Ecological determinants of Lyme borreliosis hazard in the South Downs National Park and the potential for One Health based interventions (work in progress)

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Background

Lyme borreliosis (LB) is tick-borne and if untreated can cause skin, cardiac, nervous system and musculoskeletal disease. UK annual diagnoses have more than trebled over the last two decades. Two of the ten areas in England and Wales where LB infection is most frequent are encompassed in the South Downs National Park (SDNP); the South Downs themselves and much of Wealden West Sussex.

Elsewhere increased wildlife populations have been implicated in rising tick-borne disease, setting up a potential conflict between biodiversity and human health. Given the key objectives of National Parks include enhancing wildlife and encouraging public enjoyment of the countryside, such conflict would be problematic.

Fig 1 Tick sampling with woollen (a) blanket (b) chaps and (c) flags.

Main aims

- To map LB vector and pathogen (*Bb s.l.*) distribution and assess relative extent of hazard in both woodlands and sheep grazed downland as measured by Density of Infected Nymphs (DIN).
- To determine the pathogen species present and by proxy the disease reservoir community composition.
- If *B.miyamotoi* (*Bm*) is also detected it will examine the potential dilution effect of deer on this hazard.
- To systematically review interventions based on One Health (an integrated approach to wildlife, livestock and human health) and suggest actions within the SDNP and where reasonable elsewhere.

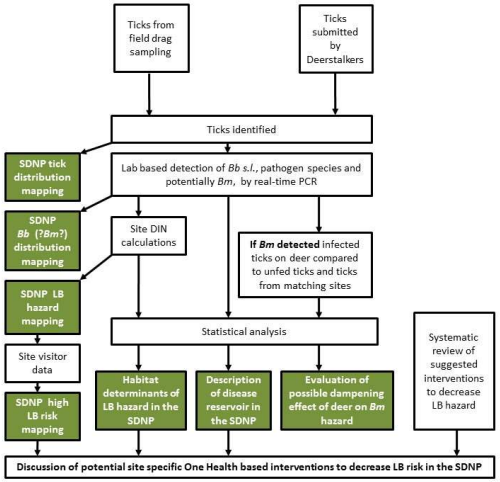

Fig 2 Research pathway from data collection and analysis to research output (green boxes).

Methodological approach

Fig 2 illustrates the research pathway from data collection to research output. The multi-year project (now in its second year) involves volunteer tick collection from culled deer, tick collection by drag-sampling (presently at seven sites) and real-time polymerase chain reaction. A systematic review is being carried out to investigate One Health based interventions.

Fig 3 Sites ticks collected from in 2015 in the South Down National Park (green border). Boundary from MAGIC (DEFRA 2015)

Results so far

- Sites sampled in 2015 by drag sampling (Fig 1) are marked on the map (Fig 3) with red dots. Ticks were present at all sites drag sampled (0-11 per 50m drag) Sampling is presently (July 2016) underway at 7 sites.
- 11 deerstalkers have collected ticks from deer culled for other reasons. Each blue dot marks a 2015 submission site where individual or multiple deer were sampled. Tick burden ranged from 0 – 30 per deer.

Ongoing

1. Ticks collected by deerstalkers and drag sampling are being lab processed.
2. The systematic review is underway.
3. Further deerstalker collection and drag sampling is being carried out April-September 2016.

Outcomes

The study will provide mapped assessment of LB risk and its causal factors in the SDNP and support development of policies that avoid or minimise conflicts between public and ecosystem health.

Support

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