outer toes angle (C) and metacarpal pad (D) and inserting into equation: $-8.417 + (A * -2.132) + (C * 0.090) + (D * 1.145)$ where results are >0.89 and <-0.87 provides a reliable method for distinguishing between dormice and wood mouse footprints respectively.

Key messages to landowners and managers derived from these results

- Camera trapping and/or bait stations may be a sufficient technique for establishing dormouse presence when survey time/effort is restricted. Pre baiting prior to collecting presence data is advised to allow sufficient time to attract dormice. Method trials are advised throughout the season to provide suitable protocols to be developed in different habitats.

- Dormice and wood mouse footprints can be confidently differentiated by unskilled volunteers by obtaining three measurements and using the defined calculation.

Key words/phrases

Dormice; *Muscardinus avellanarius*; monitoring; camera traps; tracking stations; wood mouse