

**Title:** Conservation and ecology of the hazel dormouse, *Muscardinus avellanarius*: Patterns of hibernation in the hazel dormouse: Intra-specific variation and the influence of diet. *PhD Thesis, University of Exeter, 2012*

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### **Background to study**

Hibernation facilitates the survival of endothermic organisms, such as the dormouse, during unfavourable environmental conditions. The efficiency of hibernation behaviour is likely to determine rates of weight loss, reproductive success and mortality and as such may be a key driver of population dynamics. Understanding the influence of environmental conditions and food availability of dormouse hibernation behaviour is important for future conservation strategies.

### **Method**

- The hibernation behaviour of 24 individually housed captive dormice (9 males and 15 females) at Paignton Zoo was studied. Dormice were outside, exposed to natural light and environmental conditions but protected from precipitation with no public access. A wooden nest box, bedding and branches were located within each housing cage.
- Dormice were randomly divided into two treatment groups which were provided with either a low or high calorie diet. The pre-study weight, diet and sex of each individual were recorded. Daily logs of feeding behaviour of each individual was recorded as 1) no evidence of feeding; 2) evidence of disturbing food but not feeding and 3) evidence of feeding.
- Hibernation behaviour was inferred by recording nest temperature using a temperature probe fixed data logger and data was obtained between October 2008 and January 2009. Ambient temperature in each enclosure was also recorded and used to assess absence of dormice in nesting tubes, presence of dormice in torpid state or dormouse present and active.
- Data on 19 dormice were used for analysing the variation in mean length of hibernation bouts between individual dormice, the effect of food availability on hibernation behaviour and the effect of ambient temperature and day length of dormice hibernation.

### **Key results**

- Individual dormice showed high levels of variation in the duration of torpor which was independent of sex, diet or initial weight.
- Dormice that entered long torpor periods in relation to the mean length of torpor spent a greater proportion of their time being torpid, but did not adjust the amount or frequency of torpor in response to diet quality.
- Dormice that entered shorter torpor periods engaged in fewer bouts of torpor, spending a lower proportion of their time in torpor when high quality diet was available.
- Increasing ambient temperatures and day length decreased the length of time dormice spent in torpor and the probability of dormice being in torpor increased with decreasing temperature.

### **Key messages to landowners and managers derived from these results**

- The overwinter survival of dormice is likely to decrease with increasing temperatures associated with climate change. It is therefore imperative that high quality food such as hazel is accessible in dormouse habitat throughout autumn and winter. The connectivity and cover of woodland understorey should be dense to increase access to resources and decrease risk of predation.

### **Key words/phrases**

Dormice; *Muscardinus avellanarius*; hibernation; torpor; diet; ambient temperature; day length