Title: The Population Ecology and Monitoring of the Dormouse *Muscardinus avellanarius*: A monitoring programme for the dormouse: trends, fluctuations and power to detect change, *PhD Thesis, Royal Holloway, University of London, 2004*

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Background to study

The National Dormouse Monitoring Programme was initiated in order to monitor known dormouse sites to be able to detect population changes in the UK. Effective monitoring of populations, however, is often constrained by the ability to obtain enough information to identify 'real life' trends and differentiate between these and natural fluctuations in species abundance. Identifying suitable ways to model actual trends in dormouse populations and investigate the causes of natural variations in dormouse abundance is therefore vital for determining the status of dormice in the UK.

Method

- May-June box check data from 89 National Dormouse Monitoring Programme (NDMP) sites were used to investigate population trends. Trends in dormouse populations were obtained by modelling factors that may cause variations in dormouse abundance across sites. The best model was chosen based on its parsimony and ability to explain the most variation in the data.
- Population indices were generated based on the best model and incorporated factors such as land class type (Arable I & II, pastoral IV & marginal upland VI), site, year and survey effort and population trends between 1991 and 2002 were obtained.
- Weather data obtained from the Climate Research Unit and was used to investigate its contribution to observed variations in dormouse abundance across the UK.
- An analysis of the power of NDMP to detect population declines was conducted.

Key results

- Dormouse populations show a significant downward trend across the UK between 1991 and 2002. This trend is not as prolific when discounting data from 1991 and 1992 when the number of sites in the NDMP was relatively low.
- A significant population decline was observed at sites located in all land class types except for Arable I which predominates in the south of England. The most substantial annual and overall decline was in marginal upland VI which predominates in the north and north-west of Britain.
- Ambient temperature explains the most variation in dormouse abundance and is therefore likely to be related to trends in dormouse abundance. Cold February, April, May and October temperatures and warm temperatures in March and July act as predictors of increased dormouse abundance nationally and are likely to influence survival and food resources.
- The power of NDMP to detect population declines within a 10 year period is weak but an increase in number of sites will result in sufficient power to detect this change. A total of 25 and 50 sites with no missing data are sufficient to detect population declines within 5 years.

Key messages to landowners and managers derived from these results

- Conservation priorities should focus on increasing the viability of dormouse populations within the north and northwest of England as these are more vulnerable to climatic changes.
- The role of nest box deterioration in dormouse records should be investigated and controlled experiments using old and new nest boxes at long term monitoring sites is recommended.
- Promote volunteer participation at NDMP sites to ensure sufficient information from monthly box checks can be obtained to detect trends in dormouse populations across the UK.

Key words/phrases
Dormice; *Muscardinus avellanarius;* National Dormouse Monitoring Programme; population trends; power analysis; climate