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A PILOT FIELD TRIAL INTO THE EFFECTIVENESS OF THE CatAlert™ COLLAR AT REDUCING PREDATION BY DOMESTIC CATS

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A report carried out by the British Trust for Ornithology under contract to Willana Lifesciences.

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1. INTRODUCTION

The CatAlert was developed in response to the concerns raised by large numbers of cat owners and others about the numbers of animals killed by domestic cats. Many birds employ alarm and distress calls which consist of a complex series of sonic patterns. Many of these calls are species specific, although some bird species learn to respond to the alarm calls of others. This trial is designed to test the hypothesis that a simple, repeated signal (currently a modulated tone repeated every seven seconds) is sufficient to warn birds and other mammals to the presence of domestic cats and so reduce predation. The pet industry has estimated that there are some 7.5 million domestic cats in Britain, many of which regularly prey upon the local wildlife. Unlike truly wild predators, cats are normally fed by their owners and supplement their diet by preying on local wildlife. In contrast to most wild predators, cats do not starve if the local wildlife population is greatly reduced. Indeed they have expert veterinary care and vaccinations to combat various illnesses. Thus, it is possible that cats can severely deplete local populations of mammals, birds and even reptiles and amphibians. This could be especially significant in parts of the world where there are rare species and cats and other ground predators are newly introduced by man. If the CatAlert reduces the predation success of domestic cats, then it could result in positive benefits for wildlife. It may also reduce the considerable upset that is caused to many cat owners when their cat brings in animals that they have gone to considerable efforts to attract to their gardens or neighbourhoods.

2. OBJECTIVES

1. To investigate whether the CatAlert reduces the number of prey items taken by domestic cats.

2. To assess whether cat owners find the CatAlert acceptable to them.

3. To assess the response of cats to the CatAlert.

3. METHODS

3.1 Trial

An article was placed in The *Bird Table*, the magazine of the Garden BirdWatch survey, asking for volunteers who had cats which they considered to be highly predatory to take part in the trial. In addition, Dr Liam Martin (Willana Lifesciences) passed on the names of a number of people who had contacted him wishing to take part in any trials. Thirty participants were selected. Where possible they were owners of single cats which took substantial numbers of prey. However, this was not always evident from the initial correspondence. The participants were split into two groups. All were asked to start the trial as soon as possible and the CatAlert collar and information forms were sent out simultaneously in first week of September 1998. Participants in Group 1 were asked to place the collar on the cat and activate the Mark 1, prototype CatAlert for the first two weeks, followed by a period of two weeks with the alert inactive. This protocol was then to be repeated for a second period of four weeks. Group 2 were asked to attach the alert to the cat but not activate it for the first two weeks and then to activate it for the second two weeks. Again, this protocol was repeated for a second period of four weeks. Both groups were asked to record the date, and time of day if possible, when all prey items were found. The were also asked to identify the species where possible. All participants were asked to return their forms and alert collars at the end of the trial.

The results of the trial were analysed using general linearized models (McCullagh & Nelder, 1989). The first model tested whether the number of birds caught per day was related to whether the alarm was active or not, the identity of the cat and whether it was the first or second fortnight of the trial. Similar

models were created for mammals alone and birds and mammals combined. Models assumed a Poisson error distribution, specified a log link function and treated the number of days as an offset function. Each of the three independent variables were treated as class variables.

3.2 Questionnaire

Each participant was given a questionnaire which they were asked to complete at the end of the survey. They were asked a series of questions about their views on the acceptability of the CatAlert collar to them and their cat. They were also asked for any other comments which they felt were relevant to the trial.

4. RESULTS AND DISCUSSION

4.1 Trial

Thirty participants were recruited for the trial, however, only 17 were able to provide analysable data. The reasons for non-inclusion in the analyses are summarised in Table 1. Of the six volunteers who decided not to undertake the trial, two had cats which were allowed out only at night and hence would be hunting at times when the CatAlert was inactive. A further two were un able to undertake the trial due to personal commitments and two were not happy with the collar. These latter two were not happy with the principal of putting collars on cats because of the risk of them getting caught whilst out hunting. One of these also felt that the prototype CatAlert was too large for their cat.

Two of the cats were badly affected by the collar and, as requested in the trial protocol, when the cats did not settle down after a few hours, the participants removed the collars. One of these cats was a stray which had been taken in and the owner stated it had always been extremely temperamental and would not tolerate collars of any kind. The other cat found the beep of the alert distressing. Due to the considerable variation in cats' temperaments, it is not surprising that a small number of individuals found the collar unacceptable.

Three of the 17 cats which were included in the trial lost their collar or it malfunctioned after 10 (2) or 11 (1) days of the trial. These three individuals had therefore shorter trial periods in both the active and inactive phases of the trial. In the event, the prototype CatAlert failed on all cats part way through the second round of the trial. For this reason only the first four weeks of the trial were used.

The number of each type of prey taken by cats during the trial is given in Table 2. Amongst the mammals taken, only shrews had more taken when the alert collars were active (9:4) and amongst birds, only Robins had more taken (2:0). Table 3 shows the results for each individual cat. It shows considerable variation between cats, with four cats catching no animals during the trial.

The first model indicated that the number of birds caught per day was significantly lower when the alarm was active ($\chi^2 = 4.72$, df = 1, $P < 0.05$). However, it was unrelated to the identity of the cat ($\chi^2 = 8.93$, df = 8, ns) or whether it was the first or second fortnight of the trial ($\chi^2 = 2.96$, df = 1, ns).

In contrast, the number of mammals caught per day was significantly related to the identity of the cat ($\chi^2 = 128.93$, df = 8, $P < 0.001$), but not to the status of the alarm ($\chi^2 = 2.24$, df = 1, ns) or which fortnight it was ($\chi^2 = 0.73$, df =1, ns).

The number of birds and mammals (all animals) caught in total was thus related to the identity of the cat ($\chi^2 = 170.18$, df = 11, $P < 0.001$) and accounting for this, also the status of the alarm ($\chi^2 = 5.28$, df = 1, $P < 0.05$). It was not related to whether it was the first or second fortnight of the trial ($\chi^2 = 3.27$, df = 1, ns).

4.2 Questionnaire

Table 4 gives a summary of the results of the questionnaire.

The six participants who found problems with the noise of the collar all mentioned that it had annoyed them when the cat was sat on a windowsill or in light conditions within the house. This is a significant problem if it cannot be overcome in the development of the CatAlert. If the alert can be modified so it does not activate inside the house, it will greatly increase its acceptability to cat owners.

Nobody had any complaints from the neighbours about the noise of the alerts, although many participants responded that they had not asked the neighbours whether they had been annoyed by them.

Virtually everybody had problems with the CatAlert bleeping while the cat was in the house. This was mainly a direct result of the cats liking to sleep in sunny situations on window sills.

One of the two participants whose cat was unsettled by the de-activated collar remarked that if the device had been smaller, it would be unlikely to be a problem. Of the three participants who felt that the activated CatAlert annoyed their cat, two declined to participate in the trial and the third's cat settled down after a few hours and did not have a long-term problem.

Only two participants felt that the CatAlert had a noticeable affect on wildlife. This is not surprising as most cat owners do not watch their cat for long when it is hunting. From the additional information that was supplied, it is clear that a number of long-haired cats did not have enough light getting to the CatAlert in order for it to bleep. This was particularly noticeable when they were in a crouched position, ready to pounce. This problem will need to be overcome if a light sensor is to continue to be used as an alert mechanism. A number of participants also found that the cats often sat in dark places such as underneath hedges where the light sensor did not operate. This enabled the cats to continue to stalk their prey while the alert was switched on.

Many people felt that their cats took quite a number of prey items at night when the sensor is de-activated and suggested it would be more sensible for it to be on all the time when the cat was out. In addition, many people remarked that they hoped the final version would be substantially smaller than the one used in the trial.

5. CONCLUSIONS AND RECOMMENDATIONS

1. The trial found that the CatAlert significantly reduced both (i) bird and (ii) all animal (birds and mammals) predation, although there was no significant reduction in mammal predation on its own.

2. Most cats ignored the bleeping of the CatAlert, however, a few had a bad reaction to the bleeping. For such cats the alert would not be appropriate.

3. The size of the prototype CatAlert was considered by many owners to be too large for successful long-term use.

4. The light sensor did not work effectively on long-haired cats or cats that stalked from underneath hedges and other dark places.

5. Many people found that the CatAlert operated inside the house where it was annoying. Modifying the CatAlert so that it does not activate inside the house would be preferable. Many

owners would prefer an alert which operates both day and night outside the house to one which operates only at high light levels.

6. Although these results are promising, there is a need for a much larger trial to look at the effectiveness of the collar. It would be important for these trials to include the fledging period in spring and early summer when there are large numbers of young birds around.

A Mark II prototype CatAlert is planned for a larger scale field trial, both in the UK and abroad. It will have the facility to operate continuously both day and night or in daylight only, longer battery life, improved energy management and improved attachment to the cat collar. At the commercial production stage, it will be possible to include a location sensor to switch off the CatAlert inside the home.

6. ACKNOWLEDGEMENTS

This trial would not have been possible without the 30 volunteer participants and their cats. Computing and analytical assistance was provided by Dr Stephen Freeman. Administrative assistance was provided by Jacky Prior.

7. REFERENCES

McCullagh, P. & Nelder, J.A. (1989). *Generalized Linear Models*. Second edition. Chapman & Hall, London.

Reason for non-inclusion	No. of participants
Trial information not returned	2
Trial not undertaken	6
Cat reacted badly, trial terminated	2
Cat lost alert collar	3

Table 1 The reasons for non-inclusion in the analyses of the trial results.

	Alert collar active	Alert collar inactive
Mammals		
Bat	0	1
Long-tailed field mouse	2	5
Vole	7	10
Shrew	9	4
Rat	1	3
"Mouse"	16	23
Rabbit	2	5
	37	51
Birds		
Wren	0	1
Robin	2	0
Dunnock	0	1
Greenfinch	1	2
Chaffinch	0	1
"Tit"	0	3
"Sparrow"	2	2
"Bird"	1	6
	6	16
Total	43	67

Table 2 The number of prey items of each species recorded in the 227 days that the alerts were active and the corresponding 227 days the alerts were inactive

Participant No.	No. of days of each part of trial	Alert Active		Alert Inactive	
		Mammals	Birds	Mammals	Birds
3	14	0	0	1	2
5	14	0	1	0	2
6	14	0	0	0	0
8	14	0	0	0	0
9	14	2	0	9	1
10	14	0	1	0	0
11	14	1	0	2	0
12	11	0	2	2	0
13					
15	14	0	0	0	2
16	14	1	1	1	1
18	14	0	0	2	0
19					
20	10	1	0	1	0
21	14	0	0	0	0
23	14	21	1	13	2
25	14	0	0	0	0
26	14	0	0	0	0
27	10	11	0	20	6

Table 3 The number of prey taken in the trial by each cat.

		Yes	No	Unsure
1.	**Your views on the alert collar**			
a	Does the noise of the collar cause you problems?	6	15	0
b	Does the noise of the collar cause your neighbours problems?	0	19	3
c	Does the collar bleep whilst in the house?	20	2	0
2.	**Your cat's "views" on the alert collar**			
a	Does the de-activated collar annoy your cat?	2	19	0
b	Does the bleep annoy your cat after it has been activated?	3	18	0
c	Does the bleep noticeably alert wildlife of your cat when you are watching?	2	7	11

Table 4 Summary of the results of the questionnaire. Not all participants responded to all questions.