

Title: Conservation genetics of the common dormouse: Prevalence of multiple mating by female common dormice, *Muscardinus avellanarius*, in natural and reintroduced populations, *PhD Thesis, University of Liverpool, 2010*

Author: D.Md. Naim

Country: UK

Background to study

The reproductive behaviour of common dormice is currently unknown however evidence suggests that mating preferences by either sex can determine the fitness of offspring and the diversity of the population. Due to a large scale decline, understanding mating systems of dormice will provide valuable information that may help determine the impact of habitat loss and fragmentation on populations and to help to direct captive breeding programmes so they concur with natural systems.

Method

- A reintroduced and natural population of dormice were studied using 230 and 250 nestboxes in ancient woodland (Wych) and mixed broadleaf and conifer wood (Bontuchel) respectively.
- Nest boxes were at 20-40 m intervals and were checked twice in spring and autumn in Wych and monthly in Bontuchel. Dormice were microchipped, weighed and their sex, age and breeding status was recorded. Hair and buccal swab samples were collected from individuals in 2006/7.
- DNA was extracted from 332 and 135 hair samples obtained from Bontuchel and Wych. Ten microsatellite regions of the dormouse gene were amplified for each sample. The genetic diversity was measured and tests were conducted using DNA from 23 and 5 litters from Bontuchel and Wych respectively to investigate multiple paternities.

Key results

- Multiple mating by female dormice was found to be commonplace at both sites with evidence being found in 69% and 80% of litters sampled at Bontuchel and Wych respectively. This may be beneficial to female dormice who will gain access to resources in male territories.
- Most of the multiply-sired litters were fathered by at least two males and evidence was obtained for litters which had been sired by three males at each site.
- Nearly 50% of males sampled at both sites had sired the multiply-mated offspring and all were generally equally successful in siring the offspring.
- Mean minimum number of fathers per litter did not differ significantly between sites and evidence suggests that a large proportion paternal males at both sites had not been sampled.
- Litter size was positively correlated with the body weight of females and there was some evidence that multiply mated females were larger on average than singly mated females.
- Genetic evidence suggests that two pairs of co-inhabiting females were half siblings.
- Multiple paternity may be of benefit to dormice, reducing their chance of reproductive failure and potentially increasing fitness of females and their offspring, however this was not tested.

Key messages to landowners and managers derived from these results

- Captive breeding programmes should consider multiple mating by rotating resident females with a group of males to encourage natural mating behaviour. In the absence of multiple mating in captive bred stocks, dormice may still adopt this mating strategy once released into the wild.
- Reintroductions should release larger females that produce larger litters and are more likely to mate with multiple males to encourage rapid population growth and limit genetic erosion.
- Woodland management should focus on structural connectivity to prevent fragmentation of individuals as this may reduce multiple mating and affect the populations' genetic diversity.

- Nest boxes are useful for determining relative abundances of dormice; however they fail to sample all individuals and as such this should be a consideration when determining the presence of dormice in woodlands where development or management work is planned.

Key words/phrases

Dormice; *Muscardinus avellanarius*; microsatellites; genetic diversity; multiple mating; paternity