

Title: Population genetics of the hazel dormouse, *Muscardinus avellanarius*, in South-West England.
A Report to the People Trust for Endangered Species, 2012

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Background to study

The widespread loss, fragmentation and unsympathetic management of woodlands in England has resulted in many dormouse populations becoming small and isolated and at increased risk of extinction. Small populations commonly suffer from a reduction in genetic diversity, reducing their ability to adapt to environmental perturbations. In the absence of gene flow the genetic distinctness between populations also increases causing potentially important genetic adaptations. Identifying populations at risk to extinction and determining evolutionary significant units will help determine conservation management and help to maintain the genetic integrity of dormice.

Method

- Genetic samples were obtained from hair plucks from 600 dormice encountered at National Dormice Monitoring sites across South West England and from fatalities at Paignton Zoo.
- Samples of closely related individuals and those of poor quality were removed from the dataset leaving 237 samples, of 5 or more individuals from 13 main populations and 4 or less individuals from 14 additional locations.
- Genetic analysis of genetic structure, diversity, genetic differentiation, isolation by distance and inbreeding were undertaken using statistical software.

Key results

- Moderate to very high genetic differentiation between sampled populations was observed and three regional populations were identified; Devon and Somerset; East Cornwall; Mid Cornwall.
- Reduced genetic diversity, increased distinctness and isolation by distance was observed within the mid and East Cornwall populations suggesting reduced dispersal between these and dormice from Devon and Somerset. The River Tamar may present a significant dispersal barrier.
- The highest genetic differentiation between populations and lowest genetic diversity was observed in Mid Cornwall indicating a decline in gene exchange from the core to the periphery of the dormouse range along the southwest England peninsula.
- The genetic differentiation of populations from Devon and Somerset was not as pronounced as those in Cornwall where the genetic structure of population is more influenced by isolation by distance suggesting restricted gene flow between occupied habitat patches.

Key messages to landowners and managers derived from these results

- Cornish hazel dormouse populations are likely to be genetically distinct with advantageous local adaptations and as such, translocations and improving landscape connectivity between these populations and those from Devon and Somerset is not advised.
- Improving hedgerows, woodland management and encouraging 'wildlife-friendly' garden management in Cornwall will help to facilitate patch occupancy and improve connectivity between Cornish dormice populations.
- Conservation resources should focus on preserving dormouse populations living both at the edges of their distributional range as these are more likely to have reduced genetic diversity and those living within core areas to maintain a strong genetic stock.

Key words/phrases

Dormice; *Muscardinus avellanarius*; genetic diversity; genetic distinctness; gene flow; isolation