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Bovine TB in cattle. It's not the Badgers. It never was.

New research <https://www.nature.com/articles/s41598-024-67160-0> in *Scientific Reports (Nature Springer)* will sweep away government beliefs that badgers play a significant role in the spread of cattle tuberculosis and that culling them is justified.

Five independent veterinary researchers based in Zurich, Switzerland and in the UK have discovered a mis-described statistical method in the ***Randomised Badger Culling Trial*** (1998-2005), one of the largest, most expensive and controversial field experiments in England of the last 50 years **(1)**.

Examining archived data, new analysis to be published shortly **(2)** found that the original 2006 methodology did not match their written description in the 2006 paper, apparently escaping the attention of the peer-reviewers at that time, and in breach of basic scientific protocol. Essential adjustments were necessary to provide equivalent rates of herd breakdown between 10 paired test areas where there were large variations in number of herds under study. However, such essential adjustments were not correctly undertaken resulting in a flawed conclusion to the study.

The new research finds that while the experiment was meticulously planned and executed the analysis was less defined. The analysis found the results that the experiment **(3)** was specifically designed to seek, i.e. that killing badgers can cause increase in cattle TB, or it can cause a fall in cattle TB, depending on the distance of culling from herds. This is what was heralded as a significant scientific finding. However, this was done at the expense of more standard analyses, showing no effect.

Prof Paul Torgerson of the Vetsuisse dept at Zurich University, a veterinarian whose work on zoonoses, such as bovine TB, includes international epidemiological investigations for bodies such as the World Health Organisation.

Continued/.

He was motivated to investigate the original analysis because its results were so different from those published in the British journal *Veterinary Record* in 2022 that showed badger culling in England since 2013 had no measurable effect on cattle TB **(4)**, He did this by trying to replicate the 2006 RBCT paper's results using its written methodology but was unable to do so. Before giving up, he analysed the data in ways he knew were inappropriate and discovered what had been done. He then re-analysed the data using standard approaches applied in epidemiology (the study of patterns of disease), finding strong evidence that the culling of badgers made no difference to disease levels in beef and dairy herds.

The new findings place a new question mark over the policy of the last Conservative Government who have coordinated the mass shooting of 230,000 largely healthy badgers in west and central England since 2013, using shooting methods that an independent expert group found to be inhumane in 2014.

The published discovery is timely as the new Labour government now takes over the results of a Consultation which aims to reverse a 2020 policy to phase out culling by February 2026, and to introduce more culling based on a further pilot study in Cumbria and Lincolnshire. These 100% culling pilots failed to show efficacy **(5)** however. DEFRA's published data show local declines that can be attributed to gradually tightened cattle herd testing and lockdowns. The past government had wanted to keep culling badgers in dozens of large areas of countryside, a proposal now in the hands of the new Labour Government **(6)**.

The new research undermines completely the badger control elements of the bovine TB eradication strategy that rested exclusively on the RBCT findings in England, and also in Ireland. But not in Scotland, Wales and Northern Ireland where badger culling is prohibited. Much of the recent academic studies by Defra in recent years have repeated the analytical errors **(7)** probably unaware of additional issues surrounding the RBCT analysis **(8)**.

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Quotations:

Professor Paul Torgerson said:

***“In 2022 British researchers could not detect measurable effects of badger removal over the 2013-2020 period and while government dismissed it, signs that the policy was failing were clear.*”**

Going back to the original 2006 RBCT study to seek a reason provides a simple explanation, albeit one that is hidden due to ambiguous statistical wording. There had been a strong expectation that an effect could be found. However, the analysis overstretched to claim it. The real conclusion is that the most plausible analysis shows there is simply no effect as does use of all of the herd breakdown now that cattle testing results are better understood.”

Tom Langton said –

***“Past oversights are understandable, with huge pressure from the livestock industry in the 1990s upon the soon to be disbanded MAFF, to resolve the big question. That was how much badgers might be involved in TB spread between cattle herds. In 2007, the RBCT researchers claimed large effects but that any beneficial effects were countered by negative effects, with mechanisms that remained an unproven hypothesis. But since 2010 Governments have decided to mass cull healthy and diseased badger adults and cubs.*”**

Our new research corrects claims of a heavily wildlife-mediated livestock disease going back 40 years and attracting worldwide attention. It is a case perhaps of researchers trying to do the right thing for an iconic UK mammal, under circumstantial blame, but not being able to carry it off. Nevertheless, the best of intentions was there at the time in the RBCT team. This is just one of the scientific curve balls that show how science evolves, when emphatic groupthink is unravelled by subsequent investigation - it’s how science progresses. The huge waste of life and funding over the last decades heralds an opportunity to learn and focus on cattle measures to tackle the disease head-on.

Footnotes and further information

(1)

Donnelly CA, Woodroffe R, Cox DR, Bourne FJ, Cheeseman CL, Clifton-Hadley RS, Wei G, Gettinby G, Gilks P, Jenkins H, Johnston WT, Le Fevre AM, McInerney JP, Morrison WI. Positive and negative effects of widespread badger culling on tuberculosis in cattle. Nature. 2006 Feb 16;439(7078):843-6. doi: 10.1038/nature04454. Epub 2005 Dec 14. PMID: 16357869.

The RBCT experiment cost in excess of £50 Million and euthanised 11,000 badgers. It claimed the trapping and shooting of badgers in wire cages between 1998 & 2005 had an effect of reducing the number of cattle herds catching bovine tuberculosis in culled areas. In all culled and controlled study areas herd breakdowns increased by up to 100% over the study period. BTB is a debilitating disease of mammals, which spread rapidly from 2001 after failure to vaccinate restocked cattle after foot and mouth disease. It reached epidemic levels in England, peaking in 2015 after annual tuberculin testing was enforced in 2010.

(2)

Paul Torgerson, Sonja Hartnack, Philipp Rasmusen Fraser Lewis and Thomas Langton Absence of effects of widespread badger culling on tuberculosis in cattle. Sci Rep 14, 16326 (2024). <https://doi.org/10.1038/s41598-024-67160-0>

<https://rdcu.be/dNRHI>

(3)

Krebs, J, Anderson, R, Clutton-Brock, T, Morrison, I, Young, D & Donnelley, C 1997, Bovine Tuberculosis in Cattle and Badgers. MAFF.

<https://www.pure.ed.ac.uk/ws/portalfiles/portal/10845557/KrebsReport.pdf>

The Krebs report, named after John Krebs at Oxford University with epidemiologist Roy Anderson, and Christl Donnelly at Imperial College, London, had a role in the ambitious experiment design that was attacked as over-ambitious by researcher Angela Cassidy in her book Vermin, Victims and Disease in 2019. <https://link.springer.com/book/10.1007/978-3-030-19186-3> It said future study of the RBCT data would be important.

(4)

Langton, T. E. S., Jones, M. W. & McGill, I. Analysis of the impact of badger culling on bovine tuberculosis in cattle in the high-risk area of England, 2009–2020. Veterinary Record 190, e1384 (2022).

This published peer-reviewed paper was attacked publicly by the DEFRA Chief Scientific Advisor Gideon Henderson the Chief Vet Christine Middlemiss who apologises when their published response was found to be flawed. They claimed later that it did not matter but failed to release data or to publish anything to qualify their criticisms.

(5)

Griffiths, L.M., Griffiths, M.J., Jones, B.M., Jones, M.W., Langton, T. E. S., Rendle, R.M., & P.R. Torgerson. 2023. A bovine tuberculosis policy conundrum in 2023. On the scientific evidence relating to the Animal and Plant Health Agency/DEFRA policy concept for ‘Epidemiological’ badger culling. An independent report by researchers and veterinarians to Defra and the UK Parliament. And April 2024 addendum.

(6)

Labour now faces the issue of having promise to end badger culling. Calling the process “ineffective” in their 2024 pre-election manifesto yet appeasing the powerful National Farmers

Union to whom an understanding it is believed to have been made in 2023 that badger culling might be allowed to continue.

(7)

e.g. containing the same incorrect modelling

Downs S H, Prosser A, Ashton A, Ashfield S, Brunton L A, Brouwer A, et al. Assessing effects from four years of industry-led badger culling in England on the incidence of bovine tuberculosis in cattle, 2013–2017. 2019. Sci Rep. 2019; 9:14666. <https://doi.org/10.1038/s41598-019-49957-6>.

However, in 2024 APHA quietly switched to using rate correctly, for one analysis, in their more recent paper that showed it was not possible to determine if badger culling had an effect on herd breakdowns:

Birch CPD, Bakrania M, Prosser A, Brown D, Withenshaw SM, Downs SH. Difference in differences analysis evaluates the effects of the badger control policy on bovine tuberculosis in England. Sci Rep. 2024 Feb 28;14(1):4849. doi: 10.1038/s41598-024-54062-4. PMID: 38418486; PMCID: PMC10902358.

This paper released in front of the March Consultation has been criticised for having a misleading abstract that repeats an opinion (not finding) in the paper that badger culling has contributed to the fall in herd breakdowns that is attributed by prior published study to cattle measures. It clearly states in two places that the method of the study cannot show the cause of bTB decline is attributed to any cause, as has also been confirmed by a review by Prof David Macdonald at Oxford University. The muddle over the ‘56% claim’ is a part of the March 2024 Defra Consultation on badger culling, which is now subject to legal action alongside challenge of continued badger culling generally.

(8)

*The new study **Supplementary Information file no. 1** provides a detailed study justification. This includes further insight such as claims by the RBCT statisticians, that with respect to the peer-review of results: ‘**the suggestion of requiring independent replication of specific statistical analyses as a general check before publication seems not merely unnecessary but a misuse of relatively scarce expertise.**’*

RBCT statisticians placed emphasis on the value of data and analysis being available for discussion with subject matter specialists (in this case presumably veterinary epidemiologists with statistical knowledge) for formulation and investigation of new questions. This implied that a planned analysis with audit should effectively be a closed matter in terms of reproach. If this is the approach taken by the peer-review of that manuscript in 2006, it explains how the significant problem developed, they simply did not realise that the standard approach to rate had not been done. The present study came about while attempting to repeat the original analysis and the discovering of an unusual treatment that was not clear in the published methodology. A defence that the method used in the 2006 paper in any case is just as good as the one proposed now does not stand up and the fact that it was misdescribed and went uncorrected must raise serious questions about why important science is not adequately checked.

A badger being shot. Note it is still moving one minute after shooting. This is shot at close range. Most badgers are shot at distance and many are injured. WANRNING THIS SHOWS A BADGER BEING SHOT. <https://youtube.com/watch?v=MZEkrWW3iz8&feature=shared>