

Department for Environment, Food and Rural Affairs

TB surveillance in badgers during year 2 badger control operations in eastern Cumbria, Low Risk Area

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Overview

TB surveillance was conducted in badgers removed from one badger control intervention area (Area 32-Cumbria) in the Low Risk Area of England¹. Two out of 313 tested badgers (0.6%) were positive for *Mycobacterium bovis*, both with the 17:z genotype previously identified in this locality. A further badger was positive and most likely infected with genotype 9:c. This has been excluded due to not being linked to the hotspot, or any cattle cases in the area. The prevalence was 10% inside the previously designated central “Minimum Infected Area”. The reported surveillance followed from previous work carried out in the first year of operations (2018), and in ‘found dead’ wildlife carcasses as part of the enhanced measures initiated in a potential hotspot of TB infection².

Background

A cluster of TB cattle herd breakdowns emerged in the Low Risk Area of England in eastern Cumbria. A potential hotspot area² was declared (Hot Spot, or HS, 21) and cattle, some species of non-bovine farmed animals and wildlife were subjected to enhanced TB surveillance from September 2016. The genotype of *M. bovis* (17:z) associated with HS21 had not previously been identified in cattle herds in Great Britain. Current investigations have concluded that disease is most likely to have been introduced by cattle imported from Northern Ireland. From identification of the index case in November 2014 to 13 February 2019 there have been a total of 38 breakdowns across 32 holdings³.

The transmission route of *M. bovis* for many of the cattle breakdowns was unclear⁴, with cattle contact ruled out as a possible route of infection in some cases. Infected badger carcasses with the same genotype as the cattle outbreaks were found in this area as part of the enhanced surveillance, confirming the area as a TB Hotspot. Results from this exercise have been reported⁵. Whole genome sequencing (WGS) has been carried out on all the cattle and badger isolates from this area to assist epidemiological investigations. The novel genotype identified in both cattle and badgers in this area and the WGS

¹ The High Risk (HRA) and Low Risk Area of England (LRA) was established on 1st January 2013, and is part of the Strategy for achieving Officially TB Free (OTF) status for England by 2038

² A potential hotspot area, defined by APHA, is an area in England or Wales of historically low TB incidence where enhanced surveillance is carried out due to emergence of TB breakdowns with confirmed disease of uncertain origin

³ Of which, 20 were OTF-Withdrawn and 18 were OTF-Suspended

⁴ APHA (2019) North West LRA end-year report 2018.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/809688/north-west-lra-year-end-2018.pdf

⁵ Defra (2019) An update on TB surveillance in wildlife.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/830810/surveillance-wildlife-2018.pdf

analysis provide evidence that local spread of TB is likely to be occurring within and between both species⁵.

The badger control intervention area (Area 32) identified by APHA epidemiologists and ecologists for 2019 in east Cumbria was composed of:

- The minimum infected area (MIA), based on:
 - the location of the infected badgers, associated farms and contiguous breakdown areas, plus a radius of the estimated average social group territory based on main sett distribution
 - the location of another farm with a TB breakdown very strongly suspected on epidemiological grounds to be badger related on epidemiological grounds.
- An outer cull area, also based on estimated average badger social group territory size, surrounding the minimum infected area, to take into account the possibility that infection may have already spread in the badger population. The boundary was adjusted to adhere to natural barriers to badger movement as far as practical to minimise the risk of any possible perturbation effects⁶.

Surveillance during badger control operations

The second year of badger control operations began within Area 32 in September 2019. These were deemed safe, effective and humane by Defra's Chief Veterinary Officer in the Summary of Operations published in March 2020. Further details of the outcomes of the operations have been published⁷.

In the 2019 operations 317 badgers were removed from the badger control intervention area. Of these, 116 were controlled shot and 201 cage-trapped. Table 1 shows that there were 22 removed from the MIA and 236 from the outer cull area. A further 59 were removed from parcels that spanned both the MIA and outer cull area.

⁶ The boundary of the badger control intervention area and the locations of badger carcasses are not being released on security grounds

⁷ Natural England (2020) Summary of badger control monitoring during 2019: www.gov.uk/government/publications/bovine-tb-summary-of-badger-control-monitoring-during-2019

Table 1. Number of badgers culled by location in Area 32

Location	Culled by cage-trapping	Culled by controlled shooting	Total Culled
MIA	18	4	22
Outer Cull Area	141	95	236
Crossing ^a	42	17	59

a - parcels that cross the border of the MIA and the outer cull area

As part of the operations, APHA carried out TB surveillance on culled badger carcasses with the goal of monitoring prevalence and contributing to information for future operations in the area. Post mortem examinations of both cage-trapped and controlled shot badger carcasses removed from the area were conducted and tissue samples taken and cultured in an attempt to isolate *M. bovis*. This differed from the protocol used in 2018, where only cage-trapped badgers were sampled along with a small number of controlled shot badgers. Pathology experts confirmed that controlled shot carcasses could be reliably sampled. Inclusion of the controlled shot badgers allowed us to monitor prevalence over a wider spatial distribution than with only cage-trapped badgers. Genotyping and whole genome sequencing was then carried out on any isolates. This resulted in 200 cage-trapped and 113 controlled shot carcasses being sampled, a total of 313⁸.

Of the sampled carcasses, three of 313 were positive for *M. bovis* (1.0%) and 306 were negative. Four further cultures are still pending. Of the infected badgers, two were genotype 17:z, the novel genotype associated with HS21 and originally identified in cattle. Both positive badgers were removed via cage-trapping. The remaining infected badger was most likely genotype 9:c, which has not previously been identified in HS21 but can be found in other areas of Great Britain. As this infected badger is not linked to the outbreak of 17:z in HS21, and no linked cattle breakdowns have been disclosed, this is not included for prevalence calculation. Therefore, the prevalence of infection across Area 32 is 0.6%

In the MIA, 10.0% of removed badgers tested positive (2/20). Positive badgers were found on 14.3% (2/14) of the MIA land parcels that removed badgers. No badgers tested positive in the outer cull area (0/230). There were also 59 negative badgers found on 19 land parcels which spanned both the MIA and outer area. Table 2 shows the prevalence of

⁸ Four carcasses were not sampled due to being unsuitable for post mortem examination.

badger infection in 2018 and 2019. Please note that the boundary of the MIA was changed after 2018 operations to encompass all known infection.

Table 2. Prevalence of 17:z positive badgers in Area 32 between 2018-2019

Location	2018 Operations	2019 Operations ^a
Area 32	11.1 % (95% CI 7.9% to 14.3%)	0.6 % (95% CI -0.2% to 1.5%)
MIA	21 % (95% CI 15.4% to 27.5%)	10 % (95% CI -3.5% to 23.5%)
Outer Cull Area	1.7 % (95% CI -0.2% to 3.7%)	0 %

a – In 2019, the MIA boundaries were revised to take into account all infected badgers from 2018

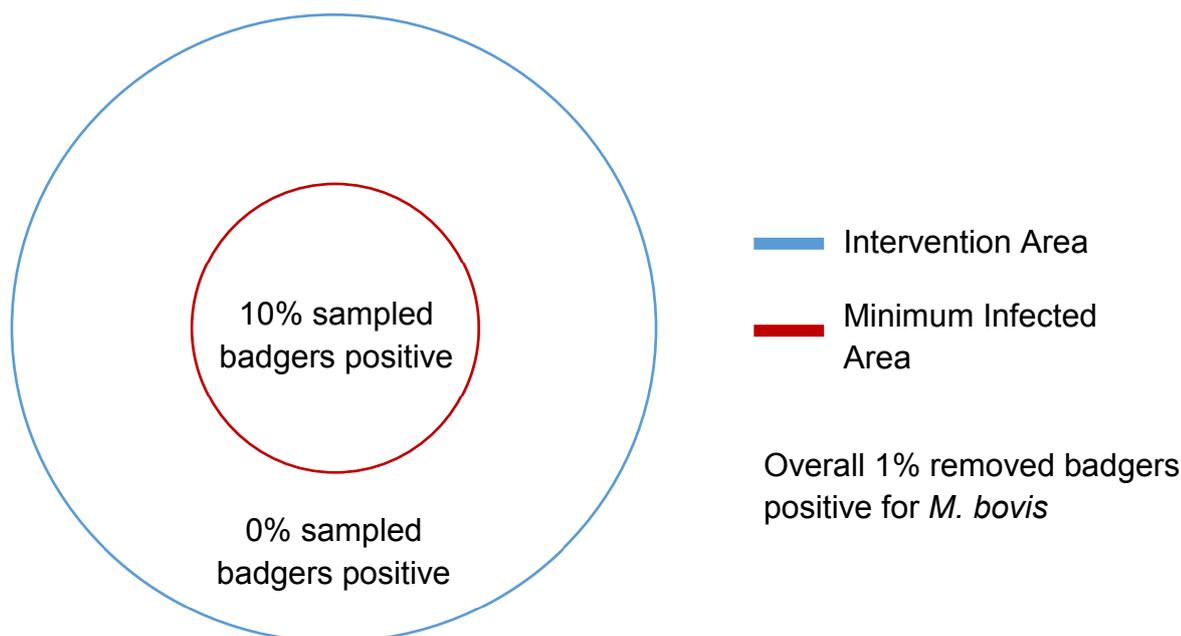


Figure 1. Schematic of the distribution of infected badgers

Conclusion

The results presented here, alongside the ongoing enhanced surveillance of cattle and ‘found dead’ wildlife, will inform future control measures in both badgers and cattle within HS21. APHA is continuing to test ‘found dead’ badgers and deer carcasses in HS21 reported through the Defra Rural Service Helpline (03000 200 301).



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