

Title: Conservation and ecology of the hazel dormouse, *Muscardinus avellanarius*: Isolation and characterisation of hazel dormouse microsatellite loci. *PhD Thesis, University of Exeter, 2012*

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Background to study

The hazel dormouse is considered vulnerable to habitat loss and fragmentation and information on their molecular ecology may provide vital information for their future protection. To enable molecular research into the species, DNA markers need to be developed which are essential tools in genetic analysis.

Method

- Two new microsatellite-enriched libraries were constructed from DNA extracted from liver tissue from one hazel dormouse found dead in Cornwall (2009). Microsatellite loci, which are short repeat motifs within non-coding regions of DNA, were identified and those which showed a high variation between individuals were retained.
- The unique flanking regions located before and after the microsatellite loci that are consistent for the species were identified and developed into 'primers' allowing the DNA of dormice to be amplified at the region of interest.
- Microsatellite primers were redesigned for 9 of 10 previously designed primers (Md Naim) to account for amplification failure.
- Performance of 53 primer sets and redesigned primers was tested on DNA obtained from two wild Cornwall and Devon dormouse populations.

Key results

- Thirty nine microsatellite loci were identified as variable to enable genetic structuring of dormouse populations to be established.
- The number of repeat motifs (alleles) per microsatellite loci ranged from 2 and 9. The mean observed and expected diversity (if populations were randomly mating) was calculated across all microsatellite loci. Results indicated that approximately 42% of individuals had two different alleles showing the inheritance of distinct genes from both parents and subsequent diversity. This was lower than what was expected under the assumptions of the model.

Key messages to landowners and managers derived from these results

- The development of microsatellite markers for dormice is a useful tool for establishing if populations are small, spatially isolated, dispersing or inbreeding and can establish genetically distinct populations which may be locally adapted to their environment. Advice can be provided from organisations such as the Peoples Trust for Endangered Species if genetic research may be beneficial locally and regionally.

Key words/phrases

Dormice; *Muscardinus avellanarius*; microsatellites; genetic diversity