Live trapping small mammals as a tool for observing landscape-scale changes on a re-wilding area, Knepp Castle Estate, Horsham, West Sussex

Executive Summary of a thesis submitted in partial fulfilment of the requirements of the University of Greenwich for the degree of MSc in Environmental Conservation – published May 2008

Abstract

The full thesis relating to this summary presents the results of live-trapping studies of small mammals over three areas of Knepp Castle Estate, Horsham, Sussex during the period of August – September 2007. The three different study areas vary according to the different grazing regimes taking place on each area, all being part of a holistic experiment on the Estate to recreate near-natural grazing with animals utilising the land with as little human intervention as possible.

Five different habitat sites within each area had 10 traps at a time on them, with three continuous days of trapping being undertaken. The number of small mammal species varied between areas; with the species of common shrew, *Sorex aranaeus*, wood mouse, *Apodemus sylvaticus*, field vole, *Microtus agrestis*, bank vole, *Clethrionomys glareolus* and yellow-necked mouse, *Apodemus flavicollis* being trapped. Whilst methodological issues and habitat differences are important, the level of data acquired is only sufficient to hint at hypothesising the differences observed. It is hoped that further repeat studies in the same areas, at the same time, under the same conditions will begin to build a picture of the differences grazing regimes impacts on small mammal population density and distribution.

Live trapping small mammals

 

Live trapping offers an effective way to monitor a wide range of small mammal species at one time as many can be found occupying the same habitat (Sibbald, Carter & Poulton, 2006). Aside from biometric data such as weight and measurements, live trapping also enables accurate identification of species and sex, during the handling process. Care is needed however as the success of a trapping study is often dependent on the skill of the surveyor to identify the species caught and success is generally based on the position of the traps in relation to appropriate microhabitats (Sibbald, Carter & Poulton, 2006). Trapping data can show how captures are distributed within a trap grid, which has the potential to impart information such as habitat preferences.

Site selection

Division of the Knepp Castle Estate followed the current grazing compartments (which can be seen within the full thesis and the website) Each of these compartments was under different management regimes and contained different quantities of grazing animals, introduced and natural (Greenaway, 2006). Within these individual compartments there were a number of different habitats. Of these compartments, three were chosen that varied significantly in their land use. A total of five different sites were chosen within each compartment, each chosen to represent a cross section of the available habitats within the compartment. Within each site a total of 10 Longworth traps were placed according to a grid system.

Methodology – grid trapping

The grid system was based on random number generation to ensure no bias in laying the trap. Each site had a grid of 100m x 100m which was then further divided in 10m x 10m grids, resulting in 100 squares. Ten numbers were then picked from a random number generator of 1-100. It was at these numbers that the 10 Longworth traps were placed. As a general rule this was compliant with the recommendations of trap spacing by Gurnell & Flowerdew (2006).

Cross – section of results

Table 1.0 – Overall small mammal numbers

	Compartment 1	**Compartment 2**	**Compartment 3**
Species	No. of individuals (%)	No. of individuals (%)	No. of individuals (%)
Apodemus sylvaticus	9 (31)	5 (36)	7 (33)
A. flavicollis	3 (10)	0 (0)	1 (5)
Sorex araneus	3 (10)	1 (7)	3 (14)
Clethrionomys glareolus	8 (28)	2 (14)	1 (5)
Microtus agrestis	6 (21)	6 (43)	9 (43)
Total number	29 (100)	14 (100)	21 (100)
Number/Trap	0.58	0.28	0.42

Trap Night Index (TNI)

Trap Night Index is a way in which to make comparisons between studies which have used different numbers and patterns of traps (Gurnell & Flowerdew, 2006). This is calculated simply by converting the number of animals captured to the number captured per trap-night or per 100 trap-nights. This is achieved by dividing the numbers of animals captured by the number of traps used and the number of nights trapping. Thus, TNI allows an estimation of population density to be extracted from the meta-data collected.

Table 2.0 – Trap Night Index

Compartment	**Species**	**Trap-nights**	**No. of individuals**	**Total catch**	**TNI (individuals)**	**TNI (total catch)**
Compartment 1: Full Grazing	*Microtus agrestis*	120	6	7	5	5.83
	Sorex aranaeus	60	2	5	3.33	8.33
	Apodemus sylvaticus	120	8	13	6.66	10.83
	Clethrionomys glareolus	90	9	15	10	16.66
	Apodemus flavicollis	60	4	6	6.66	10

	All Species	**450**	**29**	**46**	**6.44**	**10.22**
Compartment 2: Partial Grazing	*M. agrestis*	60	3	3	5	5
	S. aranaeus	30	1	1	3.33	3.33
	A. sylvaticus	60	5	10	8.33	16.66
	C. glareolus	60	5	7	8.33	11.66
	All Species	**210**	**14**	**21**	**6.66**	**10**
Compartment 3: No Grazing	*M. agrestis*	90	9	13	10	14.44
	S. aranaeus	90	3	3	3.33	3.33
	A. sylvaticus	90	4	9	4.44	10
	C. glareolus	30	1	1	3.33	3.33
	A. flavicollis	30	2	3	6.66	10
	All Species	**330**	**19**	**29**	**5.76**	**8.79**
All Sites	**All Species**	**990**	**62**	**96**	**6.26**	**9.7**

Discussion of results

Results in grassland habitats indicated that the presence of cattle, pigs and horses had a direct impact on the abundance of small mammals (note the relative lack of species found), although this was not so true across all habitat areas. The reason for this could be the size of the estate in comparison to the number of animals. Whilst it is true that there are a very large number of Fallow deer, *Dama dama* on Compartment 1, the numbers of cattle, pigs and horses is fairly comparable with Compartment 2: Partial Grazing. Additionally, the lack of internal fencing within each site means that the animals are free to move around as they please and when considering that my sample window was just three days and nights, it is easy to consider that it should not be taken for granted that just because the small mammals are sampled in an area of grazing, means they will be affected by the ungulates at that exact time of sampling. Despite this, it is of course far more likely that in the grassland habitats they will be affected as it is highly unlikely that most of the grazing animals will frequent the woodland areas, particular the cattle. Therefore the results in the grassland habitats, shows the disturbances caused by these grazing animals.

Further discussion and recommendations

As previously mentioned, the purpose of this study was to assist in the baseline ecological survey at Knepp Castle Estate was seeking to acquire in order to monitor changes and evaluate management. Due to this, no attempt has been made to draw any conclusions from the results acquired within the live trapping of small mammals. Nor should it, these trapping surveys were set up on the basis of providing a platform for which further surveying may be carried out. The idea would be to conduct these surveys on the template of this study so that over a series of years a picture may then develop, highlighting any changes in population structure, density, and movement. Therefore, whilst there are a number of ways of estimating data such as density of small mammal species, it was never the intention of doing so within this study. That is not to say this is not important, far from it. Indeed, population density is the single parameter of intrinsic interest to biologists studying population dynamics (Buckland *et al*., 1993). Now that this basic baseline data has been obtained, further surveys based on the methodology used within this study would allow far more data to be analysed, such as patterns of distribution. As it stands, this is not viable based on the data obtained here.

Further study could also be considered to expand on the scope and area conducted within this study. For example, another interesting and useful idea could be to look into sward height in the immediate vicinity to the traps. Not only would this enhance this study, it would provide valuable additional data that could be used to quantify differences between capture data, as well as providing a basis for further study branching off of the raw data of small mammal records.

To enable this ongoing collection of data, a draft survey plan and methodology has been included in the full thesis so that any individual who is sufficiently trained in the live trapping and handling of small species, as well as field signs and identification may progress with the further acquisition of field survey data.

Contact Information

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