

Title: The Population Ecology and Monitoring of the Dormouse *Muscardinus avellanarius*: Do tree phenology and climate induce contrasting dynamics in dormouse populations? The effects of weather, habitat and population density, *PhD Thesis, Royal Holloway, University of London, 2004*

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Background to study

Dormice spend up to eight months of the year in hibernation and are dependent on a continuous supply of fruits, flowers and insects for successful breeding and for survival during hibernation. As such, dormice are likely to be vulnerable to weather conditions both directly and indirectly through influencing the timing and abundance of food supply.

Method

- The total number of dormice in June and number of adults, juveniles (≤ 17 g) and total abundance of dormice in October were obtained for years 1993-2000, from 17 National Dormouse Monitoring Programme (NDMP) sites across the UK. Only dormice ≥ 6 g in October were included in the analysis as these are more likely to survive overwinter hibernation.
- Habitat surveys, using 20 randomly selected 10 m quadrats were carried out in summer 2000. Variables including % cover of edible shrub spp and all tree species, field layer height and number, maximum height and width of understorey shrubs were used to calculate the measures of food availability for dormice at each site. NVC surveys were also conducted.
- Data from local weather stations on ambient temperature and rainfall were grouped into early spring, midsummer and autumn. The winter North Atlantic Oscillation index was also used to provide a single measure of between year differences for all sites.
- Weather and habitat factors were used to investigate their influence on dormouse populations.

Key results

- Dormouse abundance and juvenile density was less in oak woodlands than in hazel woods.
- Cold autumns and cold, dry winters tend to enhance over-winter survival of dormice suggesting warmer and wetter autumn and winters are a possible mechanism for the decline in dormice.
- The extent of field layer positively correlated to dormouse abundance, however autumn food supply, spring flowers and the extent of understorey negatively affected dormouse abundance.
- Dormice were more abundant in sites in the south-east of England.
- Dormice were more abundant in October in oak woods when April-May temperatures were higher but were less abundant in wetter Septembers.
- Wetter Septembers result in higher overall dormouse abundance in October.
- There was evidence in 14 sites that dormouse abundance reduced as a result of high density suggesting dormice may self regulate population size when densities are high.

Key messages to landowners and managers derived from these results

- Increasing connectivity between woodland patches via hedgerow planting and/or management will provide dispersal corridors for dormice, increasing movement and demographic rescue of populations impacted by unfavourable weather conditions.
- Increasing cover of autumn food resources in woodlands may help to reduce the impact of climatic change (warmer wetter winters) on dormice overwinter survival.
- Maintaining an open canopy in woodlands will help increase the extent of field layer and understorey food resources which will have a positive effect on dormouse abundance.

- Landscapes should include a variety of woodland types for dormice which are interconnected by hedgerows. This will allow dormice access to different resources when food abundance in particular woodland types is negatively affected by weather conditions.

Key words/phrases

Dormice; *Muscardinus avellanarius*; National Dormouse Monitoring Programme; climate; abundance; habitat; hazel; oak