Cattle spread bovine TB to badgers

A briefing on important new research findings

Badger Trust
2B Inworth Street
London
SW11 3EP
www.badgertrust.org.uk
020 7228 6444

A. Introduction

A major new report[1] published on 2 October 2006 in the Proceedings of the National Academy of Sciences, the United States' premier scientific journal, has revealed that cattle rapidly infect badgers with bovine TB.

The hugely significant findings mean that by controlling bovine TB in cattle through better TB testing, the prevalence of TB will also be reduced in badgers. That, in turn, further reduces the small risk that badgers pose to cattle.

The research, from the Krebs Randomised Badger Culling Trial (RBCT), also confirms that killing badgers *increases* bovine TB in badger populations, probably by disrupting badgers' otherwise stable social order and by increasing the amount of contact that badgers have with cattle.

This finding means that badger culling has no place in any science-based strategy to control bovine TB. Instead, leaving badgers in peace will reduce the prevalence of TB in badgers and, again, reduce the risk that they pose to cattle.

Significantly, the research has been peer-reviewed by independent, international scientists, so it cannot be undermined by the minority of out-of-touch vets who profess to have a better scientific understanding of the complex dynamics of this disease.

B. Key findings

1. Because cattle were not tested for bovine TB during foot and mouth disease (FMD) in 2001, the prevalence of bovine TB in badgers increased from an average of five per cent in 2000 to more than 20 per cent in 2002. This increase cannot be attributed to other causes.
2. The prevalence of TB in badgers began to rise before FMD in response to badger culling and these changes were not observed in areas where no culling took place.

C. What are the implications?

3. The research shows that cattle are the primary source of TB and that by more effective control of TB through cattle testing, prevalence of the disease will be reduced in badgers.
4. The modest risk of badgers transmitting TB back to cattle will be further reduced if their populations are not culled, allowing bovine TB prevalence to decline.
5. The disturbance caused by culling can take a decade to settle down, so the negative effects of badger culling in the RBCT areas and where farmers have illegally killed badgers will be seen for many years to come[2].

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[1] Culling and cattle controls influence tuberculosis risk for badgers, Woodroffe et al, Proceedings of the National Academy of Sciences, DOI/10.1073/PNAS.0606251103, available online at http://www.nasonline.org/site/PageServer

[2] Cheeseman, C. L., Mallinson, P. J., Ryan, J and Wilesmith, J. W. (1993) In: Hayden, T. J. (ed.) The Badger, 78-93. Dublin. Royal Irish Academy. 'It is apparent that badger social organisation was considerably disrupted in the removal areas for several years post-removal, and that a stable picture did not emerge until 9-10 years had elapsed.'

Rogers, L. M. et al (1998) Movement of badgers (Meles meles) in a high-density population: individual, population and disease effects. Proc. R. Soc. Lond. B 265, 1269-1276: 'Temporal changes in [badger] movement were significantly related to the incidence of Mycobacterium bovis infection in the following year, indicating that as the movement of badgers between groups varies so does the incidence of tuberculosis in the population. This finding is of central importance in the formulation of badger control policy.'

6. Badger culling strategies proposed by the NFU and others will not work. Earlier results from the Krebs RBCT showed that to ensure a benefit from badger culling, badgers would need to be eradicated over vast areas (in excess of 25,000km2).
7. The latest report re-enforces that finding, but reveals that the culling would need to be simultaneous and comprehensive to avoid the effects of badger perturbation. Such a strategy is not possible, due to limited landowner cooperation and the huge cost. Nor is the strategy sustainable.
8. In addition, if cattle control measures are fully implemented so that badger TB prevalence is in turn reduced, there is no chance that such a strategy would be cost-effective.

D. How was the discovery made?

9. The Krebs Randomised Badger Culling Trial (RBCT) began in 1998, before the outbreak of FMD. This provided a baseline for the prevalence of TB in badgers.
10. In 1998, before the outbreak of FMD, approximately 7,500 cattle were slaughtered as reactors to the standard skin test for bovine TB.
11. Badgers initially showed an average prevalence of bovine TB infection of five per cent.
12. FMD was confirmed on 20 February 2001. Three days later, a national ban on the movement of livestock was imposed.
13. In 2002, after FMD and following the restocking of herds with untested cattle, almost 21,000 cattle tested positive for bovine TB.
14. Research by Warwick University has confirmed "an associated risk of [TB] from the purchase of cattle from herds with a history of TB" and "the distribution of [TB reactors] after a period without testing is highly suggestive of on-farm transmission between cattle"[3].
15. After FMD, the prevalence of bovine TB in badgers killed in 2002 rose sharply to more than 20 per cent.
16. TB prevalence in badgers also increased in response to badger culling during the entire culling trial.

E. How do we know that the TB went from cattle to badgers?

17. The authors did not compare infection rates in cattle and badgers. Instead, they compared the time since the last TB test with infection rates in badgers. The longer that cattle were not tested for TB, the greater the increase of TB in badgers. When TB testing resumed in cattle, TB declined in badgers.
18. In addition, adult and cub badgers showed different rates of TB prevalence. Adults culled in 2002 showed greater TB prevalence. But cubs born in that year, which came out of their setts after TB testing had resumed and infected cattle were slaughtered, did not show the dramatic increase in TB prevalence.

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[3] Green, L. (2006), SE3026 Bovine TB transmission in restocked herds: risk factors and dynamics, available online at www.defra.gov.uk

F. How do we know that the increased TB in badgers was not due to the suspension of badger culling during FMD?

19. The authors found similar peaks in bovine TB prevalence in badgers taken from areas where no culling occurred, including road-killed badgers. Therefore, the 2002 peak in TB prevalence in badgers was independent of culling activity.

G. How do we know that TB in badgers increases as a result of culling?

20. The RBCT has created a huge set of data that covers both space and time. This allows the scientists to model the distribution of bovine TB in badgers in great detail.
21. The scientists also modelled how badgers could migrate into culled areas. The model shows that where culling areas were edged with coastline, towns, dual carriageways and motorways, the increase in prevalence in badgers was slower during the course of the RBCT. This (combined with the monitoring of actual badger territories) confirms that culling increases contact between neighbouring badgers and this, in turn, increases the speed at which TB spreads within badger populations.
22. The scientists also compated two different culling strategies. In some areas, the entire area was culled simultaneously. In others, culling was undertaken in sequential sectors. The results show that sector-based culling led to increased TB prevalence in badgers, again suggesting that badgers migrated into culled areas and acquired TB from badgers and cattle.

H. Isn't this because only 60 per cent of the badgers were killed?

23. The figure of 20-60 per cent culling efficiency, as used in Defra's consultation on badger culling[4], is not supported by the Independent Scientific Group which ran the culling trial. Incredibly, the figure was simply made up by Defra by an economist in the Central Science Laboratory at York.
24. The Central Science Laboratory was asked by Animal Welfare Minister Ben Bradshaw to come up with a cost-benefit analysis for badger culling *before* the badger culling trial was complete[5]. This was patently ridiculous. A cost-benefit analysis was not possible without knowing (a) how many badgers were killed (b) how much it cost and (c) what proportion of TB was caused by badgers. These figures did not exist, so they had to be made up.
25. The economist obtained early estimates of culling efficiency, believed to be around 80 per cent after each cull, but then deducted from these figures the proportion of land where culling was not permitted by landowners. This was a serious error, because it ignored the fact that badgers will have quickly moved from these no-cull areas into culling zones.
26. Defra's vets were aware that the culling efficiency estimate had no basis in fact, but dishonestly used it in Defra's consultation anyway. They also presented the flawed figure to members of the public involved in the focus group consultation on badger culling.

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[4] Controlling the Spread of Bovine Tuberculosis in Cattle in High Incidence Areas in England: Badger Culling: A consultation document issued by the Department for Environment, Food and Rural Affairs (2005), Defra, London.

[5] See Cost-Benefit analysis of badger control (SE3117), available online at www.defra.gov.uk

27. Final estimates of culling efficiency have yet to be published in a peer-reviewed scientific journal. Until then, claims that not enough badgers were killed should be ignored.