

Note: Outline of potential beaver health screening, provided informally to AHVLA in response to its request

Possible beaver health screening provision by RZSS –draft advice

RZSS has previously provided health screening for both captive and wild Eurasian beavers within Britain. The majority of this work has focused on screening for the parasite *Echinococcus multilocularis* and the disease Tularemia in live beavers as potential vectors for these non-native health concerns. Recent beaver health screening on behalf of Scottish Natural Heritage and Scottish Government was concerned with the health risk presented by illegal released/escaped beavers within the river Tayside catchment, east Scotland, including these non-native pathogens but also as an opportunity to monitor other potential associated zoonotics. We therefore tested for a range of disease and parasites even though these are already present in British fauna, and used this as an opportunity to undertake basic physical examinations to assess animal welfare.

Any health screening could be targeted to only investigate those factors deemed of concern, however, any scanning of internal organs, particularly the liver for presences of EM requires a beaver to be anaesthetised, so there is plenty of opportunity to collect a range of samples, determine body condition and look for external parasites (beaver beetle for example being a host specific parasite not previously recorded in England). Any samples could be stored for processing at a later date. A more fuller health screen could provide interesting data on general individual health, adaptability to the environment, presence or absence of internal parasites (there are two common host specific gut parasites, again not previously recorded in England), and an opportunity to determine if these animals are carrying any potential zoonotics, particularly those which may be of public or livestock health concern. For example, we screened for Johne's disease and TB to alleviate concerns raised by the National Farmers Union Scotland, even though we perceived this transmission route to be highly unlikely.

Regarding screening for EM – RZSS developed a combined screening approach for live beavers (laparoscopic, ultrasound and use of a developing blood test). It is important to emphasise that this method was developed ahead of a validated blood test, for a situation in which wild beavers were trapped and were to be released immediately, unless suspected of being positive for EM. For the Tayside health screening project there was no opportunity to hold animals in captivity pending results. Therefore it should be considered that if any trapped beavers are to remain in captivity then there may be an opportunity to screen for EM in these individuals only using the blood test. If these animals are held in appropriate facilities, in which any deceased animal is removed (and post mortem examination undertaken) so that opportunistic scavenging by final hosts (fox, dogs, cats) then these beavers would not present a health risk. This blood test has not yet been validated on a large sample size and presently has ~85% sensitivity rate, however, this study is about to be published in Veterinary Parasitology (we can provide a draft). A final consideration in selecting an EM screening method is to note that through the laparoscopic and ultrasound screening method we were confident that any cysts will be revealed, however, positively identifying them as EM there and then is not possible. So a decision in advance should be made – for the Tayside project it was decided that any individual beaver showing any potentially suspect cysts would be euthanised as no animals were to be held until blood results could be returned. Whilst validating these methods in Bavaria, two suspected EM positive beaver were revealed. One individual was EM positive, whilst the other positive for *Taenia*, hence under the agreed screening protocols, both individuals would have been culled. If similar screening methods were requested in this instance, a consideration may be to hold any individuals under appropriate captive facilities pending confirmation from blood testing.

Costings breakdown

Total costings would be worked out EITHER price per beaver OR per day depending on how this works out logistically. Ideally we would wish to arrange for as many animals as possible to be done in less time, e.g. up to 7 animals in one day (excluding travel time).

Fixed Lab costs per beaver

Endoscopic examination for EM - £[REDACTED]/beaver

Anaesthetic for above - £[REDACTED]/beaver

Ultrasound of liver for EM - £[REDACTED]/beaver

EM blood test (non-validated) - £[REDACTED]/beaver including courier to University of Bern

Tularaemia - £[REDACTED]/beaver including courier to Norway

Other testing for health profile would be

Radiographs - £[REDACTED]/beaver

Lepto serology - £[REDACTED]/beaver

Lung wash ZN stain for TB - £[REDACTED]/beaver

Broncho-alveolar lavage for other bacteria - £[REDACTED]/beaver

Johnes faecal ZN stain - £[REDACTED]/beaver

MAP PCR for TB - £[REDACTED]/beaver

Faecal parasitology/salmonella/haematology/biochemistry etc - £[REDACTED]/beaver

Staff costs

Vet surgeon per day - £[REDACTED]

Vet nurse per day - £[REDACTED]

Mileage @ [REDACTED]/mile

Subsistence - £[REDACTED] for 3 staff per day

Accommodation costs to be covered as required.