Introduction
Badgers (Meles meles) are frequently presented to wildlife centres and veterinary surgeons in the United Kingdom (UK), especially in the south west of England where population densities are highest. Following veterinary treatment and appropriate rehabilitation, suitable cases are returned back to the wild.

Secret World Wildlife Rescue (SWWR) is a large wildlife facility in the southwest of England and cares for approximately 4,000 casualty animals per annum, including 50-75 adult badger casualties and around 50 badger cubs. The charity has played a key role in developing a responsible policy for the rehabilitation and release of badgers with particular consideration given to Mycobacterium bovis related risks.

M. Bovis and badger rehabilitation and release
As is the case for most other indigenous wildlife species, there is only welfare legislation controlling the rehabilitation and release of badgers in the UK. The adoption of a suitable policy to reduce disease risks during captivity and upon release is the responsibility of individual wildlife groups.

Mycobacterium bovis infection (bovine tuberculosis, bTB) has a broad host range and is a zoonotic infection. Badgers are considered to be the main wildlife reservoir host for the disease in cattle in the UK. The control of M. bovis related risks both with wildlife centres and upon release of badgers is therefore essential to prevent disease transmission and maintain public confidence in the work carried out by these centres.

Serological testing of badger cubs for M. bovis infection was introduced at SWWR in 1996. A detailed policy for the testing and management of rehabilitated badgers was subsequently produced by SWWR together with other badger charities (Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the Badger Trust), farming groups and government agencies. This voluntary policy was published in 2000. Although there has been no formal update of this published policy, SWWR internal policy is updated annually to incorporate new published work and informal discussions with AHVLA. Any policy amendments are discussed with the RSPCA.

Management of badgers with respect to M. bovis infection
Determining M. bovis infection

Until 2009 the commercially available serological test for bTB in badgers was the indirect ELISA test. This test has low sensitivity (67-70%) but high specificity (98-99%) and was replaced in 2009 by the BeckTB STAT-PAK® (Chembio Diagnostic Systems, Inc., Medford, NY) which has similar sensitivity (49%) and specificity (95%), although improved sensitivity (56%) and specificity (98%) have been demonstrated in cubs, and improved sensitivity in badgers with advanced disease (68-78%).

Alternative methods of testing for bTB include culture of urine, faeces, and sputum. Culture is considered to have very low sensitivity because of intermittent shedding, and has practical limitations in terms of sample collection and culture time. An interferon gamma test for bTB is not yet commercially available in the UK.

Other methods of reducing disease transmission
Badgers are isolated during captivity by segregation of animals. Adult badger casualties are isolated and ‘barrier nursed’ with appropriate disinfection. Cub groups are kept separately from other groups and similar hygiene measures applied. At the end of the year all facilities are ‘deep cleaned’ using appropriate methods.

Consideration is also given to the area of origin of the badger based upon Defra data for the bTB ‘risk’ in that area.

Adult badgers

The most common reasons for admission of adult badger casualties are trauma following road accidents (90%), localised soft tissue disease (typically abscesses found in the lower limbs) or fractures (13%). These are generally believed to have had a low incidence among free-living badgers in the UK, but this is because the majority of road casualties are found dead. In the majority of cases, a primary cause for the degenerative disease is an idio-pathic condition with possible concurrent infective disease.

Adult badgers are isolated in captivity then released exactly where they were found. This is as soon as possible following admission.

Euthanased release (those that would not be able to function normally and independently in the wild) are made over an 18 years’ period (1996-2013). 88 cubs (13.8%) tested positive on any one of the three occasions. These animals are reared by SWWR or RSCPA both of which adopt the stringent testing policy described.

Clinical signs of bTB are rarely identified in these young animals, however a number of animals each year are seropositive. Badger cub testing positive on one of the three occasions are immediately euthanased and sent for post-mortem examination and culture for M. bovis. As the sensitivity of the commercial post-mortem method has been questioned, more detailed techniques have been employed in recent years. The commercially available BadgerBCG® vaccine is used in very negative cubs prior to their release.

Over an 18 years’ period (1996-2013) 637 badger cubs have been tested at SWWR using the protocol described above. 88 cubs (13.8%) tested seropositive on one occasion and these animals were euthanised. Euthanised cubs were examined post-mortem including culture for M. bovis 15 of 88 (17%) were M. bovis culture positive.

Results

Badger cubs are grouped in captivity then released at new sites remote to where they were found. A potential risk of spread of M. bovis infection arises and serological testing for bTB is carried out to mitigate any potential disease transmission risk and ensure landlord confidence in released sites. As the sensitivity of a single test BeckTB STAT-PAK test is relatively low, three applications of the test are employed to increase the sensitivity in cubs to around 92%. Test specificity is consequently reduced to around 89%. The first test is carried out from two weeks old, prior to any contact with other cubs, and subsequent tests are performed at intervals of approximately three weeks. Mixing of cubs is kept to the minimum necessary to form release groups.

Conclusions

Badgers pose potential zoonotic risks during captivity and livestock risks upon their release; however, these risks are mitigated by the policies adopted. Only 15 of 637 cubs (2.3%) were M. bovis culture positive whereas 73 of 88 cubs euthanised were negative. This poor test specificity is accepted by badger organisations to minimise the bTB risks and ensure the confidence of consenting land-owners, although the euthanasia of ‘healthy’ animals is extremely emotive.

The current bTB testing policy adopted by SWWR, which is reviewed annually, is believed to offer the best disease prevention measures within the limitations of the available tests.

The potential zoonotic disease risk associated with infections in wildlife casualties are frequently overlooked by wildlife rescue centres. Wildlife casualties are by definition likely to have an increased disease risk compared to the general population of animals and infection risks, including those associated with mycobacteria, must be reflected in health and safety assessments for staff, volunteers, and visitors.

References

Available on request.

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Badger cubs

Badger cubs may be abandoned when cubs are disturbed or killed. Every opportunity is taken to immediately return a healthy cub to its original sett with careful monitoring to ensure the sow returns to collect her offspring. Genuinely orphaned cubs are brought in to captivity from a few days old and unlike adult badger casualties, these animals are rarely injured or diseased.

Captive badger cubs are grouped for behavioural and social reasons. Cubs are identified on admission (initially micro-chipped and later additionally tattooed) and reared in social groups of 5-8 animals with a balance of sexes. Unlike neotens of most other mammalian species they must be held fed for at least 8 weeks before weaning. Once the cubs are weaned they are kept in their social groups in secure pens until over 6 month old. The cubs are then ‘soft’ released initially into an enclosed area with an artificial sett and provision of food and water with full local landowner consent.

Badger cub approximately 1 week old

Badger cub group approximately 12 weeks old

Management of Badger (Meles meles) Rehabilitation and Release in the UK with Respect to Tuberculosis (M. bovis Infection) Risk

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Badger BCGB © vaccine is used in very negative cubs prior to their release.

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