Fact Sheet 4: Testing Badgers for Bovine Tuberculosis

(Mycobacterium bovis infection; bTB)

INTRODUCTION

Bovine tuberculosis (bTB) is caused by infection of animals with the bacterium *Mycobacterium bovis (M. bovis)*. *M. bovis* can infect a wide range of species, including humans, cattle (Fig 1), and wildlife, potentially causing disease (tuberculosis, TB).

Those dealing with badgers in rehabilitation must be aware of the possible risk of *M. bovis* infection and take suitable precautions. Infected badgers can excrete *M. bovis* bacteria in saliva, urine, faeces and pus from wounds and lymph node abscesses. Clinical signs of tuberculosis in badgers are like those in other species; typically weight loss leading to emaciation.

Fig. 1

BADGER REHABILITATION PROTOCOL

The 'Badger Rehabilitation Protocol' first published in 2003 and updated in 2018 by wildlife groups (Badger Trust and Secret World Wildlife Rescue), working with the Department for Environment, Food and Rural Affairs (Defra), aims to limit risks associated with *M. bovis* when badgers are rehabilitated. This includes risks to those handling badgers (zoonotic risks) and the risk of disease transmission to other animals, including livestock, when badgers are released. This helps to maintain the confidence of landowners providing release sites for badger cubs and is key to badger rehabilitation. The Badger Rehabilitation Protocol only applies to England. Those dealing with badger cubs in Wales, Scotland and Northern Ireland should discuss testing and releases with the authorities in those devolved regions.

TESTING BADGERS FOR bTB

Serological (blood) tests are the only commercially available tests for *M. bovis* in live badgers. Serological tests typically have low sensitivity (the test's ability to detect infection) but high specificity (the test's accuracy in detecting infection). Testing an individual animal with a serological test on more than one occasion increases the sensitivity of the test but reduces test specificity.

The standard serological test used for badgers is the Dual Path Platform VetTB (DPP) test (Fig 2 a and b). This test has a single test sensitivity of 55.3% and a specificity of 97.5%, with a sensitivity and specificity of 91.1% and 92.7% respectively if the test is applied three times. The test can be purchased and run 'in-house' but is also available by sending samples to the Animal and Plant Health Agency (APHA) laboratory at Starcross.

Fig 2a: ©Sandrine Lesellier

Fig 2b: ©Sandrine Lesellier

Blood sampling can only legally be carried out by a veterinary surgeon or a registered veterinary nurse (RVN) working under the direction of the attending vet.

Badgers should be deeply sedated or anaesthetised for blood collection (see Fact Sheet 7: Badger Emergency Care) and samples are usually easily obtained from the jugular vein (Fig 3).

A standard 'plain' (no anticoagulant) blood collection tube is required.

Fig 3: ©Secret World Wildlife Rescue

ADULT BADGERS AND bTB TESTING

Adult badgers are NOT routinely blood tested for bTB for the following reasons:

- Adult badgers must be kept in isolation in captivity and only released at the exact original location in which they were found, for social and territorial reasons; they must not be translocated to new sites (see Fact Sheet 2: bBger Capture, Handling, Transport & Release). This greatly reduces any risk of spread of disease and eliminates the risk of introducing disease into new areas.

- A single bTB blood test in an adult badger is not considered 'accurate' (sensitive) enough to be of any benefit in decision-making and a negative result does not suggest that the badger is necessarily free from infection.

Equally, it is unlikely that an adult badger will be held in captivity for medical reasons long enough to conduct three blood tests. To keep adult badgers isolated in captivity for protracted periods of time is contrary to their best welfare needs and will do little to reduce the risk of disease spread.

Badgers with clinical tuberculosis (TB) should be easily recognised by a veterinary surgeon on clinical examination. As the sensitivity of serological tests for bTB in badgers is increased in infected badgers with more severe disease, using a single test may be of some benefit where disease is suspected to confirm this and help reduce the risk of zoonotic spread.

Image: Rescued adult badger in cage © Northamptonshire Badger Group

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BADGER CUBS AND bTB TESTING

Badger cubs that cannot be returned to their natal sett using Monitored Natal Return (MNR; see Fact Sheet 2: Capture, Handling, Transport & Release and Fact Sheet 5: Badger Cubs) need to be tested for bTB (see Fig.4 flowchart on page 5). Badger cubs are social animals and need to be mixed into small groups with other cubs whilst in captivity before being 'soft released' in the wild (see Fact Sheet 5: Badger Cubs & Fact Sheet 3: Artificial Setts). Cubs cannot be released at the location where they were found; instead, the group is released at a new site. This 'translocation' of animals creates a risk for spreading of disease (including bTB), and therefore to minimise the risk to other animals and maintain landowner confidence, the cubs must be bTB tested.

Image: Rescued cubs © Sam O'Hara

To maximise test sensitivity (see above), cubs are tested three times. A flow chart (Fig 4 on page 5) illustrates the protocol for testing badger cubs. Tests should be performed at approximately equal intervals during the 4-6 months of the badger-rearing process. The first blood test for bTB should be carried out from 6-8 weeks old when any maternal antibodies (temporary antibodies from the sow) should have waned.

Cubs under 6-8 weeks old should be mixed with the minimum number of others to allow necessary social contact; usually into pairs or groups of three. Mixing of untested cubs must be kept to a minimum to avoid any risk of spread of infection. Cubs must be permanently marked with a microchip prior to bTB testing. A licence from Natural England is required for all marking of badgers including microchipping. Microchipping must be carried out by a veterinary surgeon, or a vet-directed RVN.

Once cubs are 6-8 weeks old the first bTB test should be carried out. If cubs test negative, then individuals or small groups can be mixed to form larger 'mini groups' of 2-4 animals. Each 'mini-group' of cubs should then be blood tested for a second time (Fig 4 on page 5), at least four weeks after the last cub in the group was first tested. If all the cubs test negative, two or more 'mini groups' may be mixed to form a suitable 'release group'.

All cubs in a release group should be tested for a third time, as near as possible to the time of release and at least 4 weeks after the second test. Anaesthesia for the third blood test also allows full health inspection of the animal prior to release and for BCG vaccination (see below) to be given.

Image: Cub © Northants Badger Group

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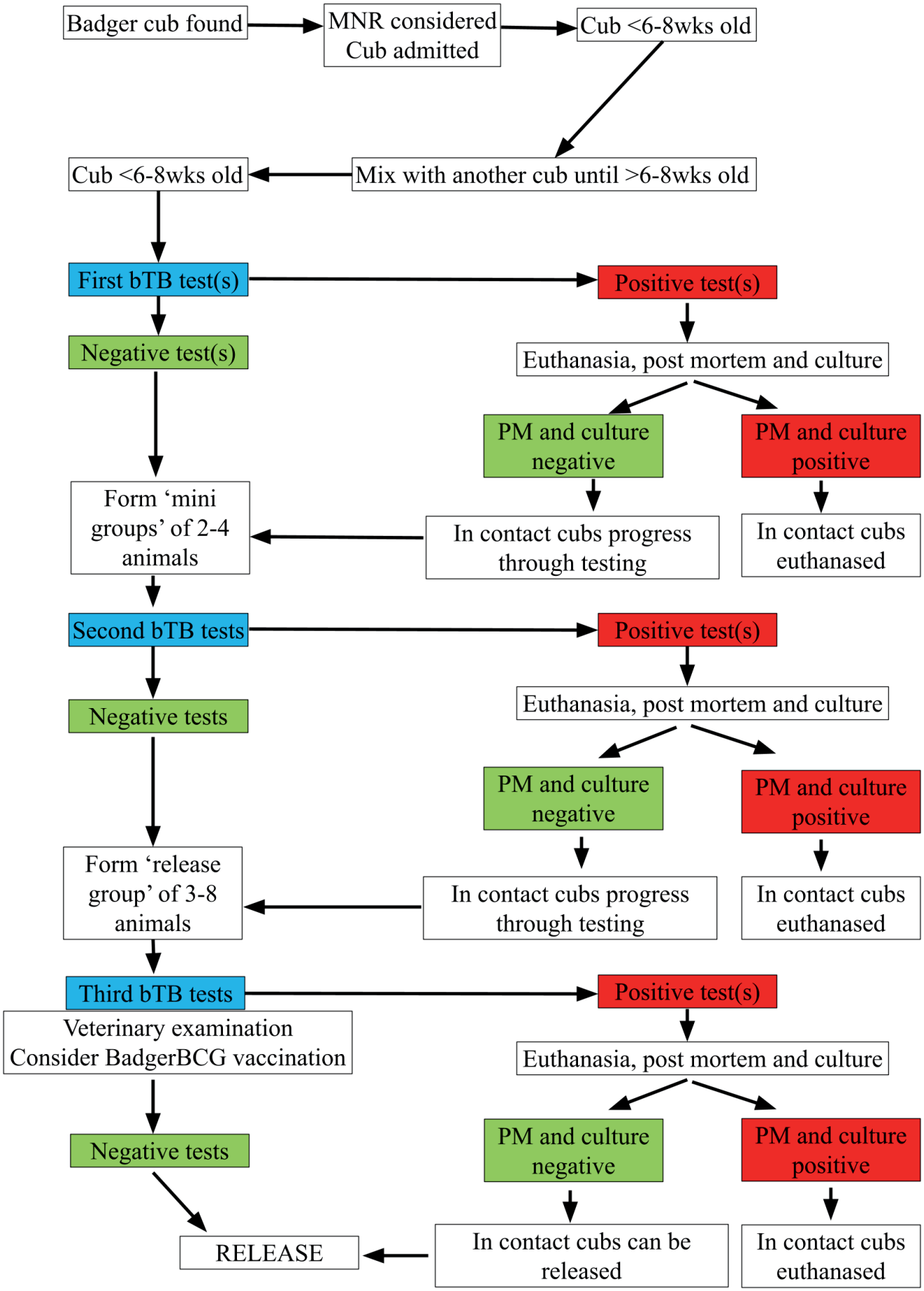
Fig 4 Flow chart illustrating the protocol for testing badger cubs for bovine tuberculosis. (MNR monitored natal return)



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BADGER CUBS AND bTB TESTING CONTINUED

Badger cubs can only be released following three consecutive negative blood test results. Cubs testing positive to ANY of the three bTB blood tests must be immediately euthanased, as they cannot be released and pose a potential disease risk to people and other animals. A licence, available from Natural England, is required for euthanasia of badger cubs in these circumstances. The test-positive cub must be sent for post-mortem to an approved laboratory (e.g. an APHA laboratory), and a culture of tissue samples must be carried out for *M. bovis*. This process is the 'gold standard' for bTB diagnosis. Culture of *M. bovis* takes around twelve weeks, during which the remaining animals in the release group must be kept in captivity.

There are two possible outcomes of the post-mortem and culture results:

- If the euthanased animal is post-mortem and culture-negative, the remaining group can continue the release protocol.

- If the euthanased badger is positive on post-mortem and/or culture examination, the remaining animals in the group must be euthanased.

Further testing of cubs following a positive blood test result is not of any benefit as a result of the low test sensitivity. Negative post-mortem and culture results do not necessarily mean that the cub was a 'false positive' (as the specificity of the test remains high even with multiple tests) but mean that the cub is unlikely to have been infectious to others in the group and they can continue through the testing regime.

Image: © Wildlife Aid Foundation

BADGER VACCINATION WITH BCG

As badger cubs are released in small social groups, there is a benefit to vaccinating the group with the BCG vaccine prior to release (Fig 5).

The vaccine has been shown to reduce the severity and progression of infection in animals that become infected after vaccination.

Fig. 5: © Secret World Wildlife Rescue

Image © Secret World Wildlife Rescue

The vaccine is a Prescription-Only veterinary Medicine (POM-V) and can be obtained by the attending veterinary surgeon from a veterinary wholesaler.

In wildlife rehabilitation situations, unlike field vaccination programs where trained lay staff may vaccinate badgers, the vaccine must be administered by a veterinary surgeon or directed RVN. In adult badgers, whilst the vaccine will do no harm it is likely to be of limited clinical benefit.

CHOICE OF RELEASE SITE FOR BADGER CUB GROUPS

Testing for bTB greatly limits the potential risk of spread of *M. bovis* infection from released badger cubs.

The translocation of badgers over large areas is, however, discouraged not only because of potential bTB risk but also because of the unnecessary movement of badger genetics and the possible movement of other badger diseases that are not routinely tested.

Badger cubs should, therefore, where possible, be grouped with those from a similar area and released as close as possible to that area (See Fact Sheet 3: Artificial Setts).

Adult badgers should always be released back where they came from, see Fact Sheet 2: Capture, Handling, Transport & Release for more information.

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REFERENCES & FURTHER READING

Badger Rehabilitation Protocol (2018) is available at:

- 'Living With Badgers' page on Badger Trust Website: https://www.badgertrust.org.uk/_files/ugd/15d030_3000e2d35dc64d71860aafc24657cd20.pdf
- Secret World Wildlife Rescue Website: https://www.secretworld.org/wp-content/uploads/2018/04/Badger-Rehabilitation-Protocol-Final-Liz-07032018.pdf

Useful information

- APHA Starcross (blood tests): Staplake Mt, Starcross, Exeter, EX6 8PE. Phone: 0300 060 0020
- APHA laboratories (PMs): https://www.gov.uk/guidance/laboratory-test-price-lists
- Natural England for licences: contact wildlife@naturalengland.org.uk
- Licence to mark a badger (for microchipping etc.) form A25: https://www.gov.uk/government/publications/badgers-survey-or-research-licence
- Licence to kill a badger (serologically positive) form A01: https://www.gov.uk/government/publications/badgers-licence-to-interfere-with-setts-to-prevent-damage

Image © Secret World Wildlife Rescue

Badger Trust, Citibase, 95 Ditchling Road, Brighton, BN1 4ST

Tel: 01237 033440 | **Email:** staff@badgertrust.org.uk | **www.badgertrust.org.uk**