NAT. CROAT. | VOL. 6 | No 2 | 199–204 | ZAGREB | June 30, 1997

ISSN 1330-0520
UDK 598.323.2+503.743(410.1)

NESTBOXES, CAPTIVE BREEDING AND RE-INTRODUCTION OF THE COMMON DORMOUSE *(MUSCARDINUS AVELLANARIUS)* IN ENGLAND

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Woods, D. E.: Nestboxes, captive breeding and re-introduction of the common dormouse (*Muscardinus avellanarius*) in England, Nat. Croat., Vol. 6, No 2., 199–204, 1997, Zagreb

The use of nestboxes by British dormice is described. Young weighing less than 15 g in October are taken in captivity and used to provide captive-bred stock for reintroductions to suitable areas where dormice have become extinct in recent times. Husbandry of captive animals and methods for release into the wild are described.

Key words: *Muscardinus avellanarius*, captive breeding, re-introduction, England

Woods, D. E.: Kućice, razmnožavanje u zatočeništvu i ponovno naseljavanje puha orašara (*Muscardinus avellanarius*) u Engleskoj, Nat. Croat., Vol. 6, No 2., 199–204, 1997, Zagreb

Opisano je korištenje kućica za puhove orašare u Britaniji. Mladi, lakši od 15g u listopadu, uzimani su u zatočeništvo i korišteni za ponovno naseljavanje u pogodna područja gdje su puhovi nedavno izumrli. Opisano je postupanje sa životinjama u zatočeništvu i metode za puštanje u divljinu.

Ključne riječi: *Muscardinus avellanarius*, razmnožavanje u zatočeništvu, ponovno naseljavanje, Engleska

The Common or Hazel Dormouse *(Muscardinus avellanarius)* was notoriously difficult to find in the wild in Britain until it was realised that they readily use nest boxes especially put up for them (Morris, Bright & Woods, 1990). Dormouse boxes are similar in size and shape to those which are used to encourage blue tits *(Parus caeruleus)* except that the entrance hole, measuring 26 mm in diameter, is sited nearest to the tree with a 20 mm bar above and below which allows the animals to enter through the hole. They are fixed to the tree by wire. The boxes are placed 1.5 m up the main trunk of the tree (usually Hazel, *Corylus avellana)* and it

seems to make no difference which compass direction they face. How high they are sited seems to make little difference to the dormice, and 1.5 m above the ground keeps them away from ground predators while making it easier for us to inspect them. Blocks of fifty boxes are placed in the woodland at 15 m intervals, in three or four rows. As well as dormice, many other animals find the boxes attractive, such as blue tit, nuthatch *(Sitta europaea)*, wren *(Troglodytes troglodytes)*, woodmouse *(Apodemus sylvaticus)*, yellow necked mouse *(Apodemus flavicollis)*, pygmy shrew *(Sorex minutus)* and bats, both pipistrelle *(Pipistrellus pipistrellus)* and long eared *(Plecotus auritus)*.

In England, dormice are usually found in deciduous woodland which contains a mixed variety of trees and bushes such as hazel, oak *(Quercus robur)*, sycamore *(Acer pseudoplatanus)*, ash *(Fraxinus excelsior)*, holly *(Ilex aquifolium)*, blackthorn *(Prunus spinosa)*, blackberry *(Rubus fruticosus)*, honeysuckle *(Lonicera periclymenum)* as well as many other species (BRIGHT & MORRIS, 1990). They can sometimes be found in conifer plantations where they may partly live on insects. Thick hedgerows are an important habitat, which also aid their dispersal. They prefer woodland edges and will disappear from climax woodland where the understorey has been shaded out. Dormice are wholly arboreal during the summer and very rarely come down to the ground (BRIGHT & MORRIS, 1991, 1992) so it is essential that branches from the tree to which the box is attached touch those of neighbouring trees to allow the animals to move freely through the wood.

We put no nest material in the boxes, the animals find their own. Honeysuckle bark is the preferred material. One of our studies (MORRIS, BRIGHT & WOODS, 1990) showed that boxes sited within 5 m of honeysuckle were more often occupied than those further from honeysuckle. Alternatively they will use the bark of wild clematis *(Clematis vitalba)* as well as moss and green leaves taken from hazel trees. Leaves are frequently used as nest material in the autumn prior to hibernation, and for breeding nests.

By weighing monthly samples of dormice living in the boxes it has been established that animals born into late litters (eg at the end of September and in October), are unlikely to survive the winter if they weigh less than 15 g before the first frosts come to destroy their food supply, forcing them into hibernation (BRIGHT & MORRIS, unpublished). Some of these animals have been collected under a special licence granted by English Nature – the Government body responsible for Nature Conservation in England. The animals are housed outdoors in large airy cages each measuring approximately 2 × 1 × 2 m, with some protection from the weather. Although juvenile animals can be housed together, it is inadvisable to hold more than 8 animals in one cage. This is because, even where several nestboxes are provided, they tend to congregate in one box which then gets very damp from condensation. Adult animals are housed in pairs, or two females with one male. If adult males are kept together during the breeding season they tend to fight. The animals are provided with hazel branches and, during the summer months, fresh twigs with leaves attached. Water is readily available and a bunch of hay or moss is hung up

to provide nest building material. They are also fond of nipping off the hazel leaves and using these for nesting. A large tray filled with soil and covered with plenty of moss and leaves is placed on the floor of the cage. The animals burrow into this in the autumn to construct their hibernating nests.

The animals are supplied with plenty of food (sunflower seeds, nuts, plain biscuits and fresh fruit). Because there is a supply of food available, they do not hibernate but continue to eat and grow. It is only when we get a period of very cold weather and day temperatures remain around 10 °C, or less, that they go into torpor. However, as soon as temperatures rise again they become active once more. They usually start to eat a lot more food in early September and by the end of October the adults have gone into hibernation where they remain until April. They are capable of doubling their weight in two weeks. Some of them can then weigh as much as 40 g. These captive-reared animals are then used as breeding stock whose offspring can be released into the wild in attempts to reinstate dormice in areas of England from which they have been lost.

The dormouse population in England has declined dramatically over the past 100 years and they appear now to be extinct in seven counties (HURRELL & MCINTOSH, 1984; BRIGHT, MORRIS & MITCHELL-JONES, 1996). This is due partly to the decline in coppicing but mostly to loss of habitat and fragmentation of what remains (BRIGHT & MORRIS, 1996). The Dormouse Recovery Programme seeks to support dormice in areas where they still occur and reintroduce them to those parts of the country where the species has become extinct (WHITTEN, 1990; BRIGHT & MORRIS 1995).

Experiments have been conducted to determine the best method and time for releasing dormice to ensure the survival of the maximum number of those released (BRIGHT & MORRIS, 1994). If they are simply liberated without support, so called »hard releasing«, whether they are captive bred or translocated wild animals, they lose weight, disperse and probably die. As they are loathe to travel on the ground, they have to learn aerial pathways among the branches of trees and bushes as well as having to discover where food sources are to be found. Because of this a »soft release« technique is used. A nest boxes containing pairs of animals (or two females and one male) is tied to a suitable trees – usually hazel – whose branches touch those of surrounding trees in order that the dormice may move through the wood. A release cage made from 6.6mm wire weldmesh, and approximately 80 cm square, is then constructed around the box and tree trunk. This keeps the animals confined while they become accustomed to their new environment. They are supplied with food and water in the cage. After 12 days, one corner of the cage is opened allowing the dormice to leave if they wish.

Radio-tracking has shown (BRIGHT & MORRIS, 1994) that they usually stay very close to the release cage for several days, venturing further away each night but returning every morning. Food is still provided and this helps to support the dormice until they have found a full range of natural foods. The food also serves to keep the population from scattering and thereby reducing chances of meeting and

breeding. Before release all the animals are given an identifying number which is tattooed in the ears. At the same time a veterinary surgeon inspects and weighs them to ensure that every animal is in good condition and has every chance of survival. No animals weighing less than 18 g are released. About thirty animals are released at a time, followed by a further release the following year at the same site. The animals at the release sites are fed and monitored by local volunteers.

The timing of these releases is an important question. If dormice are released in the autumn, (September, October) there is maximum food availability, but before they can breed they have to face 6 months of hibernation, when the mortality rate could be high. On the other hand, animals released in the spring (May, June) have plenty of time to breed, but their liberation coincides with the period when food supplies are minimal (BRIGHT & MORRIS, 1993). The provision of supplementary food not only assists their survival but allows release early in the year. This offers more potential for breeding during the same summer, helping to build up the population quickly.

Such re-introductions require large samples of animals which are difficult to obtain from the wild without depleting local populations. This is because dormice, unlike woodmice and voles, live at very low densities, perhaps only 8 animals per hectare. In England they have one, or perhaps two, litters a year in the wild and the young develop slowly. However, captive animals are comparatively easy to keep and breed and it is these captive-bred animals that are used for reintroductions, minimising the drain on scarce wild populations. Studies have therefore been conducted to determine how well captive bred animals are able to cope with release into the wild compared with translocated wild dormice (BRIGHT & MORRIS, 1994). Captive bred animals tend to remain closer to their release point and are slower to adapt to their new surroundings. Nevertheless, within a few weeks, their survival and growth is comparable with that of wild animals.

Selecting sites for release requires a lot of preliminary research. It is unwise to release animals into a wood where dormice are already living, as the resident animals would normally be up to optimum numbers and adult males respond aggressively to territorial intruders. The addition of a large number of new dormice means that all of them might be short of food and living space. The history and management of a woodland site also need to be considered before releasing dormice into it. If no dormice are present perhaps the climate is unsuitable. Perhaps the management system is or was inappropriate (often woods have been clear-felled in recent years and no recolonisation has taken place because no hedgerows lead to it). Perhaps there is insufficient diversity of trees and shrubs. Grazing animals, especially sheep, may deplete the ground flora. It is important to identify why dormice are absent and ensure that the problems are rectified before animals are released. The future of the wood is also important; perhaps it will be destroyed for development or cropped for timber? The owner needs to be sympathetic to wildlife conservation. A team of local helpers is also needed to support a release programme.

Fortunately in England there has been a considerable change of Government policy with regard to farming and forestry over the past few years. Farmers are now

being asked not only to stop removing what is left of our hedgerows, but are encouraged with the aid of grants to replant some of those that have been destroyed. In forestry, instead of planting dense stands of conifer trees, (which was the policy in the 1950s), there is encouragement to plant a lot more deciduous trees. Both practices should help to encourage the repopulation of dormice.

So far dormice have been released at three sites in various parts of England. The first release (in Cambridgeshire, about 100 km north of London) took place in 1993, supplemented in 1994. The project appears to have been successful and offspring from the released animals were thriving in 1996 and have themselves bred. Dormice were then released in 1994 and 1995 at a second site further north (in Nottinghamshire)., This seems to have been less successful, with only one litter of young being found in 1996. The third release was in the county of Cheshire and took place in June 1996. Young were born there within a few weeks. We have great hopes that with education of the public and the help of local Wildlife Trusts, as well as the support of English Nature, that these reintroductions will help to improve the prospects for the survival of *Muscardinus* in England.

Received January 20, 1997

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SUMMARY

Nestboxes, captive breeding and re-introduction of the common dormouse (*Muscardinus avellanarius*) in England

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The use of nestboxes by British dormice is described. Young may be born in these nestboxes too late in the year to attain adequate weight for surviving hibernation. Young weighing less than 15g in October may therefore be removed without reducing the effective population. These are taken into captivity and used to provide captive-bred stock for rentroductions to suitable areas where the dormouse has become extinct in recent times. Husbandry of captive animals is described. Methods for release into the wild are described, with a brief review of the underlying rationale for release at particular times of year. Reintroductions have been carried out in three English counties. At least two of these projects appear to have been successful so far.

SAŽETAK

Kućice, razmnožavanje u zatočeništvu i ponovno naseljavanje puha orašara (*Muscardinus avellanarius*) u Engleskoj

D. E. Woods

Opisano je korištenje kućica za puhove orašare u Britaniji. Mladi se u tim kućicama mogu okotiti prekasno da bi dosegli težinu dovoljnu za preživljavanje hibernacije. Zato mladi lakši od 15g u listopadu mogu biti uklonjeni a da se time ne smanjuje stvarna populacija. Oni se uzimaju u zatočeništvo i koriste za ponovno naseljavanje u pogodna područja gdje su puhovi nedavno izumrli. Opisano je postupanje sa životinjama u zatočeništvu i metode za puštanje u divljinu, s kratkim pregledom osnovnih principa za puštanje u određeno doba godine. Reintrodukcija je izvršena u tri engleske pokrajine. Čini se da su bar dva od tih projekata do sada bila uspješna.