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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

Standing Committee

23rd meeting
Strasbourg, 1-4 December 2003

Tuberculosis in cattle and badgers in United Kingdom

Report by the Government

Document prepared by
the Governmentof United Kingdom

TUBERCULOSIS IN CATTLE AND BADGERS
Report by the United Kingdom Government

Background

1. This is the annual report to the Standing Committee of the Bern Convention that the Government of the United Kingdom agreed to provide at the Committee's 19th meeting. Previous years' reports are T-PVS(2000)50, T-PVS(2001)65 and T-PVS/Inf(2002)43; these provide the background.

Progress with the Randomised Badger Culling Trial (RBCT)

2. In last year's report to the Standing Committee, we reported that the Independent Scientific Group for Cattle TB (ISG) intended, in early 2003, to carry out a further assessment of the effect of the 2001 outbreak of Foot and Mouth Disease (FMD) on the RBCT. This was completed and reported to Ministers in May 2003 (Annex 1). The ISG concluded that FMD may have contributed to a loss of about 4-6 triplet years of functional proactive culling treatment and, in the letter to Ministers covering their report, indicated the point for achieving the target of 50 proactive trial years would be reached in mid-2006.

3. The latest position with the field trial is that proactive culling took place in all ten triplets in 2002, with initial proactive culls being carried out in the three remaining triplets to be enrolled at the start of the culling year (1 May 2002 to 31 January 2003). Follow up and maintenance proactive culling operations were completed in the seven triplets that had already been enrolled. In addition, reactive culling was carried out in the seven enrolled triplets. In the current culling year, from 1 May 2003, for the first time a full programme of proactive follow up and reactive culling was on course to be completed in all ten triplets. At 10 October 2003, a total of 8,073 badgers had been culled in all trial operations since December 1998 (to put this figure in context, the badger population in Great Britain is estimated to be between 300,000 and 350,000 and it is thought that up to 50,000 badgers are killed in road traffic accidents in Great Britain, each year).

4. On 4 November 2003, Ministers suspended the reactive culling element of the RBCT following receipt, from the ISG, of an interim statistical analysis. This analysis compared the incidence of TB in the reactive cull areas to that in the control (survey only) areas and found TB incidence in reactive areas to be an average of 27% higher than in the control areas (95% certainty that the increase lies between 4.8% and 53%). The findings are statistically valid and consistent across all nine of the ten reactive areas where culling had already taken place. In view of these findings, Ministers decided to suspend the reactive culling element because of the risk that to continue would cause more cases of TB than otherwise, and because it would mean killing some badgers unnecessarily. A similar analysis of the data from the proactive cull element has yet to yield a scientifically conclusive result, and this element of the trial will continue until it does. The ISG's advice to Ministers is published on its website, at:

www.defra.gov.uk/animalh/tb

5. Further detail relating to the ISG's analysis has been published in Nature, see:

www.nature.com/nature.

6. The UK Government feels that these results justify its commitment to the RBCT to provide scientific evidence of culling strategies as potential means of controlling TB in cattle. It is only through the RBCT that we now have clear evidence that reactive culling, a strategy used in the past, actually makes the situation worse. The UK Government is also vindicated in its refusal to bow to pressure from farmers to allow limited culling of badgers to be extended outside the RBCT areas. The UK Government sees these results as providing a significant step forward in helping develop a future scinece-based strategy for controlling cattle TB, in the UK.

Vaccine Research

7. A Sub-group of the ISG, established in 2002 to advise on the feasibility of a TB vaccine strategy for either cattle or badgers, reported in 2003. The Sub-group concluded that the BCG (Bacille Calmette Guerin) vaccine might be of value to protect badgers but the outcome of current studies in the Republic of Ireland and the results of the RBCT were needed first, in order to inform the design of

a field trial to demonstrate whether badger vaccination would reduce the level of TB in cattle. The Sub-group felt, however, that BCG, in its current form, was not suitable as an effective cattle vaccine and that cattle vaccination could only be considered when an improved vaccine was developed. The current effort to develop and test new vaccines therefore remained imperative. The Sub-group reported that preliminary studies on the vaccination of calves with BCG had suggested that vaccination of young animals was more effective thn that of mature cattle and recommended work on neonatal vaccination of calves with BCG. The Sub-group also recommended that greater priority be given to developing improved diagnostic tests for both cattle and badgers.

Other TB Research

8. Research projects covering a range of TB relevant topics including disease pathogenesis in cattle, genetic analysis of TB, epidemiology of TB, diagnostics, TB in other species, ecology and economics continue and information on individual projects within the cattle TB research programme can be found by typing in the words 'bovine tuberculosis' in the search box displayed when entering the Defra website using this address:

http://www2.defra.gov.uk/research/project_data/Default.asp .

9. Information on the progress of operations and the work of the ISG can be found via the Defra website (see the link given above, in paragraph 4).

10. Publication of the ISG's next full report, its fourth, has been delayed It is currently in draft form, and its publication is anticipated early in 2004.

Department for Environment, Food and Rural Affairs, London

November 2003

EFFECTS OF DELAYS CAUSED BY FMD ON THE NUMBER OF BADGERS CAUGHT IN PROACTIVE TRIAL AREAS

Introduction

The Foot and Mouth Disease (FMD) outbreak was expected to affect the operation of experimental treatments in trial areas. Impacts on two of the treatments were obvious at the time: the survey-only (=experimental control) treatment was probably not affected, but reactive culling was necessarily halted due to the cessation of cattle testing. The impacts of FMD on the proactive culling treatment, however, were difficult to assess. At the time of the outbreak, initial proactive culls had been completed in seven of the ten nominated treatments. However, the proactive culling treatment also involves repeated 'follow-up' culling intended to maintain badger populations at very low densities within proactive areas. These follow-up culls were suspended during the FMD outbreak, creating the possibility for recovery of badger populations in those areas, due to births and immigration. Data from other areas (e.g. Thornbury, Woodchester and North Nibley) suggest that badger populations recover slowly, indicating that the effects of this suspension on badger numbers (and, hence, cattle exposure to badgers) might be fairly small. However, at the time of the FMD outbreak it was not possible to make quantitative predictions of the outbreak's impacts on the proactive treatment.

Standard Operating Procedures for the proactive treatment specify an initial cull, followed up 6-9 months later by a 'first follow-up' cull of the entire trial area. Culling is then repeated annually across the area, in a series of localised 'maintenance' operations. The largest numbers of badgers have typically been taken on initial culls, with fewer badgers trapped in subsequent operations (e.g. Figure 1).

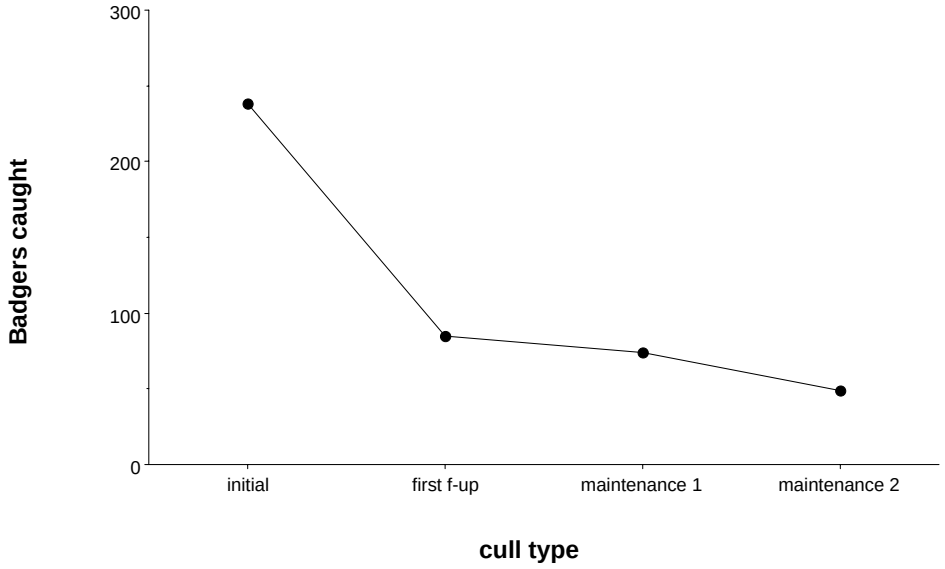

Figure 1 – Badgers trapped and culled on initial and subsequent proactive culls in Triplet B

Follow-up culling was suspended in all seven proactive areas operating at the time of the FMD outbreak. However, because the triplets were not all recruited at once, only four of the triplets (A, F, G & H) were due for first follow-up culls during the period of the outbreak. First follow-ups had already been completed in the three other triplets (B, C & E), although maintenance culls were due to take place. All of these delayed follow-up culls have now taken place (although up to 28 months after initial culls), creating an opportunity to evaluate possible impacts of the suspension of culling on the operation of the proactive treatment.

Numbers caught on first follow-up culls

The number of badgers trapped in a culling operation may be expected to give an index of the number of badgers present in that area (although factors such as season and weather conditions

influence trapping efficiency). The lower number of badgers captured in culls carried out after the initial proactive (Figure 1) almost certainly indicate a reduced population density of badgers.

Figure 2 shows how the delay between initial and follow-up culling is related to the number of badgers caught on the first follow-up (here expressed as a ratio of the number caught at the first follow-up to the number caught on the initial cull, to correct for variation in badger density across triplets). Not surprisingly, across all triplets, larger numbers of badgers are caught on follow-up culls if those culls are delayed (r_s=0.893, $p<0.05$). It is worth noting that, thus far, only one first follow-up (that in triplet E) has been carried out within the 6-9 months stipulated by the Standard Operating Procedure. Even before the FMD outbreak, follow-up culling had been delayed to as much as 15 months after the initial cull. This tendency to delay has now been resolved, and culls are expected to be carried out on schedule.

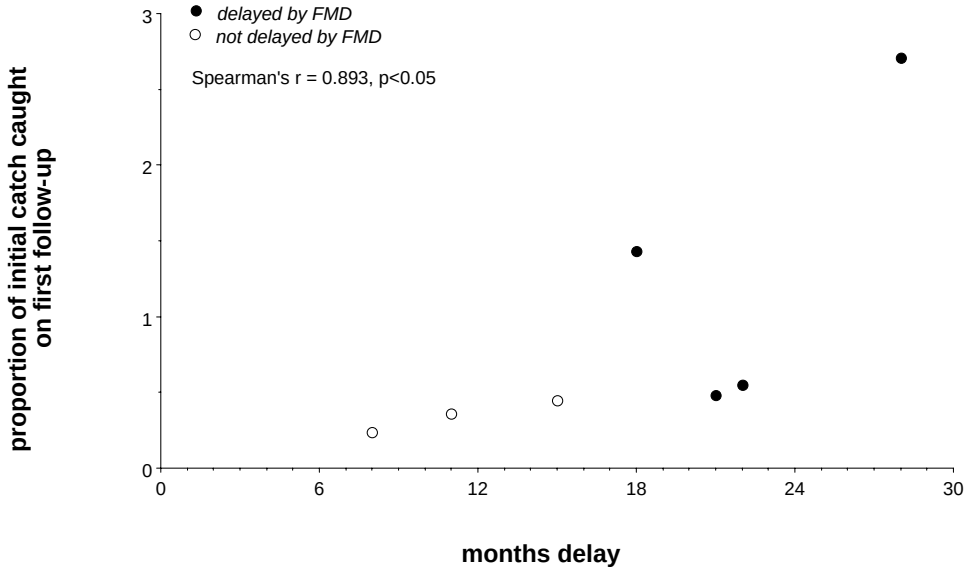

Figure 2 – The effect of the delay between initial proactive and first follow-up culls on the number of badgers caught on the follow-up (expressed as a proportion of the initial catch).

As can be seen in Figure 2, initial follow-up culls were markedly delayed by the FMD outbreak. The number of badgers captured on these delayed follow-ups (expressed as a ratio of the numbers caught on the initial cull) was significantly higher than those recorded in follow-ups completed before the FMD outbreak (Mann-Whitney $U_{4,3}$=12, $p<0.05$). This is shown again in Figure 3, which gives the exact numbers of badgers captured on each cull.

Both Figures 2 and 3 indicate that this relationship is led by two follow-up culls (in triplets A and H), at which the WLU captured more badgers than they had on initial culls. Both of these initial culls were carried out in winter (a poor time to trap), and under either extreme weather conditions (H) or restricted trapping protocols due to security concerns (A). Thus it is likely that trapping success was low on initial culls, leaving larger numbers of badgers to be captured on subsequent follow-ups. Delays to the completion of follow-ups in these areas leads to concern about the operation of the proactive treatment in these two triplets. In contrast, Figure 3 suggests that the number of badgers captured on follow-ups in triplets F and G was not dissimilar from what might have been expected in the absence of delay.

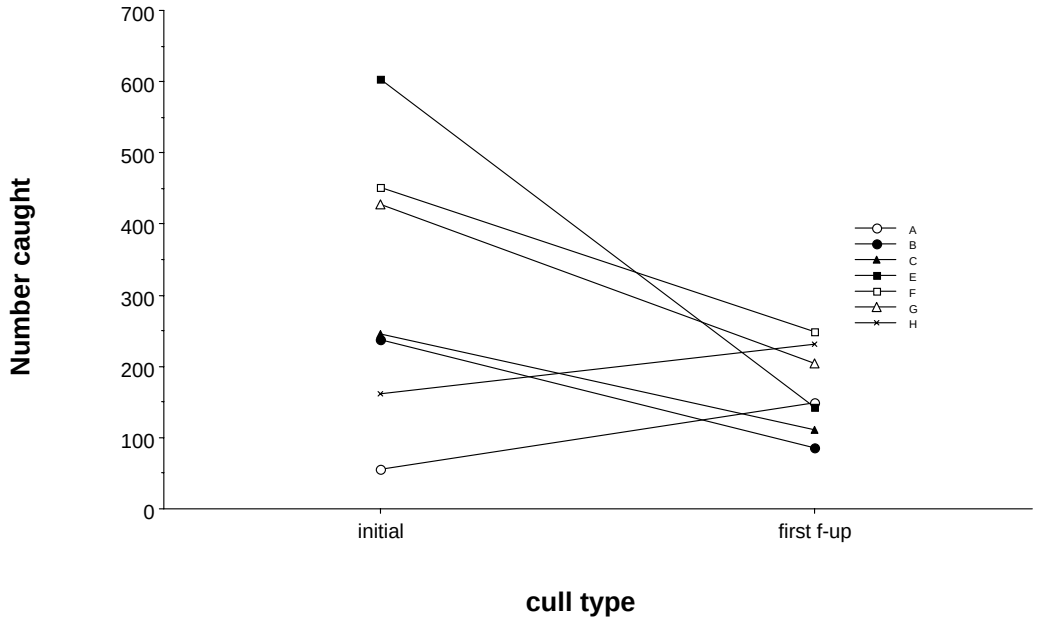

Figure 3 – Number of badgers caught on initial proactive and first follow-up culls. Follow-up culls in triplets A,F,G and H (open symbols, dotted lines) were delayed due to the FMD outbreak, while those in triplets B,C and E (filled symbols, solid lines) were completed before the FMD outbreak and so not delayed by it.

Numbers caught on maintenance culls

Maintenance culling was disrupted in all triplets where it was due to take place during the FMD outbreak. The single maintenance operation completed before FMD (in triplet B) captured 87% of the number caught on the previous follow-up. For comparison, delayed maintenance operations in triplets C, E and B (again) captured 135%, 68% and 66% of the numbers caught on previous culls. These numbers are too low to permit statistical analysis but probably indicate that badger populations remained at low densities in these trial areas during the FMD outbreak.

Conclusions

These data allow a qualitative assessment of the impact of the FMD outbreak on the proactive treatment of the randomised badger culling trial.

- Operations in triplets D, I and J were not affected as they had not been commenced at the time of the FMD outbreak. Hence the only loss to the trial are the data that would have been accumulated had the triplets been recruited on schedule. Calculation of trial progress by triplet-months rather than triplet-years indicate that 50 triplet-years should still be accumulated by the end of 2005.

- Data indicate that badger populations in B, C, E, F and G stayed very low throughout the FMD outbreak and were probably not markedly higher than they would have been had culling not been suspended.

- Badger populations in proactive areas of Triplets A and H were likely reduced by initial proactive culls (especially in H), but delays caused by FMD may have compounded problems with initial culls, such that badger density was not as low as intended during the initial two years of the lives of these two triplets. This may constitute as much as four triplet-years lost to the trial, although some of this impact is attributable to poor conditions surrounding initial proactive culls, rather than to FMD delays.

- In conclusion, FMD may have contributed to a loss of *circa* 4-6 triplet years of functional proactive treatment. Now that all ten triplets are in operation, this indicates a likely extension of 5 to 7 months to the duration of the trial.