

The ongoing monitoring of slow worms (*Anguis fragilis*) at Wandlebury Country Park

Steven J. R. Allain & Iain H. Bray

Introduction

The Cambridgeshire and Peterborough Amphibian and Reptile Group (CPARG) have led an ongoing monitoring project of slow worms (*Anguis fragilis*) at Wandlebury Country Park, Cambridgeshire (TL495535) since 2016, with surveys becoming more structured in 2017 (Allain *et al.*, 2019). The slow worms were originally introduced to the site in 2006 from a site in Chelmsford, Essex (Allain *et al.*, 2019). It is understood that they previously did not occur at the site and there are no previous records held for them by Cambridge Past Present and Future (CPPF), who manage the site.

As well as monitoring the health of the slow worm population, including evidence of breeding, CPARG has been trying to determine where else at Wandlebury the slow worms may have dispersed to, as the extent of their previously known occurrence was limited to the area where they were originally released. It is hoped that if they have spread, this will inform the management of additional areas of the site to further benefit the population and increase its resilience.

Slow worms are challenging to monitor due to their fossorial lifestyle, which often leads to detection rates being lower than that of other reptile species (Schmidt *et al.*, 2017). The project is therefore important in contributing to the current knowledge and understanding of the species – especially through the use of standardised protocols. Research has shown that mitigation-driven translocations often fail (Germano *et al.*, 2015), but there are very few cases where populations of slow worm have been monitored post-translocation (Platenberg & Griffiths, 1999). Our monitoring presents the opportunity to establish why this translocation was successful, in the hope of helping to increase the likelihood of such events elsewhere in the future.

Methods

In order to increase detection of slow worms, artificial cover objects (ACOs) were used. These are readily utilised by the species to bask beneath. In this case, ACOs in the form of 0.5m² pieces of roofing felt were laid down in the area of Wandlebury Country Park close to the release area (Allain *et al.*, 2019), as well as in some surrounding habitat that was deemed as suitable but where they had not been previously observed. Surveys took place in the morning during April, May, June and August 2017, 2018, 2019, typically between 9 and 11am at least twice a month. To sample in the paddock, each of the felt tiles was lifted and any slow worms found underneath were captured. The paddock is an area that was previously grazed by sheep but has subsequently been left to become overgrown with areas of bramble scrub. If slow worms were found outside of the paddock, they were recorded but not handled. Surveys did not take place in July, during the time when pregnant slow worms were expected to be birthing, in order to reduce the impact of disturbance on the population; however, when resumed after this period an aim was to observe the emergence of hatchlings.

When slow worms were captured, they were first placed in a plastic container and transferred to an electronic scale (Metro Electronic MH-Series, 0.1g accuracy up to 200g) and the mass recorded. They were then photographed, with a sponge used to help restrain them whilst being inverted to photograph the underside; although in later surveys it was determined that this was not necessary in order to determine the overall length of each individual (Bray & Allain, 2019). The open source software ImageJ was used to measure the length of slow worms, based on the photographs taken.

Results

During the three years of monitoring between 2017 and 2019 a total of 195 slow worm observations were made in the known release area; of which 35 were adults (with a snout-to-vent length (SVL) over 120mm) and 126 were juveniles. The mean adult recording rate remained relatively constant over this period, at between 1.9 and 2.1 individuals per survey.

The extended survey within the adjacent field, which commenced in 2019, recorded a total of eight observations, with the furthest record from where the slow worms were originally released being approximately 300m. The

numbers of slow worms found were relatively low compared to the release site, with a total of four adults from 50 ACOs being found, compared to 12 adults from 15 ACOs in the same year, respectively.

Discussion

The number of adult slow worms observed between 2017 and 2019 indicates that the population was relative constant over this period. Given the number of immature animals recorded and the time elapsed since their original release, it appears the population is now likely self-sustaining. This is very encouraging given the relatively small founding population (Allain *et al.*, 2019). Our next steps are to try to establish why the introduction has been successful so that guidance can be given to the wider community on how to translocate reptiles and ensure their survival. Often with translocations hundreds of individuals are moved before a very small population is established, due to factors such as dispersal and high mortality rates (Sullivan *et al.*, 2015). In this case it seems that the relative isolation of the slow worms were enough to ensure its longevity and success, despite the small founding population.

Evidence of slow worm dispersal elsewhere within Wandlebury Country Park is encouraging, as a more extensive population will make it more resilient to possible changes in habitat, predation or disease. The known release site, which appears to be the population stronghold, is currently managed primarily for slow worms, with restricted access and sensitive management which has included selective scrub clearance undertaken by CPARG during the winter of 2018/19. It is within this stronghold that gravid females and hatchlings have been observed throughout the monitoring period, indicating that it may also act as a nursery. The behaviour of slow worms is not fully understood due to their fossorial lifestyle and that fact they can be a challenge to survey. If the release site is acting as a nursery or crèche, then we believe this is the first time that this behaviour has been recorded in this species.

It is hoped that further information on slow worm dispersal will help inform habitat management decisions in other areas of the park, which will potentially benefit the slow worm population and aid further dispersal. Future surveys planned by CPARG over the coming years aim to reveal whether the slow worms have colonised areas further away from the release site than is currently known, as well as building a clearer picture of the demography and size of the population.

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