sometimes other gardeners do. The gardeners certainly know about the large number of badgers that live in some gardens. The college garden survey has revealed that there are several enormous elms in Cambridge. They were planted in the 18th century and have proved to be resistant to elm disease.
We have started planning for a book of about 120,000 words. Introductory sections will cover the physical background and development of the city. Sections on animals will include butterflies, moths, selected other invertebrates, fish, herptiles, mammals and birds. The bird section is currently being written up as an example. Sections on plants and fungi will include vascular plants and bryophytes, lichens and some fungi. We will end with a review of interesting sites, including college gardens and city wildlife sites.

If you would like to see what we are up to, or to contribute records, visit our Twitter account @NatHistCam, visit our website www.NatHistCam.org.uk, or send us an e-mail NatHistCam@gmail.com.

Notes on the successful mitigation-driven translocation of slow worms (*Anguis fragilis*) at Wandlebury Country Park

Steven J. R. Allain, Mark J. Goodman & Aunald D. Jopling

Introduction

In the summer and autumn of 2006, 63 slow worms (*Anguis fragilis*) were translocated to Wandlebury Country Park, Cambridgeshire (TL495535) as mitigation for development of their original site in Chelmsford, Essex. As slow worms are protected under the 1981 Wildlife and Countryside Act, developers are obliged to mitigate the loss of habitat where appropriate (Platenberg & Griffiths, 1999). This often takes place as a mitigation-driven translocation, where all of the individuals are relocated to a suitable receptor site. In this case, on delivery to the receptor site at Wandlebury, the slow worms were transferred to the northern end of Clark's Corner where the site had already been specially prepared for them. Compost piles and brash refugia were constructed nearby as a form of hibernacula. A destructive search of the original site was conducted after the translocation and no more slow worms were found to be present. Very little is known about the originally translocated slow worms due to the fact that attempts have failed to secure documentation produced by the consultants who initiated the project.

No known population of slow worms existed at Wandlebury Country Park before the translocation. The area they were moved to is a mixture of chalk grassland, open woodland (a recent plantation around 18 years old) and scrub. This mosaic of habitats provides plenty of cover and foraging opportunities for the slow worms, although our surveys were focused in a small area of scrub/open woodland that has been fenced-off to the public. This area is approximately 0.6 hectares in size and is known to be used by the slow worms, as all previous recorded encounters post-translocation were in this area. Slow worms are relatively scarce in Cambridgeshire compared to other reptiles, and this may be in part due to the heavily modified agricultural landscape that dominates the county. There is also a lack of heathland and other such appropriate habitats that are usually associated with reptiles.

Many mitigation-driven translocations fail to succeed as they may not follow best practice and/or scientific guidance (Germano *et al*., 2015). This is confounded by the fact that failures are often unreported, meaning that lessons can't be learned from those attempts leading to unfavourable outcomes. However, when executed properly, mitigation-driven translocations

can be successful and help to benefit reptile populations (McInerny, 2016). Since the original translocation, very little monitoring has been conducted, therefore we set out to establish whether this action was successful in establishing a viable breeding population of slow worms.

Methods – Survey Protocol

Pre-survey preparations: Following the discovery of a small number of slow worms under pre-existing refugia, an initial site evaluation was carried out on 8th June 2016. Plans were then made to complete a more in-depth study of the population, starting the following year. A pre-survey visit was therefore made on 20th April 2017 in preparation for regular surveys. To prepare the site, ten 1 m x 0.50 m roofing tile felts were placed in suitable areas (long grass unshaded by trees). The felts were left for a period of 16 days prior to slow worm surveys starting.

Surveys: Surveys took place between 9 and 11am when each of the felt tiles was carefully lifted and any slow worms found underneath were placed into a large bucket prior to being processed. The first four surveys (6th May, 20th May, 3rd June and 17th June 2017) were carried out before the breeding season. Surveys were resumed on 18th August, with subsequent surveys taking place on 23rd August, 26th August, 3rd September and 9th September 2017. Surveys were spaced out fortnightly in the spring and much more frequently in the summer to try to catch the emergence of hatchlings.

When slow worms were captured, they were placed in a sealable plastic container and their weights were measured using a set of digital scales. The sex of each slow worm was recorded (if it could easily be determined) as well as which felt it was discovered under. Surveys took approximately one hour to complete, but this varied due to the number of slow worms captured and therefore the processing of the sample set before release. Individuals were also photographed for individual recognition, using their unique markings to investigate recaptures.

Results

There were a total of 77 capture events across the nine surveys, comprising 70 individuals, with six recaptures. Three of these recaptures were of a gravid female, although she was only handled on the first encounter, and the other three recaptures were sub-adults. Following Smith (1990), each slow worm was classified into one of four groups based on its snout to vent length. These classifications are 'hatchling' (below 50 mm), 'yearling' (50-70 mm), 'sub-adult' (70-130 mm) and 'adult' (130+ mm). The group containing the most individuals during the one season of sampling was yearlings, with a total of 29 encountered. The other capture events comprised hatchlings (n= 14), sub-adults (n= 24) and adults (n= 10).

Discussion

Our results show that the translocation was successful in establishing a viable population of slow worms, with the population demography spread widely. The high proportion of juveniles also shows that the population has been breeding successfully. Due to the longevity of the species, adults tend to be the dominant age class (Beebee & Griffiths, 2000), but this was not the case in our study. The number of adults located was lower than expected, meaning that they are likely to be elsewhere at the site. The high number of yearlings can easily be explained by the fact that slow worms can have up to 26 young per clutch (Beebee & Griffiths, 2000). There is also the possibility that the area our surveys were

concentrated in has been used by the slow worms as a crèche, with the artificial refugia being more beneficial to gravid females and young as opposed to sub-adults and males. If this is the case then this is the first recorded instance of this behaviour, although further research is needed to investigate this.

The survey area did contain some old and severely deteriorated felt tiles before our study began and these were removed prior to our study. These had been *in-situ* for a number of years and when the pre-survey visit was conducted these were the only places where slow worms were seen.

Fish (2016) found that juvenile slow worms preferred felt compared to other artificial refugia materials. Roofing felt was the only material used to survey the slow worms in our study, due to its ease of availability and relative low-cost compared to other potential materials. We believe the use of roofing felt may have produced a microclimate that was favourable to the hatchlings and yearlings compared to the other age classes; this may be due to their small size. In the future, refugia of different material types should be used in order to compare the difference in preference between adults and juveniles. A small number of individuals also showed signs of scarring, which can be linked to predation (Smith, 1990). The gravid female seen on multiple occasions under the same felt may have been inactive due to the condition under the felt being optimal for her (Hurst & Hubble, 2006).

With this in mind, future surveys will expand our search area to see if the initial study site is indeed acting as a site where females prefer to give birth due to its secluded nature and absence of disturbance. Expanding surveys will also allow us to investigate how far the slow worms have dispersed since their initial introduction to Wandlebury. This is important to take into account as it may influence land management protocols on site, in order to make areas of habitat more favourable to the slow worms. It's also important to map their current distribution so that the population can be monitored in the long-term regarding distribution, population density and population structure.

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New records of midwife toads (*Alytes obstetricans*) in Cambridgeshire

Steven J. R. Allain & Mark J. Goodman

In recent years the Common Midwife Toad (*Alytes obstetricans*) has been recorded at two sites within the county of Cambridgeshire. A non-native species, it is mainly restricted to