Bovine TB (bTB)

Mycobacterium bovis, is a slow-growing aerobic-bacterium and the causative agent of tuberculosis in cattle (known as **Bovine TB**). Related to *M. tuberculosis*—the bacterium which causes tuberculosis in humans—*M. bovis* can also jump the species barrier and cause tuberculosis in humans and other mammals.

Mycobacterium bovis under a microscope

M. bovis is usually transmitted to humans by infected milk, although it can also spread via aerosol droplets. Actual infections in humans are nowadays rare in developed countries, mainly because pasteurisation kills most bacteria in infected milk; also, cattle are randomly tested for the disease and immediately culled if infected, but can still be used for human consumption.

Bovine TB is a chronic infectious disease which affects a broad range of mammalian hosts, including humans, cattle, most species of deer, voles, pigs, domestic pets, wild dogs, such as foxes, mustelids, such as stoats and polecats and badgers, and rodents, such as squirrels, mice and rats; it rarely affects equids or sheep. The disease can be transmitted in several ways; for example, it can be spread in exhaled air, sputum, **urine**, **faeces** and pus, so the disease can be transmitted by direct contact, contact with the **excreta** of an infected animal, or **inhalation of aerosols**, depending on the species involved.

In the 1930s, 40% of cattle in the UK were infected with *M. bovis* and there were 50,000 new cases of human *M. bovis* infection every year. According to DEFRA and the Health Protection Agency, the risk to people contracting TB from cattle in Great Britain today is very low.

Badgers (*Meles meles*) were first found to be infected with *M. bovis* 40+ years ago (1971), but the report of an independent review committee in 1997 concluded badgers made some contribution to the spread of *M. bovis* between herds of cattle, but **now the contribution made by badgers is thought to be very small, compared with the transmission by cattle movement.**

Some cull facts: 80% of badgers culled don't have TB.

This is the major cause of the struggle between animal conservationists (keen to save the badger) and farmers (keen to cull badgers, to reduce livestock losses).

The Randomised Badger Culling Trial, (designed, overseen and analysed by the Independent Scientific Group on Cattle TB, or ISG), was a large field trial of wide-scale (proactive) culling and localised reactive culling (in comparison with areas which received no badger culling). In their final report, the ISG concluded: "First, while badgers are clearly a source of cattle TB, careful evaluation of our own and others' data indicates that **badger culling can make no meaningful contribution to cattle TB control in Britain**. Indeed, some policies under consideration are **likely to make matters worse rather than better**. Second, 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 of infection. 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 the UK, many other mammals have been found to be infected with *M. bovis*, although the frequency of isolation is generally much less than cattle and badgers. In some areas of South-West England, **deer**, especially **fallow deer** due to their gregarious behaviour, have been implicated as a possible maintenance host for transmission of bovine TB, a disease which in the UK in 2005 cost £90 million in attempts to eradicate. It has been argued that in some localised areas, **the risk of transmission to cattle from fallow deer is greater than it is from badgers**.

In a 2010 opinion piece in 'Trends in Microbiology', Paul and David Torgerson argued that bovine tuberculosis is a negligible public health problem in the UK, providing milk is pasteurized. Bovine TB is very rarely spread by aerosol from cattle to humans. **Therefore, the bovine tuberculosis control programme in the UK in its present form is a misallocation of resources and provides no benefit to society. Indeed, there is even very little evidence of a positive cost benefit to the livestock industry**, as few studies have been undertaken on the direct costs of bovine TB to animal production. Milk pasteurisation was the single public health intervention that prevented the transmission of bovine TB to humans, and there is no justification for the test and cull policy in the UK.

In July 2010 the 2nd issue of the discussion document 'Bovine TB, Time for a Rethink' was published by Rethink Bovine TB, an independent research group. The paper considers current policy in England and Wales. It proposes an alternative solution that is both practical and cost effective. In the paper, evidence is drawn from Defra and the work by Professors Paul and David Torgerson.

In March 2012, think tank the Bow Group published a target paper urging the Government to reconsider its plans to cull thousands of badgers to control Bovine TB, stating that the findings of Labour's major badger culling trials several years prior were that **culling of badgers does not work**. The paper was authored by Graham Godwin-Pearson with a foreword by singer Brian May and contributions by leading tuberculosis scientists, including Lord Krebs.

It seems that the government now, (2015) want to impose post-movement testing on cattle brought in to the Low Risk areas like the North of England, so we will be ultimately classed as TB FREE, like Scotland. Pre-movement testing would be better, of course, but post-movement would be better than nothing. It would certainly demonstrate to farmers that their animals in no danger from badgers up here!

M. bovis is innately resistant to pyrazinamide; therefore, the standard treatment is isoniazid and rifampicin for 9 months. However, most cattle with TB will be culled. Research: https://en.wikipedia.org/wiki/Mycobacterium_bovis

Most voices in the debate, including the NFU, support the use of badger vaccination to help stop bTB spreading further. http://www.tbfreeengland.co.uk/

People blame badgers for giving cattle bTB. Why? Largely because badgers were the first *wild* animal found to carry bovine TB.

bTB in cattle in England is largely in the South West.

As far as we know, there is no bTB in cattle in the east of the country.

So, what can we do to help stop this terrible disease? We need a vaccine for cattle and wild animals.

https://www.gov.uk/government/

https://www.gov.uk/government

The cost to your tax = £4790 per badger culled. (We could inject them for around £600), (as at 2016

Injectable Badger Vaccine

Badger BCG is an injectable vaccine that has been available on prescription since March 2010.

Studies have demonstrated that vaccination of badgers with BCG can significantly reduce the progression, severity and excretion of Mycobacterium bovis (the cause of bovine TB).

In Gloucestershire, a study found that vaccination resulted in a 74% reduction in the proportion of wild badgers testing positive to the blood test for TB.
https://www.gov.uk/government/publications

Cull facts: The cost to your tax bill = £6,775 per badger culled. We could inject them for around £600. as at (2016)

My own thoughts on bTB. These are my own thoughts on bovine TB. I can't prove them scientifically.

Consider for a moment: M. bovis passes into the soil from the faeces of infected animals. Another animal feeds nearby and inhales the bacterium. It is then carrying bovine TB. The cycle continues.

Badgers usually defecate in **dung pits**. These are shallow holes – 5 to 10 cm deep. It seems that they act as territorial boundary markers between other groups of badgers. It is also thought that they provide information e.g. they might indicate that a badger is ready for mating. Edges of landscape, such as woodland ecotone with pasture fields, corners of fields, hedge-lines and tracks particularly beneath or around elder trees and beneath blackberry bushes are all places to find dung pits.

The contents of dung pits give clues to the food being eaten. If it is watery, then worms are in abundance. It might also contain berries, bones of rodents, hair from young rabbits, cereals and parts of insects.
http://badger.org.uk/badgers/biology-ecology/pathssigns.aspx *See below for a diet pie chart.*
Consider this: Badgers are classed as carnivores, (though their diet is, to some extent omnivorous). The larger part of their diet is flesh in one form or another.

Cattle are not keen to feed near to badger dung pits. Why? Think about it.

You would think nothing of buying bags of cow or horse manure to top-dress your herbaceous borders in the autumn. However, you wouldn't consider spreading 'dog muck' on your garden – or that of cats. Why? You don't mind faeces from herbivores, but you find carnivore faeces distasteful and repulsive. Cattle are no different. They too avoid carnivore faeces, but pay no attention to herbivorous faeces, from their herd-mates or other herbivores that graze their fields.

Badger Dung Pits

Badger diet The badger's diet consists mainly of earthworms. It will also eat insects, birds and small mammals (when it can catch them!)

It will also eat cereals, fruits green plants and many other foodstuffs.

But what sort of herbivores might feed or cross over fields where cattle graze? Deer? People will tell you that deer and cattle won't graze or use the same fields. Look below!

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Grateful thanks to Walter for the photos.

Cull facts: Percentage of bTB outbreaks caused by badgers - 5.7%

So cattle and deer won't feed together. Eh?

Bovine TB is spread primarily through the exchange of respiratory secretions between infected and uninfected animals.

This transmission usually only happens when animals are in close contact with each other.

http://www.thedeerinitiative.co.uk/

Cattle and badgers don't usually spend much time together. But these cattle seem happy to feed in very close proximity with deer.

Deer suffer from, or may be implicated in zoonoses such as Lyme disease, bTB, Foot and Mouth and Bluetongue.

http://www.cotswoldsaonb.org.uk/

Status of M. bovis infection in North American and Hawaiian wildlife species Cervidae Historically bTB has been identified and confirmed in nine geographically distinct wildlife populations in North America and Hawaii and is thought to be endemic in three cervid, (deer), populations .. Before the 1990s, M. bovis had only rarely been reported in free-ranging Cervidae in North America. In Canada, Hadwen confirmed M. bovis infection in elk, moose, and mule deer that ranged with M. bovis-infected bison in the Buffalo National Park in east-central Alberta. Belli reported M. bovis in a white-tailed deer in Ontario, Canada. In the USA, Levine and Friend et al., each reported two cases of M. bovis in white-tailed deer in New York, and Ferris et al., reported two cases in white-tailed deer in Illinois. In Michigan, a M. bovis-infected white-tailed deer was documented in 1975, and in Montana, a free-ranging mule deer living near a M. bovis-infected elk ranch was diagnosed with M. bovis. More recently, hunter harvest surveillance by the Michigan Department of Natural Resources in 1995 identified via bacterial culture an endemic focus of M. bovis in free-ranging white-tailed deer within a five-county area of the north-eastern Lower Peninsula., after M. bovis was diagnosed in a hunter-killed white-tailed deer. In response, the state established a special deer management unit that encompassed the core area of infected deer.
http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1169&context=zoonoticspub

So, do only badgers carry bTB? No! Pigs, sheep, horses, dogs, cats, rats, foxes, stoats, shrews, polecats, mice, voles, squirrels and most species of deer also carry it!

So what is the way forward for the reduction of bTB across the country? Injections? Certainly. Culling? Largely a waste of tax-payers' money. Restricted cattle movements and pre/post movement testing. Definitely!

What about reintroducing an apex predator to help keep deer numbers down? Absolutely!

Grateful thanks to all websites and organisations from which information and photos have been used in this article. As far as we are aware, all photos are public domain and copyright-free.