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Modelling the role of acaricide in preventing tick borne disease in a wild game bird.

The incidence of tick borne diseases is increasing which has the potential to impact on humans, live stock and wildlife. Ticks feed on a number of different host species which can play different roles in disease transmission acting i) as a disease host which cannot sustain the ticks, ii) a tick and disease host, iii) a tick host which does not transmit the disease but does increase the tick population. Here we will use mathematical models to consider the role that acaricide can play in reducing the tick population, preventing tick bites and reducing disease incidence.

We consider in particular the dynamics of louping ill virus (LIV) a potentially fatal tick borne disease affecting red grouse, an important economic game bird in upland Britain. In this case sheep and red deer both play a crucial role in maintaining the tick population. In theory any efforts made to reduce the tick population should reduce the opportunity for ticks to bite grouse and hence lower virus incidence. Here we discuss SIR type models considering multiple hosts and including management strategies that use acaricide to achieve the reduction in virus incidence. We also discuss whether the treatment of individual grouse broods can provide protection for the rest of the grouse population.