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A trial of one-way entrance multi-capture traps and different attractants to capture the edible dormouse (*Glis glis*) in England

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Abstract

Forty nestboxes modified with one-way entrance systems were placed on trees in 3 woodland sites in the Chilterns, England to catch edible dormice alive in a 'proof of concept' trial. Four types of attractant were used in an attempt to attract dormice to the nestbox traps. A single attractant was placed in each nestbox in a stratified manner. Nestboxes were checked daily for 10 days. On a long established monitoring site the nestbox traps caught many dormice. The traps caught 67.4 % of the total number of all animals seen in the same area throughout 2010, representing 81 % of the adult population and 92.7 % of females. There was no overall difference between male and female captures. However, there was a significant difference of the number of captures between males and females at the different attractants; apple bait captured more females and peanuts more males. Trapping in nestboxes was successful where edible dormice were very used to entering but further studies are needed to explore the success of trapping in new sites with naïve dormice and to improve the trapping mechanism.

Keywords: trapping, control, modified nestboxes

1. Introduction

The edible dormouse (*Glis glis*) is an alien species in Britain that was introduced by Lord Rothschild in 1902 to the Chilterns and the main population remains in the Chilterns area. The number of introduced individuals is unknown (Morris 1998). Their population increased to such a number that by the 1920s there were reports of damage in houses (Thomson 1953). By the 1960s, the edible dormouse was causing considerable damage to forestry produce and agricultural crops (Jackson 1994).

Previous studies have shown that edible dormice feed a lot in beech trees (*Fagus sylvatica*) on the flowers and seeds (Burgess et al. 2003, Bieber 1998). Their reproductive success and population densities have shown to vary enormously between years (Jurczyszyn 1995, Schlund et al. 1997). In England, it has been suggested that a lack of food force the animals to strip bark to eat the cambium layer beneath (Platt & Rowe 1964), slowing tree growth and development. In some cases ring-barking may lead to stem snap or even to death of the tree and can result in an economic problem in timber production, especially for trees such as Norway spruce (*Picea abies*) and European larch (*Larix deciduas*) (Platt & Rowe 1964). They have also been found in houses where they are a noisy nuisance at night when they are active and can cause damage to timber, furniture and electrical wiring (Morris 1998). Fruit trees have also been affected by the edible dormouse, leading to lower yield of orchards (Jackson 1994).

Historically in Europe edible dormice have been hunted and captured in a variety of ways. Simple baited snares, made of shaped wood and string, were used up to the 1800s. The edible dormouse 'bag' was a way of capturing the dormice in the trees rather than on the ground (Mansfeld 1942). Spring traps are used today in entrances to underground chambers in Slovenia.

A method of mass capture at ground level was described by Valvasor (1689 in Vietinghoff-Riesch 1960) which makes use of hibernation sites. The mechanism was a hollow pipe with a series of spikes that point in an inward direction, allowing the dormice to easily enter but making it difficult to escape. This method of trapping is similar to a method described by Santini (1978) who developed a modified version of a nestbox in a tree, whereby the entrance is surrounded by a funnel shaped ring of sharp steel strips. In our study we used a modification of this one-way entrance live-capture method in nestboxes. There have been references to baiting of traps in past literature (Vietinghoff-Riesch 1960, Pepper 1967) which was also a focus of this study. We hypothesised that a one-way multi-capture entrance system would successfully trap a significant number of the local edible dormouse population to prove the concept of capturing and that different baits would have significant effects on the number of dormouse captures.

2. Material and methods

Three sites in the Chilterns area of England were used in this study. Forty nestboxes were used at each site and were run for 10 days during July 2010. The first woodland site A used a discrete block of 40 (out of a total of 220) nestboxes for edible dormice, used as part of a long term continuous population monitoring study (Morris & Morris 2010). Animals had been PIT (Passive Integrated Transponder) tagged under the skin for individual identification using a hand held reader. The second site B already had 17 nestboxes present for 2 years, so those were adapted and 23 new boxes were added prior to this trial, spacing nestboxes throughout 60% of the woodland at a rate of 10 nestboxes per ha. The third site C was a woodland just outside the main core population of edible dormice in England, where a recent sighting had been confirmed but no nestbox or population monitoring had previously been made. Forty new nestboxes were erected and adapted.

The nestboxes were set up and run for 10 days during July 2010. The entrance of each nestbox was modified by fitting a 'one-way' mesh steel cone (see Fig. 1) to allow easy entry to the box but prevent escape. Each modified nestbox was sprayed with concentrated apple juice as a base attractant.

Additionally, four different types of attractants were used in the nestboxes in a stratified rotation on succeeding boxes - apple, dissected anal gland scent, peanuts, scat scent.

Traps were inspected daily and the gender of edible dormice and nestbox location recorded. Any animals found in site A were identified from their PIT tags (or microchipped

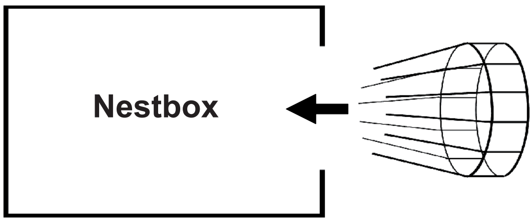

Fig. 1 Adapted nestbox by inserting a one-way wire cone mechanism into the entrance hole.

if unmarked) and released onto a nearby tree; in site B they were humanely killed under licence from Natural England. These data were then analysed to examine the number of dormice removed in relation to the local population. All trapping cones were then disabled to allow animals free access. Site A was subsequently checked every month as part of the ongoing monitoring. A check of the nestboxes in site B was completed two months after the trial to monitor the effects of the culling on the population. Site C was also checked every month. ANOVA analysis was used to examine the relative effectiveness of each attractant to attract edible dormouse and if there was any interaction with their sex. ANCOVA analysis was then used to analyse any interactions found.

3. Results

At site A, 241 captures were made over the 10 day trial, representing 124 individuals (see Fig. 2). On 13 occasions two animals were caught in one nestbox and on eight occasions three. The daily number of new animals captured (i.e. all those previously known and previously unknown animals captured just during the trial period) decreased over time (see Fig. 2). From all data on this population from 2010 we calculated that this represented 67 % of all individuals including young; 81 % of the total adult population known during the whole year (before and after the trial) and 92.7 % of the adult female population; i.e. the potential breeding population of the local area. In this site, all the animals were released after capture and were able to go on to breed. Had they been culled, their young would not have been born, therefore, only 7.3 % of known females could potentially have gone on to breed.

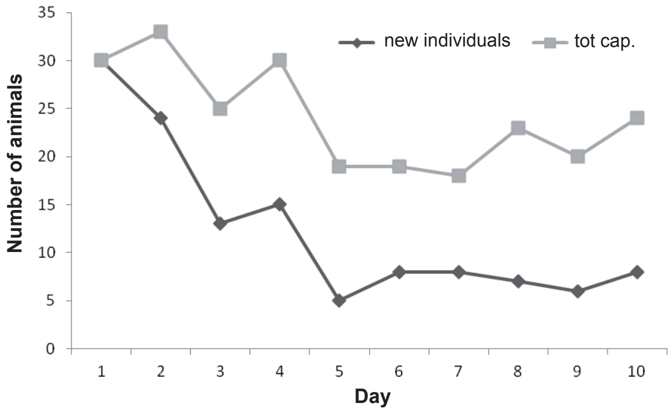

Fig. 2 The daily capture of different individuals during the 10 day trial in comparison to the total number of captures, including re-captures of PIT tagged animals. ('new' refers to the first time of catching during the ten day trial; most animals were already known and marked several years before, while some were previously unmarked).

In site B, 21 adult animals were humanely killed. This represented a removal rate of 5 animals per hectare. Seven (33 %) of the animals were in the 55 % of newly erected boxes in new locations and 14 in the well established ones. In mid-September another nestbox check revealed 16 more adult animals. This was broadly in proportion to the area not covered by the traps. No evidence of edible dormouse was found in site C during trapping nor after the trial.

Two-way ANOVA analysis showed that there was no significant effect of attractant or sex on the number of dormouse captures in site A (F = 1.56, p = 0.21, p > 0.05 and F = 0.04, p = 0.83, p > 0.05). However, the analysis showed that there was a significant effect of the interaction between sex and attractant on the number of dormouse captures (F = 4.78, p = 0.004, p < 0.01). Therefore, further analysis using Analysis of Covariance (ANCOVA) examined the effects of these interactions. This analysis shows that apple and peanut attractants have the greatest difference between number of male and female captures (t = 3.65, p < 0.001), followed by anal scent (t = 2.69, p < 0.01), then droppings (t = 2.05, p < 0.05). Apples appeared to be more effective at capturing females whilst peanuts were more effective at capturing males (Fig. 3).

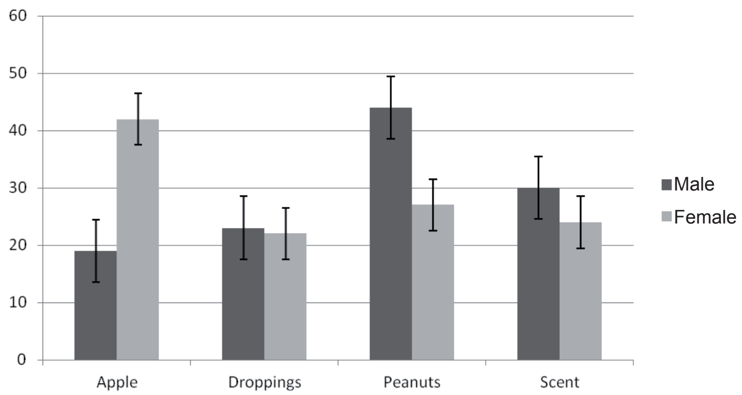

Fig. 3 Total number of male and female edible dormouse captures using the different attractant materials. Error bars representing 1 standard error.

4. Discussion

This study demonstrated that the one-way entrance multi-capture mechanism worked successfully on tree-mounted nestboxes in England at capturing edible dormice. We captured 81 % of the known adults in the local area in site A, representing 92.7 % of females. The traps captured multiple animals, this is not surprising given the sociable nature of this species (Morris 2004). The edible dormice on this site were very accustomed to using the nestboxes throughout the past 14 years. This enabled us to anticipate a large potential catch to provide a sufficient database for analyses in order to determine a ‘proof of concept’ result for the attractants. It does not mean that this level would be achieved at a new site with naïve animals – indeed we caught no animals in site C (but this may be because there were none there). In site B we caught 33 % of the animals in the 55 % of newly erected boxes in new locations.

Animals culled in site B represented 5 animals per hectare. The culling of resident animals creates an increased availability of nestboxes for other animals to move in. Jurcyszyn & Zgrabcynska (2007) showed the distances travelled by males are greater in low-density populations. Animals from the remainder of the wood or from surrounding woodland may have taken over the nestboxes during the 2 months following the culling trial but unfortunately funding did not allow monitoring or culling in the subsequent year.

There were some observations of animals being able to escape from the nestbox traps and it is suggested the cone mechanism should be modified, which may increase the rate of removal rather than the number removed. Nonetheless, these are very encouraging results for an initial proof-of-concept trial in that the concept had been successful.

It is well known that edible dormice use scent in trailing behaviour (Morris 2004) so it is likely that they would use scent to find food. The attractants were cheap, easy to prepare and to apply. Future work should incorporate a blank control. Whilst no single attractant was better than another at attracting greater numbers of dormice overall, apple appeared better at attracting female whereas peanuts attracted more males. The reason for different preferences for bait is difficult to surmise.

Overall, this study has demonstrated the principle that edible dormice can be successfully trapped in trees using a one-way multi-capture nestbox mechanism. We have demonstrated trapping a high percentage of adult females in an area where the population was very familiar with nestboxes for over a decade. Further work should be carried out to establish the best method of (multicapture) trapping removal in situations with no prior nestbox experience since this is a critical requirement for urgent pest control situations. Further investigations are needed to explore attractants – with a blank control – and artificial hibernacula trapping, since the latter would require few visits for control purposes and reduce the resources to service.

5. Acknowledgement

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