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Dispersal since re-introduction and movements of individual animals between nest boxes by *Muscardinus avellanarius* – A preliminary study

SUE TATMAN, MARK AMBROSE, SARAH BIRD & SCOTT WILSON

Abstract

This study, based on data collected by the Northwest Dormouse Partnership, relates to a reintroduced population of the hazel dormouse (*Muscardinus avellanarius)* in Cheshire, north-west England. Colonisation of the whole site since the reintroduction is illustrated and shows a preference for some areas over others. This was explored by analysing frequency of nest box use in relation to woodland structure and botanical species composition. High nest box use is associated with high shrub layer density, greater abundance of poplar (*Populus sp*.) and ash (*Fraxinus excelsior*), and lower abundance of holly (*Ilex aquifolium*) and sycamore (*Acer pseudoplatanus*). Average distances between nest box captures were 46.2 m (males), 48.9 m (females) and 52.0 m (juveniles). The population has increased over 15 years but declined recently.

Keywords: North West Dormouse Partnership, colonisation, dispersal

1. Introduction

As an attempt to restore dormice to the county, groups of captive bred animals were released into a patch of ancient semi-natural woodland in south-west Cheshire. Twenty-nine animals (10 males and 19 females) were released in June 1996, and a further 24 animals (11 males and 13 females) in June 1997. This release was part of a nation re-introduction programme for the hazel dormouse (Mitchell-Jones & White 2009) and was the third such project to be carried out in England.

Since the first release the dormouse population in the Wych Valley has been monitored using nest boxes, initially by Cheshire Wildlife Trust and a team of dedicated volunteers. In 2005 several local groups with an interest in dormice formed the North West Dormouse Partnership to widen the scope of the regular monitoring. In particular, all dormice are now routinely micro-chipped, allowing the recognition of individual animals. Micro-chipping is done in the field, by qualified veterinary staff from Chester Zoo, using portable anaesthesia equipment.

Much research on dormouse ecology has been published in the last two decades, but there is almost none on reintroduced populations. Reintroduction is a key part of the conservation strategy for the dormouse in England (Mitchell-Jones & White 2009) and it is important to understand how reintroduced animals disperse and colonise new sites. This presentation forms part of a wider analysis of data accumulated over the 15 years, since the initial reintroduction to Cheshire.

2. Material and methods

The Wych Valley is in Cheshire, North West England (52º 59' 46" North 2º 46' 18" West, Ordnance Survey grid reference SJ483446). The re-introduction site is ancient semi-natural woodland, approximately 29 ha in area, surrounded by improved grassland which limits connectivity to other wooded areas nearby. Purpose-built nest boxes were put up to aid monitoring of the re-introduced population (Fig. 1).

The population is monitored by checking the nest boxes four times each year. Autumn counts generally include many juveniles, so numbers of dormice found at the Spring monitoring counts are best used to show long-term population trends.

The position of nest-boxes was plotted using MapInfo GIS software and measurements were taken to determine the minimum distance between captures of individual micro-chipped animals. If an animal was recorded in a box as a juvenile on one visit, then as an adult on a subsequent visit, the movement between the first and the second boxes was classified as the movement of a juvenile. All subsequent movements were classified as adult. Colonisation of the site post-release was examined by plotting the use of nest-boxes year on year using GIS. In July 2011 environmental factors were recorded around each nest-box in the wood, including the nearest five tree and shrubs and the density of the shrub layer.

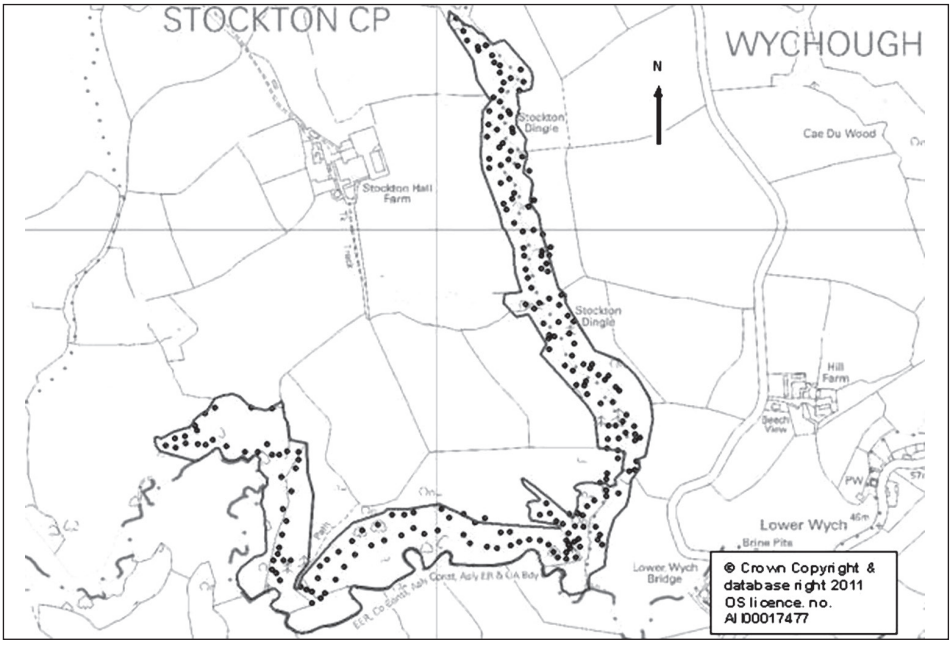

Fig. 1 The Wych Valley re-introduction site, showing the location of all nest-boxes.

3. Results

The numbers of dormice found at the May count from 1997 onwards suggests a general increase over time, although there are large fluctuations between years, and a decline in numbers in the last two years (Fig. 2).

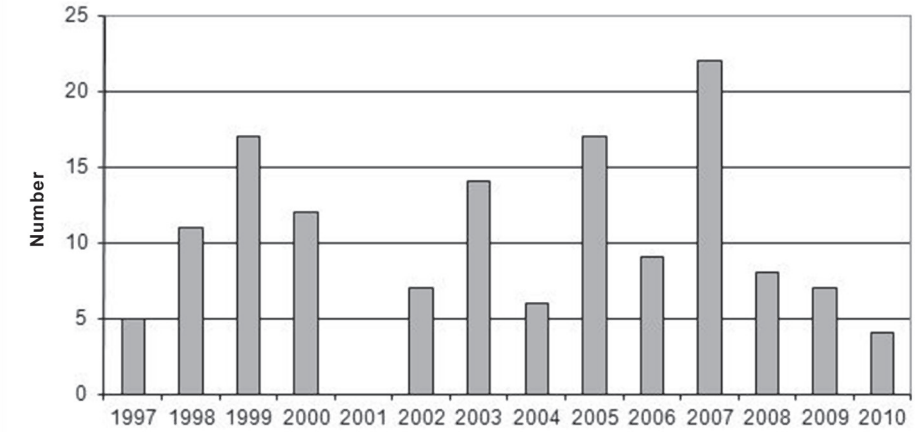

Fig. 2 Number of dormice found at May surveys 1997–2010.

We detected a progressive colonisation of the wood in the years post-release, in terms of the boxes found to have dormice present (Fig. 3). The particular years selected are those that best illustrate the pattern of colonisation. It is apparent that one area, circled on the 2010 map (see Fig. 3), has not been used to the same extent as the rest of the site, although animals must have moved through here to reach the western end of the wood.

Sanderson (2004) found that reintroduced dormouse populations in England could spread at up to 250 m per year, although 100 m per year was more typical. In the Wych valley the furthest points from the release site reached by dormice are approximately 500 m north (after 1 year) and 750 m west (after 10 years), but the average rate of spread is slightly less than that found by Sanderson.

Data on environmental factors recorded around each nest-box was used to divide the site into compartments depending upon the dominant vegetation groups (see Fig. 4).

Mann Whitney U tests were used to identify any significant differences between environmental conditions in the area avoided by dormice (Area 1) and the remainder of the site (Area 2). The only significant differences found were in the density of the shrub layer between areas ($p = 0.01$), with a lower density in Area 1. There was also a significant difference in the frequency of four shrub and tree species between areas, with holly (*Ilex aquifolium*) and sycamore (*Acer pseudoplatanus*) being more abundant in Area 1, while Poplar (*Populus* sp.) and ash (*Fraxinus excelsior*) were more abundant in Area 2. The low shrub density in Area 1 may partly explain the absence of dormice there, as the lack of understorey may make it less easy for dormice to move around. Another possible explanation is that dormice are present, but using natural nest sites instead of the nest boxes, perhaps because they were nesting closer to food sources in the canopy.

For the 71 tagged dormice for which distances travelled could be calculated, 16 were only ever recorded in a single nest box and are excluded from Table 1.

There were no significant differences in distances travelled between these demographic groups (Kruskall Wallis test: $n = 71$ $df = 2$, $p = 0.456$) and our results thus differ from other studies. Juškaitis (2008) found males travelled significantly greater distances between nest boxes than females. Using radio tracking, Bright & Morris (1991) also found greater movements by male dormice. In the present study, distances travelled by juveniles were

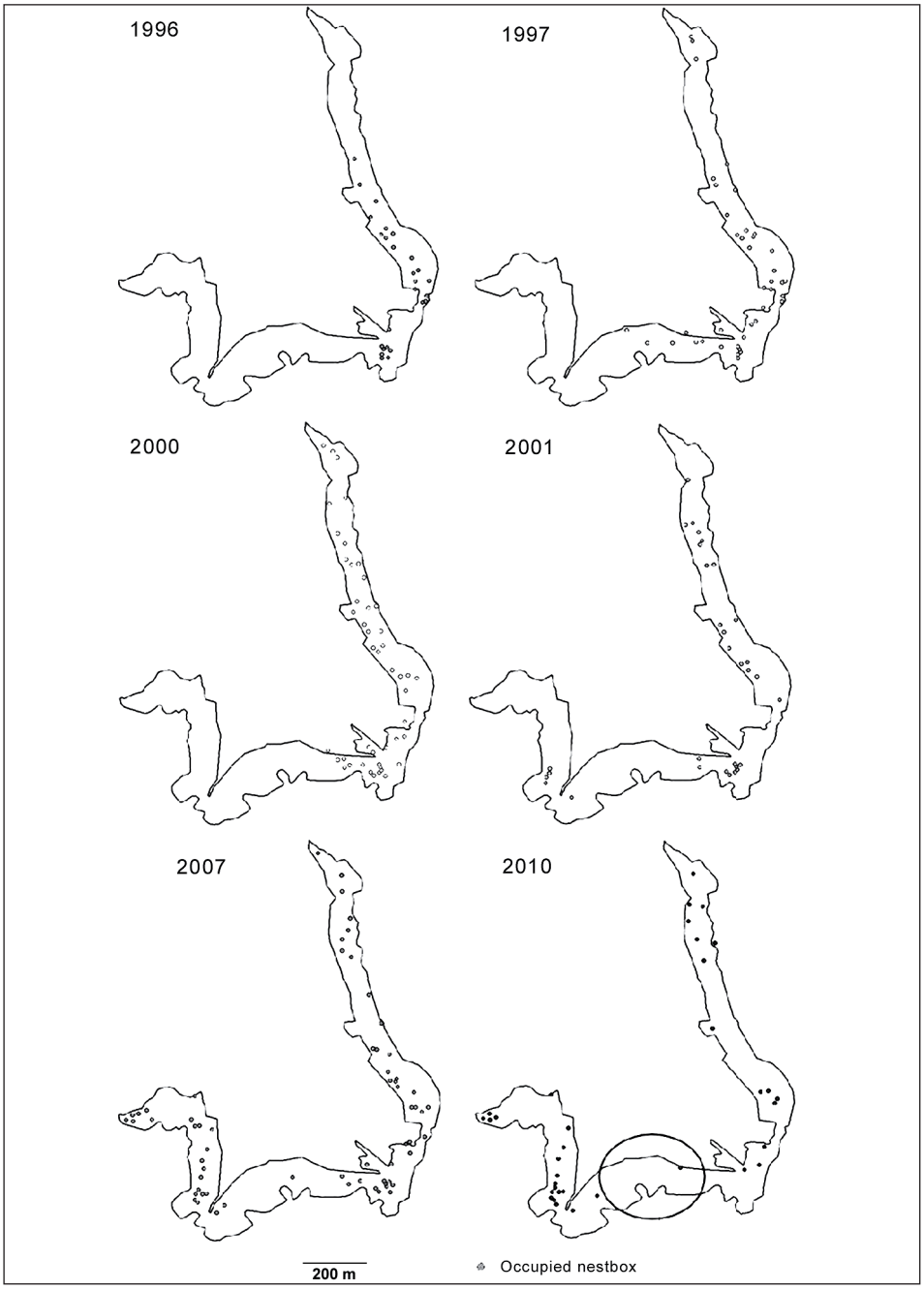

Fig. 3 Nest boxes used by dormice in 1996, 1997, 2000, 2001, 2007 and 2010. The dormice gradually colonised most of the wood, occupying the northern area first, then moving west. The south section, circled on the 2010 map, appears not to be favoured by dormice.

slightly greater than adults, but this was not statistically significant. By contrast, Juškaitis (1997) found greater distances travelled by juveniles, and concluded that dispersal occurs in the juvenile phase. Linear distances measured between nest boxes will underestimate how far dormice can travel as they may move beyond the area sampled by them. They also live in a three-dimensional habit.

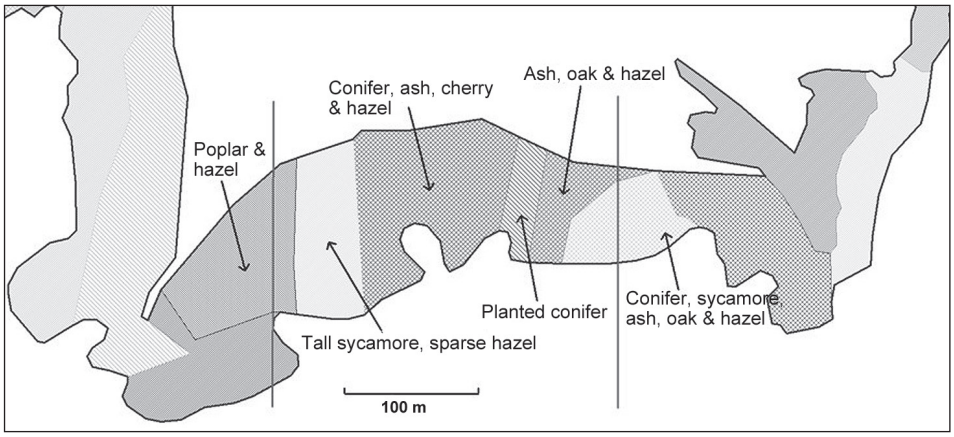

Fig. 4 The south section of the wood, showing the vegetation types recorded and the area with very few dormouse records (Area 1).

Tab. 1 Distances between nest box captures.

	Average distance between captures (metres)	Maximum distance between captures (metres)
Adult males (n = 28)	46.2 (S.D. = 55.4)	213
Adult females (n = 27)	48.9 (S.D.=56.5)	255
Juveniles (n = 16)	52.0 (S.D. = 99.5)	376

4. Conclusions

The re-introduction has been generally successful, with dormice colonising all the woodland available except the area highlighted here, even though it appears to be suitable in terms of botanical diversity. This raises a number of questions about the distribution of dormice in and around the re-introduction site. Dormouse numbers increased for the first 10 years, although there has been a recent fall in numbers, but we know from micro-chipping studies (not reported here) that some animals use nest boxes only infrequently, so actual numbers may be under-estimated. We hope to explore this by searching for dormouse nests away from nest boxes and by attempting some live-trapping.

A full report of the dormouse re-introduction in Cheshire will be available from Cheshire Wildlife Trust in 2012, titled 'The Wilder Wych Research Project'.

5. Acknowledgements

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Authors' addresses:

Sue Tatman*, Mark Ambrose
Cheshire Wildlife Trust
Bickley Hall Farm, Malpas,
Cheshire SY14 8EF, United Kingdom

Sarah Bird, Scott Wilson
North of England Zoological Society
Chester Zoo, Caughall Road, Chester,
Cheshire CH2 1LH, United Kingdom

*Corresponding author: Sue Tatman (e-mail: statman@cheshirewt.org.uk)