

# Tackling Bovine TB

This blog will provide updates on the work carried out across England to tackle TB in cattle, and share information on the disease and its impact.

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## The story of bovine TB – The attack of the clones

**By Professor Ian Boyd, Defra Chief Scientist**

Mycobacterium bovis, the bacteria that is the cause of bovine TB (bTB), is a fascinating beast. Because it doesn't have sex very often – perhaps not at all – each bacterium is a clone of every other bacterium. For the forensic microbiologist, this high genetic stability is both a blight and a blessing. It is a blight because it makes tracking short-term variation in M. bovis extraordinarily difficult, unless you use whole genome sequencing. But it is a blessing because it makes tracking the long-term origins of M. bovis much easier. So what does this tell us?

First, it says that the British Isles has its own clone of M Bovis (ingloriously referred to as the SB0140 clonal complex). About 85% of bTB in Britain is caused by this beast but it is almost absent from our continental neighbours. Therefore, for example, the M bovis bacteria in France is very different to what we have in the UK. SB0140 does however have some closer relations in Australia, New Zealand, Canada and South Africa, probably dating way back to the days of the British Empire through cattle trading with these nations.

Second, when one drills down in to the details of this clonal complex within Britain one finds an interesting pattern. There

are different forms of bTB in different areas. Put simply, if bTB could talk it would probably have regional accents. This implies, for example, that bTB from Somerset doesn't mix much with bTB from Cornwall. Now, if you are in to bTB like I am this is just fascinating. It also an encouraging signal that cattle movement controls to prevent the spread of bTB are working, as otherwise we would probably a lot more mingling of the bTB strains and an eventual blurring of regional distinctions. That there are still such thick 'accents' between regional variations suggests some success in containing them within their regions.

The emergence of the SB0140 clonal strain in the British Isles is a bit of a conundrum. Could it be the result of selection caused by the kind of test we use to determine whether cattle have TB? To test cattle for TB, we use a strain of TB (called AN5) that was gathered from an English cow in the 1940s. While this test is still perfectly adept at picking up SB0140, we have found through our testing that the original strain, AN5, has been successfully eliminated from English cows. It is interesting that while this strain has died out, SB0140 has survived and flourished. This leads me to an intriguing hypothesis; is SB0140 specifically adapted to survive and thrive in badgers?

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