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PROGRESS REPORT ON THE EFFECTIVENESS OF THE MARK II 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 has been 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 reducepredation. 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.

An initial trial was carried out in Autumn 1998 which looked at theeffectivness of the Mark I CatAlert. This trial found that there was a significant reduction in the number of birds taken when the collar was active. There was not, however, a significant reduction in the number of mammals taken. The trial suffered from a number of problems. Analysable data came from only a small number of cats (17) and the collars failed after the first round of the trial resulting in only one half of the experiment being undertaken. The current trial was, therefore, designed to look at the effect of the CatAlert collar Mark II on cat predation at different times of the year.

2. OBJECTIVES

1. To investigate whether the CatAlert Mark II reduces the number of prey items taken by domestic cats in spring, summer and autumn.

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

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

3. METHODS

3.1 Trial

The first trial was undertaken using volunteers who took part in the BTO's Garden BirdWatch Survey. However, the second trial was undertaken using participants who had heard about the CatAlert through the press and bought a collar at cost price directly from Willana Lifesciences. Each person buying a collar was asked to undertake two trials, one as soon as they obtained the CatAlert and one in June 1999. Only a small portion of those people buying the CatAlerts were expected to take part in the trial. Some people had two cats both with collars, in this instance owners were asked to undertake the trial with both cats as one unit.

Each trial was split into two groups with individuals assigned to each group alternately as they bought collars. The first group were asked to undertake the surveys with the CatAlert activated for the first week, de-activated for the second, activated for the third and de-activated for the fourth. The second

group were asked to do the same but in reverse order, starting with the CatAlert de-activated. Forms were designed to be as easy as possible to complete and participants were asked to send them directly to the BTO. Each person was asked to record as accurately as they could all the prey that were taken. The results of the surveys were analysed using general linearised models testing a number of factors.

The results for mammals and birds were analysed separately. The first models were created to investigate whether there was a seasonal effect, an effect of the collar being active or inactive and if there was an effect of whether it was the first or second fortnight of the trials. A second set of models was then produced which investigated whether there was an effect of the group, the number of cats, the number of collars in the trial or the mode (i.e. whether the collar was on all the time or just during the day). Models assumed a Poisson error distribution and specified a log-link function. Each of the independent variables were treated as class variables.

3.2 Questionnaire

A simple questionnaire was given to each participant asking some very basic questions about their use of the CatAlert and their reaction to it in order to gauge the acceptance of the CatAlert to the general public.

4. RESULTS AND DISCUSSION

4.1 Trial

A total of 35 households with cats took part in the trial. Fifteen of these households took part over two seasons giving a total of 50 four-week trials. Twenty-four of the households obtained one collar, with the remaining 11 obtaining two. The results shown in Table 1 show that there was a wide variation in the numbers of birds and mammals taken by cats in different households. This is clearly in part related to the quality of the hunter and will also in part be related to the prey that are available in the cat's local territory. A total of 18 different bird species were taken during the trials and at least nine species of mammals (Table 2).

Effect on Mammals

The results of the trial on mammals taken is given in Table 3. It was not possible to produce satisfactory models relating to the number of cats in each house or to differences between cats. There was no significant effect of the number of cats with collars in each house the fortnight of the trial or whether the collar was active or not. This suggests that the CatAlert has no effect on mammal predation. There was a significant difference between whether the CatAlert was on just during daylight or whether it was on all the time. Surprisingly cats caught more mammals if they were undertaking the part of the trial where they only had the bleep activated in daylight. This effect however related also to the time when the collar was de-activated. Many of these cats are actually kept inside at night in an attempt by their owners to reduce their predation on wildlife and it may be that they are naturally better hunters.

Not surprisingly there was a highly significant effect of season with fewest mammals per cat caught in spring and most mammals per cat caught in autumn. Mammal populations are known to go through substantial population variation throughout the year which is expected to result in mammals being more available to cats later in the year. There was also a highly significant effect of the group in which the households were placed. People obtaining CatAlerts were alternately placed in groups A and B when they purchased the collar. Thus, this can only be a chance effect even though it is extremely strong. It has no bearing however on whether the collar is active or not just the predatory abilities of the cats overall.

Effects on Birds

It was not possible to get a satisfactory model, only for one variable the cat ID effect (which tested for the difference between individual cats). There was no significant relationship between the number of collars in a household the fortnight of the trial or whether the CatAlert was active all the time or just during the day. There was a weak effect of group and season and a strong effect for the number of cats in the house. This probably means that prey attributed to a cat with a collar was sometimes actually caught by other cats in the household.

There was a highly significant result for the 'collar active' variable with cats catching less than half the birds during the periods the collar was active compared to when the collar was inactive. This effect occurred in all seasons suggesting that the result is extremely robust.

4.2 Questionnaire

A summary of the results of the questionnaire of cat owners' views is given in Table 4. The important findings of this questionnaire was that there were only three cats which appeared initially to be annoyed by the bleep. All three of these appeared to settle down after a short while. There was, however, one owner of two Burmese cats that found the cats did not settle down. He did not send back the questionnaire hence it has not been included within the results. Burmese cats are known to be highly strung and therefore this response is not surprising. There was a very high level of acceptance of the CatAlert and a significant number of people indicated they would be prepared to pay for a more expensive model which de-activates as soon as a cat comes inside. A number of those who said they would not be prepared to pay did so because they preferred to have the collar activated so they could locate the cat in the house.

5. CONCLUSIONS AND RECOMMENDATIONS

- The trial strongly suggests that the CatAlert has a major effect on reducing predation of birds by cats. However, there is no evidence for reduced predation of mammals.
- Most cats showed little reaction to the bleep of the CatAlert.
- There was a very positive reaction from cat owners who had tried the CatAlert and a substantial number would be prepared to pay for a more expensive model that could be turned off as the cat entered the house.
- Although these trials showed a strong effect of the CatAlert in spring, summer and autumn, a survey still needs to be undertaken during winter to ensure that the CatAlert is effective throughout the year.

6. ACKNOWLEDGEMENTS

The trial would not have been possible without the help of the volunteer participants who sent in their results. Computing and analytical assistance was provided by Dr Ian Henderson.

Season	Group	Household No.	No of cats	No of collars	mode	on mam	on birds	off mam	off birds	on mam	on birds	off mam	off birds
spring	1	1	1	1	1	1	0	1	0	0	0	1	0
	1	2	1	2	2	0	1	1	0	1	1	1	1
	1	3	2	2	?	0	0	0	0	0	1	2	4
	1	4	2	2	2	2	0	3	0	4	0	2	1
	1	5	3	1	2	0	0	0	1	2	4	0	4
	1	6	1	1	2	0	0	0	0	0	0	0	3
	1	7	1	1	2	3	0	3	0	1	0	1	0
	1	8	1	1	2	1	0	0	1	0	0	0	0
	1	9	1	1	1	0	0	0	4	2	1	1	0
	1	10	3	1	1	0	0	0	1	0	0	1	0
	1	11	1	1	?	0	0	0	1	0	1	1	1
	2	12	2	2	1	0	0	0	1	0	0	1	0
	2	13	2	1	2	0	0	0	0	0	0	0	2
	2	14	1	1	1	0	0	0	0	0	0	0	0
	2	15	2	1	2	1	0	0	0	0	2	0	3
	2	16	1	1	2	0	0	0	1	1	0	0	0
	2	17	1	1	2	0	0	0	1	0	0	0	0
	2	18	2	2	1	0	0	0	0	0	0	0	0
	2	19	1	1	?	2	4	1	3	1	4	1	7
	2	20	2	1	?	0	0	0	0	0	0	0	0
	2	21	2	2	2	0	0	0	0	0	0	0	0
summer	2	12	2	2	1	0	0	0	0	0	0	2	0
	2	13	2	1	2	0	0	0	0	1	0	0	2
	2	15	2	1	?	0	3	0	1	1	1	2	3
	2	18	2	2	1	0	0	0	0	0	0	0	0
	2	21	2	2	?	0	1	0	3	0	0	0	0
	2	22	1	1	1	3	0	1	1	2	0	2	1
	2	23	1	1	?	2	0	0	0	0	0	0	1
	2	24	4	2	2	0	1	0	0	0	0	1	0
	1	1	1	1	1	1	0	0	0	0	0	0	0
	1	3	2	2	?	1	0	1	3	1	0	4	1
	1	6	1	1	2	0	0	1	0	1	0	2	0
	1	4	2	2	2	4	0	2	0	2	0	2	1
	1	5	4	1	2	0	0	0	1	0	1	2	0
	1	8	1	1	2	2	0	2	0	3	0	4	0
	1	9	1	1	1	3	3	1	0	3	4	1	1
	1	10	3	1	1	2	0	1	1	3	0	3	1
	1	25	5	1	2	0	0	0	3	0	0	0	3
	1	26	2	1	1	4	1	4	1	2	0	3	3
	1	27	3	2	1	0	3	0	2	0	1	0	3
	1	28	2	2	2	0	0	0	2	0	0	0	1
	1	29	1	1	1	1	0	0	2	1	0	1	0
autumn	2	30	2	2	1	1	1	1	0	1	0	0	0
	2	31	2	1	?	0	0	1	0	0	0	0	0
	2	32	1	1	2	0	0	1	0	0	0	1	0
	1	33	2	2	?	2	0	5	2	0	1	1	1
	1	25	5	1	?	0	1	0	2	0	0	0	1
	1	34	1	1	2	0	0	0	0	0	0	0	1
	1	35	2	2	1	2	0	2	0	6	1	1	0
	1	26	2	1	1	1	0	4	0	2	0	3	0

mode: 1 = on all the time; 2 = on during the day only

Table 1 The results of the individual household surveys used in the analyses

	Alert Collar Active			Alert Collar Inactive		
	March/ April	June	October	March/ April	June	October
Birds						
'Bird'	2	6	1	8	14	
Blackbird	2			3	6	
Chaffinch		2		3	1	
Collared Dove				1		
Dunnock			1		1	3
Greenfinch		1		1	1	
House Sparrow		2		3		2
Magpie	1					
Mistle Thrush			1			
Pied Wagtail				1		
Pigeon	4	4		3	3	
Robin	2			1	1	
Song Thrush				2	2	
Starling		2		4	1	
'Tit'					2	
Blue Tit	7	1	1	3	5	2
Coal Tit				1		
Great Tit	1	1		1	2	
Wren				3	1	1
Yellowhammer				2		
	19	19	4	40	40	8
Mammals						
Mole	1			1		
'Mouse'	12	17	8	10	14	4
Field Mouse		6		2	5	
Harvest Mouse						1
Wood Mouse	2			2		
Rabbit	6	1		4	2	
Rat			2	1	1	1
Shrew		7	1	1	8	4
Vole	1	10	4		14	10
	22	41	15	21	44	20
Total	41	60	19	61	84	28

Table 2 The number of prey items of each species taken by cats during the CatAlert Mark II trial

	Mammals			Birds		
Model effect	**Chi-sqr**	**P**	**df**	**Chi-sqr**	**P**	**df**
Season[1]	17.38	***	2	6.45	*	2
Collar active[1]	0.06	NS	1	16.63	***	1
Fortnight[1]	1.04	NS	1	1.97	NS	1
Group[2]	36.47	XXX	1	3.86	*	1
No. of cats[2]	NA	-	-	15.74	**	4
No. of collars[2]	0.85	NS	1	0.28	NS	1
Mode[2]	6.42	*	1	0.12	NS	1
Cat ID effect	N/A	-	-	N/A	-	-

NB [1] = Independent variables for model 2. Type 3 significance values of the GLM likelihood ratio tests: *P<0.05, **P<0.01, ***P<0.001, NS = P>0.05. N/A = no model convergence (data not suitable); [2] = Independent variables for model 1.

Table 3 The results of the GLM models used to analyse the results of the trial. GLM models included a Poisson error and log-link function. Models were good fits to the Poisson distribution with scale deviance values between 1.3 and 1.7.

Question			Yes	No	Unsure
1	Does wearing the de-activated collar annoy your cat?		2	30	-
2a	Does the bleep annoy your cat?		3	29	-
2b	If answer to 2a is yes, did the cat settle down after a while?		3	-	-
			Urban	**Suburban**	**Rural**
3	Do you live in an urban, suburban or rural area?		1	13	19
		<100m	**101-300m**	**301-700m**	**>700m**
4	How far away are the nearest fields?	19	6	2	2
			Yes	**No**	**Unsure**
5	Do you think you found most of the prey items taken by your cat?		25	6	1
6	If the collar is effective, would you be happy for your cat to wear the collar permanently?		28	1	2
7	If a CatAlert is produced which automatically de-activates when the cat comes into the house would you be happy to buy it? (Estimated cost £40)		9	14	5

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