

BOVINE TB INFECTION IS NOT AN ISSUE IN CATTLE OR BADGERS IN SCOTLAND

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1. What is bovine tuberculosis (bTB)?

Bovine tuberculosis (bTB) is a disease of cattle, which is caused by an organism *Mycobacterium bovis*. The bacterium is excreted by infected cattle on to the land they graze where it can survive in the soil. It can be passed to other species, including badgers, rats, deer and humans (rarely). The chances of a badger in Scotland carrying infection are remote. Even in those areas of England and Wales where tuberculosis in cattle is rampant, the vast majority of badgers (86%) remain clear of infection (1).

Human tuberculosis is caused by a different organism *Mycobacterium tuberculosis*. Tuberculosis in humans in the UK had been largely wiped out as a result of the BCG vaccination programme. In recent years, some increase has been reported; these are cases where people already carrying TB have come to the UK.

2. Bovine TB in Scotland's cattle. Is it true that Scotland is bTB free?

In Scotland the incidence and risk of bovine TB has historically been very low and there is no evidence of a wildlife reservoir of bovine TB. Recognising the need for confidence, the Scottish Government has, in recent times, introduced a stringent package of measures including tissue sampling at farm visits, an epidemiological risk assessment, tracing cattle, contiguous herd assessments, and two consecutive tests with negative results to retain bTB free status. Scotland is officially free of bovine tuberculosis.

In October 2009 Scotland was added to the long list of European Commission member states and regions to have been declared free of bovine tuberculosis. The commission attributed this to the success of Scotland's livestock industry working in conjunction with the government. In Scotland a stringent testing regime for cattle is adhered to, involving regular testing of tissue samples from herds and testing at post-mortem if signs are observed. Monitoring is carried out by the Scottish Veterinary Service, part of the Scottish Agricultural Advisory Service. These measures have been combined with strict movement controls on cattle – testing them both before and after they are moved, and quarantining suspected cases.

Throughout the 70's and 80's, badgers killed on roads in Scotland were monitored and tested for bovine TB. One badger out of 48 tested positive during this period, and the practice was stopped in 1993 as unnecessary.

In Scotland the number of cattle infected with bovine TB is extremely small, and reducing. Out of over 13,300 cattle herds in Scotland, a single figure number of individual herds had a confirmed occurrence in the most recent year for which figures are available. These incidents were all traced to imported infected stock from England, Wales or Ireland.

3. *Bovine TB in English and Welsh cattle. What is the extent of the problem and is it changing?*

Tuberculosis in English and Welsh cattle is a serious problem for farmers in some areas, notably in the South West and West Midlands. For example, 26,000 cattle suspected of being infected were slaughtered in 2011 in England costing £90m in compensation. However, the picture has already been improving since controls on cattle movements and more stringent testing were introduced from 2008 onwards.

How has this come about?

Firstly, the skin test system, used for cattle for over thirty years, has not been sufficiently reliable or effective. It fails to identify almost a fifth of infected cattle on farm visits, which is a major problem as these cattle

remain in the herds and spread infection to other cattle.

Of the cattle which are 'positive reactors' at farm testing, only 30% turn out at post mortem testing to be actually infected with tuberculosis. The result is a pointless loss of healthy cattle, and a waste of millions of pounds in compensation.

Secondly, during the BSE and Foot and Mouth epidemics TB testing in cattle was disrupted. Subsequently, persistent backlogs in overdue testing developed and this is when bovine TB levels rose sharply. Cattle were moved routinely before testing and so were able to carry infection in to other herds.

Thirdly, evidence emerged in 2011 that infected animals may have been deliberately retained in the herd and healthy animals sent to slaughter in their place. Routine abattoir checks being carried out by several different Trading Standards authorities discovered that ear tags had been swapped from diseased to healthy cattle, resulting in infection being retained in the herds. A stricter system was promptly introduced, involving DNA tagging of suspected TB-infected cattle.

Improved Cattle Controls.

Stricter practices in the management of cattle were introduced from 2008. These included a moratorium on overdue testing and enforced testing before movements of cattle. Since then, Department of Food and Rural Affairs (DEFRA) scientists have reported a steady fall in the rate of new infections in cattle. There has been a decline in cattle slaughtered, from 38k in 2008 to 33k in 2010.

In 2011, abattoir controls involving DNA tagging of cattle were introduced to combat the retention of infected cattle in herds.

Now, most experts argue that cattle-based measures (more stringent tests, a moratorium on overdue testing, clearance before cattle movements and DNA tagging of suspected infected cattle) are the effective way to stop the spread of infection to other cattle and to progressively root out infected cattle in the herds.

Vaccination of cattle.

The Bacillus Calmette-Guerin (BCG) vaccine, which is used to protect humans against TB, has been shown by government scientists to be effective in controlling TB in cattle. Used in combination with other cattle-based measures, a better testing system and stricter controls on cattle movements, a vaccination programme would achieve progressive removal of bTB from the herds year-on-year over a shorter timescale than offered by all other alternatives. The BCG vaccine is ready for licensing for use with cattle, could be implemented quickly and would have a permanent effect.

EU food regulations have until recently been seen as an obstacle to the export of vaccinated cattle to the rest of the EU, as tests could not distinguish vaccinated from infected cattle. However, this has changed with the scientific development of a test capable of Distinguishing Infected and Vaccinated Animals (DIVA). Once implemented this test would remove the last obstacle to cattle vaccination as the means to control and ultimately eradicate TB in cattle.

Cattle in Wales

Following the introduction of a strengthened testing regime for cattle, the incidence of tuberculosis in cattle declined sharply in Wales - a 30% decline over a 12 months period was recorded in 2012. The sharpest fall was in the area where the disease is at its worst. In Dyfed, 36% fewer cattle were slaughtered over two years at a saving to the taxpayer of £6.5 million pounds in compensation.

In March 2012 Wales announced that it had scrapped any badger cull plans on the basis of the science in favour of a package of cattle-based measures of which a vaccination programme for badgers is a part.

Cattle in Ireland

In the Republic of Ireland tuberculosis in cattle is still a big problem and on the increase, despite the fact that for many years badgers have been eradicated in up to 30 per cent of its land mass. It is now looking at replacing this approach with a package of badger vaccination and cattle controls.

In Northern Ireland where there is no badger culling programme the incidence and prevalence rates of tuberculosis in cattle are declining.

4. Cattle and Badgers

Bovine TB is a disease of cattle. It is caused by an organism *Mycobacterium bovis* which can be transmitted to wildlife, including badgers, rats and deer with inevitable tragic consequences.

The vast majority of badgers are healthy and do not carry bovine tuberculosis. Scientific testing of badgers culled during previous research trials in bTB hotspots in England showed that just 14% of badgers had TB, and just one in a hundred had severe symptoms. (1)

The epidemiology of bovine TB in cattle and badgers

In 1998 the UK government launched a ten year large-scale field trial (The Randomised Badger Culling Trial, RBCT). This was conducted in 30 areas of England, each located in a high-risk area for cattle TB, measuring approximately 100km². The 30 areas were grouped into 10 sets of three; each called a 'triplet'. Within each triplet, one area was subjected to annual culling across all accessible land ('proactive culling'), and in one area the badgers were culled locally on and near farmland where recent outbreaks of TB had occurred in cattle ('reactive culling'). The remaining area received no culling ('survey only'). This was repeated annually for five years.

The scientists found that, while it was underway, proactive culling (killing all badgers) gave a modest reduction in cattle TB inside the culled areas, but an increased incidence in neighbouring areas (the perturbation effect) as a result of expansion of badger ranging behaviour and an increase in prevalence of cattle TB infection among badgers following culling.

In 2007 the Independent Scientific Group, chaired by Professor John Bourne, published its conclusions (2).

Firstly, "*badger culling can make no meaningful contribution to cattle TB control in Britain*", "*indeed some policies are likely to make matters worse*".

Secondly, "*weaknesses in cattle testing regimes mean that cattle themselves contribute significantly to the persistence and spread of disease in all areas where TB occurs, and in some parts of Britain are likely to be the main source*".

Their recommendation, backed by the TB advisory group and the TB eradication group, was that "*Scientific findings indicate that the rising incidence of disease can be reversed and geographical spread contained, by the rigid application of cattle-based control measures alone.*"

In 2010 scientists published the results of monitoring cattle TB incidence up to one year and three years following the cessation of culling. Their findings showed that "*the reductions in*

cattle TB incidence achieved by repeated badger culling were not sustained in the long term after culling ended, and did not offset the financial costs of culling". They concluded that "badger culling is unlikely to contribute effectively to the control of cattle TB in Britain" (1).

The proposed culling of badgers in England

Through 2011 and 2012 in England ministers have put forward proposals to cull badgers in pilot areas where cattle TB is a big problem. They argue that culling could achieve a reduction of 12-16 % in the increase of cattle TB if undertaken intensively for many years and over large areas (this would not be a reduction in cattle TB in absolute terms, but in the rate of increase). In October 2012 more than 30 eminent animal disease experts wrote an open letter saying "*the complexities of TB transmission mean that badger culling risks increasing cattle TB rather than reducing it*", and is a "*costly distraction*". Lord John Krebs, one of the UK's most eminent scientists and the architect of the 10-year culling trials, said "*The scientific case is as clear as it can be; a cull is not the answer to TB in cattle*". (3)

In summary although badgers can act as a reservoir of bovine TB in hotspot areas, any part they play in the complex process of bovine TB transmission is minor compared to cattle to cattle transmission. Experts in bovine TB control and wildlife experts are united in their views that the effective approach to bovine TB control is a package of cattle-based measures, including a stringent testing system, a moratorium on overdue testing, clearance before cattle movements, cattle tracing, DNA tagging of suspected infected cattle and a cattle vaccination programme.

5. Welfare issues and public opinion

The badger culling proposal provoked a large reaction from the public; more than 150,000 people signed a petition to the government and polls registered 70% of the public as being opposed to a cull of badgers. A campaign was run by coalition of groups (4) with Brian May providing a high profile media presence.

Scientists and the public agree that, even if a reduction of 12-16% in the rate of increase of cattle TB were to be obtained by culling badgers, it would be neither morally acceptable nor practically sustainable.

With badgers numbers higher than expected the proposed pilot culls were postponed as not achievable.

Culling could wipe out over a third of England's population of badgers, the vast majority of which (over 85%) would be healthy animals.

Wildlife experts have warned of likely dangers, including shooting of lactating sows leading to the starvation of dependent cubs, shooting of pregnant sows, and the risks of shooting in darkness resulting in maiming and consequent suffering.

Police Forces have raised concerns about potential danger to human life arising if people are out in the countryside whilst shooting is underway in the dark.

Vaccination for badgers

Scientists have shown that a badger vaccination programme achieves a critical level of protection when 60% of individuals have been vaccinated, making it a practical possibility. However scientists argue that the main thrust of an effective bovine TB control programme has to be cattle-based measures.

New evidence from a four-year field study has shown that BCG vaccination reduces the risk of bovine tuberculosis infection in unvaccinated badger cubs in vaccinated groups, as well as in badgers that received the vaccine {Health and Veterinary Laboratories Agency (AHVLA) and the Food and Environment Research Agency (FERA), in an area in Gloucestershire where TB is highly prevalent in the badger population}.

CONCLUSION

“There is no evidence of bovine Tb infection in Scotland in wildlife or in cattle herds. On the very few occasions bovine TB has been identified in cattle it has been caused by cattle imported from parts of England, Wales or Ireland where bovine TB persists. The Scottish Government’s positive advances in cattle controls have significantly reduced the threat to the health of wildlife in Scotland and have increased the confidence of both the conservation and farming communities.”

To Find Out More

- (1) Jenkins, HE, Woodroffe, R and CA Donnelly (2010) *The duration of the effects of repeated widespread badger culling on cattle tuberculosis following the cessation of culling*. PLoS ONE, February, 5 (2).
- (2) Bourne, FJ (2007) *Final Report of the Independent Scientific Group on Cattle TB*.
<http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/isg/index.htm>
- (3) The Observer 14:10:12 *Culling badgers could increase the problem of TB in cattle* (Letter, p42)
Top scientists launch attack on ‘mindless’ badger cull (p1)
- (4) If you want to know more about the situation relating to the proposed badger cull trial or bovine TB in England, Wales and Northern Ireland please follow this link
<http://www.badger.org.uk/content/what.asp>.
- (5) If you want to know more about the public campaigns please follow these links
<http://www.badgertrust.org.uk>
<http://www.badgerprotectionleague.com>