

A REVIEW OF RESEARCH ON BRITISH DORMICE (GLIRIDAE)
AND THE EFFECT OF INCREASING PUBLIC AND SCIENTIFIC
AWARENESS OF THESE ANIMALS

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Two species of dormice occur in Britain, one native (*Muscardinus avellanarius*) and one introduced (*Glis glis*). The latter is localised, but increasing and is often a pest. The former has suffered a long-term decline in numbers and distribution and is now fully protected. Detailed studies of the ecology and conservation requirements of *Muscardinus* increasingly show the value of this species as a bio-indicator of habitat quality and integrity, with encouraging signs that its occurrence will be monitored systematically as a means of assessing conservation requirements in the wider countryside.

Key words: *Glis*, *Muscardinus*, dormice, Britain

INTRODUCTION

Two species of dormice are found in Britain, the hazel dormouse (*Muscardinus avellanarius*, native) and edible dormouse (*Glis glis*, introduced in 1902), but between 1880 and 1980, fewer than ten scientific papers were published on both species in Britain combined, three of them being distribution studies. A small book (HURRELL 1980) summarised much of what was known and even the normal body weights of wild *Muscardinus* remained uncertain until well into the 1980s. This lack of information was due to the rarity and obscurity of dormice, but also because normal techniques for small mammal study could not be applied successfully to these animals. This paper attempts a brief review of progress in studying these animals and indicates how *Muscardinus*, once an obscure rarity, is now recognised as a significant animal, both by wildlife conservationists and officials planning for economic development in the countryside. Research on *Glis* is less well advanced, but focussed on other issues (notably its potential status as a pest). Nevertheless, the biology of this species proves to have some extraordinary aspects and reveals many more differences than might be expected from a species in the same family of mammals.

Since 1984, traps have been developed (MORRIS & WHITBREAD 1986) and special nest boxes (MORRIS *et al.* 1990) that enable *Muscardinus* populations to be sampled. Radio tracking and other techniques have been applied to reveal details of dormouse ecology and population biology (BRIGHT & MORRIS 1990, 1991,

1992, 1993). A distribution survey carried out by the Mammal Society (HURRELL & MCINTOSH 1984) revealed a probable contraction of range. In 1993, a major public– participation survey was organised to establish the current distribution of *Muscardinus* in Britain (BRIGHT *et al.* 1996), based on searching for characteristically gnawed nuts of hazel (*Corylus avellana*). This exercise was repeated in 2001 and both surveys confirm that the hazel dormouse has become extinct across wide areas of Britain, especially in the north.

The hazel dormouse is a strongly arboreal food specialist that requires a sequence of flowers, insects and fruits to sustain it throughout the summer. The best habitats are those with high diversity of trees and woody shrubs and a tree canopy that does not cast dense shade. The animal also thrives in certain types of species-rich scrub.

Detailed research has now made it possible to explain why *Muscardinus* has become progressively more rare over the past 100 years, and to establish appropriate conservation measures based on detailed scientific understanding (BRIGHT & MORRIS 1996). The main causes of extinction are habitat fragmentation (BRIGHT *et al.* 1994) and inappropriate woodland management (leading to unfavourable habitat structure and composition). Other factors include climatic disadvantages (BRIGHT *et al.* 1996), and widespread failure to keep farm animals out of woods inhabited by dormice. Once exact problems can be identified, it is possible to propose exact remedies and develop precise conservation management plans. Since 1991 the hazel dormouse has become one of the most successful elements of the Species Recovery Programme, a strongly focussed conservation programme administered by English Nature (the statutory nature conservation agency). The Dormouse Recovery Plan has three strands:

- to defend dormice where they still occur, by arranging suitable habitat management and providing nest boxes for this species;
- to reintroduce dormice to some of the areas from which they have been lost;
- to increase public awareness of dormice and the biological issues that they highlight.

These aims have been met to a considerable degree. For example, dormice now frequently appear in national and local newspapers, many scientific papers and magazine articles have been published, thousands of people joined in the national nut hunts of 1993 and 2001. There are now over 6,000 nest boxes in more than 100 sites where dormouse conservation is a priority. These also offer access to information about the yellow-necked mouse (*Apodemus flavicollis*), another rare small mammal in Britain (MARSH & MORRIS 2000). Nest boxes provide data on body size, parasites (SAINSBURY *et al.* 1996) and breeding success in *Muscardinus*

and allow access to the animals for study of basic biological activities such as the incidence of summer torpor.

Nest boxes also form the basis for a National Dormouse Monitoring Programme, the first for any terrestrial mammal species in Britain. This aims to keep track of population changes and to provide better understanding of the effects of climate, annual variation and woodland development. This programme is now managed by the Peoples Trust for Endangered Species (15, Cloisters House, Battersea Park Road, London, SW8 4BG, UK). Data are collected from volunteers who check the nest boxes regularly, analysed to show population changes and a newsletter is sent to all contributors twice each year. Many hundreds of people are now involved in this work annually. Data are now available from some sites covering more than ten years, allowing detailed analysis of population dynamics (see Sanderson, this conference).

It is now widely recognised that *Muscardinus* is an attractive and charismatic animal that is an icon of attractive deciduous woodland habitats. It is also a highly sensitive bioindicator. For example, it requires a high diversity of woody shrubs and trees to sustain viable populations, so the presence of dormice is indicative of a rich botanical composition, which in turn supports many other taxa (including invertebrate and vertebrate species). *Muscardinus* is also very sensitive to habitat fragmentation. Studies show that viable populations need at least 20 ha of suitable habitat, anything less is likely to lead to extinction unless small woodland areas are linked by tree lines or hedgerows (BRIGHT *et al.* 1994). Thus, the presence of dormice is an indication of habitat integrity at the landscape level. In turn, this highlights the need for proper management of hedgerows. These linear habitats are often species-rich, highly productive (being fully exposed to the sunlight and not overshadowed by taller trees and in mature woodland). They provide shelter and form important dispersal routes for many taxa that do not easily cross open spaces. Dormice have helped to re-focus attention on the importance of hedgerows for a diversity of species, not just the birds that have previously been the centre of attention. Hedgerow management and the importance of this habitat is reviewed by Bright, (this Conference).

It is widely appreciated elsewhere that building roads across the countryside creates significant barriers to dispersal for many species, leading to fragmentation of populations and ultimately piecemeal extinction. In many countries it is now accepted that 'habitat bridges' are needed to retain linkage between habitats on each side of a major route. There are several on the new autoroute south of Calais in France, more have been built in the Netherlands and Austria, but so far there have been no 'habitat bridges' built in Britain as part of the thousands of kilometres of new roads and major road widening projects. Currently (2002) the final planning

stages have been reached for widening a stretch of the A21 (linking London with Hastings on the south coast). Dormice live along both sides of this road and can cross it easily in a short sprint or through the tree canopy that meets overhead in places. Creating a dual carriageway road will prevent such movements, for dormice and most other small animals. A revised plan is now being considered that involves construction of a 'habitat bridge'. If this is actually built, it will be the first such bridge associated with a British road project, and it will have arisen directly as a result of dormouse distribution studies carried out over a decade ago.

From being an obscure rarity, *Muscardinus* is now a familiar part of our fauna, securely embedded in national and local Biodiversity Action Plans. It is increasingly recognised, by the public, conservation organisations and Government Agencies, that the dormouse is an important example of a "Flagship Species". Where dormice can be conserved, the rest of the faunal "fleet" are also likely to be present. Generally, what is good for dormice is good for many other species too, from invertebrates to reptiles, particularly species that have low dispersal abilities or are sensitive to inclement weather. Thus, it has now become a legal requirement to survey for dormice and take suitable action wherever new road and building developments threaten their habitat. This is not simply because dormice are rare and attractive, but it is also seen to benefit many other species, and the landscape too.

Studies on the edible dormouse are less well advanced, having been focussed almost entirely on the damage this species can do and on its increasing numbers and distribution (JACKSON 1994). However, a small investigation allowed estimates of population size (HOODLESS & MORRIS 1993, MORRIS 1993), and a nest box study was initiated in 1996 from which a basic understanding of ecology and population dynamics is slowly emerging (MORRIS 1997*a, b*, MORRIS *et al.* 1997). Litter sizes range up to 11 young, but far fewer are actually raised and the juveniles have to reach viable size to survive the winter within less than 12 weeks. The animals only breed once in a summer and no young have been found in the woodlands before August (although the season may be extended for those individuals that live in houses). Some years there are large numbers of young born in the nest boxes, other years, none at all. Reproductive failure seems to be related to masting of beech (*Fagus sylvatica*), as has been reported from Germany (BIEBER 1998) and is the subject of analysis by BURGESS *et al.* (this Conference). Individually marked animals frequently appear to live more than five years, but although many are very site-faithful, others are only ever seen once. This suggests that edible dormice may move about a lot, yet radio tracking suggests that they do not travel very far. The animals hibernate underground, sometimes communally and for at least 6-7 months (MORRIS & HOODLESS 1992).

Glis is responsible for substantial amounts of damage to planted trees, leading to assertions of major economic losses. In fact, while the damage is significant, the financial losses are less so, owing to the limited value of the trees concerned (mostly low-grade softwoods). The fact that edible dormice will use nest boxes so readily means that they could be captured and removed quite easily, without the need for labour-intensive trapping. However, nest boxes are expensive, so a cheaper substitute has been developed (MORRIS & TEMPLE 1998). These 'nest tubes' are used equally often and could be an inexpensive way of removing *Glis* from plantations. Smaller versions have now been created for use with *Muscardinus*, in distribution surveys and studies of hazel dormice living in hedgerows.

While substantial progress has been made towards understanding the biology of *Glis* in Britain, many questions remain. For example, why are some nest boxes used repeatedly, but others not at all? Why do animals share nest boxes and are they related? How many were in the original release group 100 years ago? Why do individually marked edible dormice appear in certain areas of the forest only in major breeding years? Where have they been during the intervening years? What is the link between beech masting and reproductive success/failure? Is it mediated via the male or female dormouse?

Moreover, edible dormice often enter houses where they may cause a considerable nuisance and sometimes significant damage. Over time, more than 60 animals may be removed from a single house, yet neighbouring houses remain unvisited for reasons that remain obscure. Meanwhile, despite its non-native status, the edible dormouse is a protected species in Britain (in compliance with the Berne Convention). Anyone catching these animals in their house should only do so under licence, and then cannot release them because, as non-native animals, this is illegal! The Law offers no solution to this conundrum and biologists cannot help either as no research funds have so far been available to investigate the issues. Many *Glis* are probably captured and released secretly, often well beyond their present range. This can only result in spreading the species, overcoming current constraints on its natural dispersal. The problems posed by *Glis* invasion of houses are acute for some of the people involved, but remain to be tackled with no obvious sign of who will undertake the necessary research.

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