

# Controlling tick borne diseases in upland Britain: modelling different strategies.



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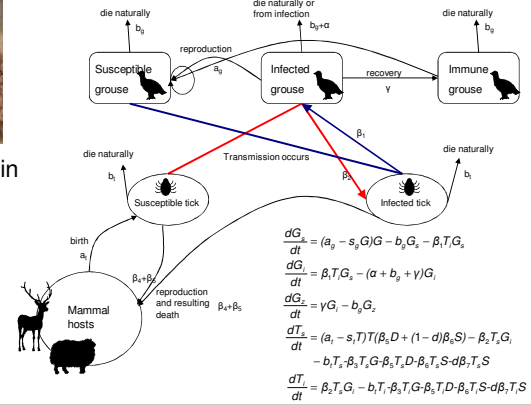
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## Louping Ill Virus (LIV)

- Tick borne disease of livestock; primarily sheep and red grouse
- Variable mortality in sheep, dependent on preventative treatment
- Up to 80% mortality in infected red grouse, a game bird of economic importance in upland Britain



## Control strategies

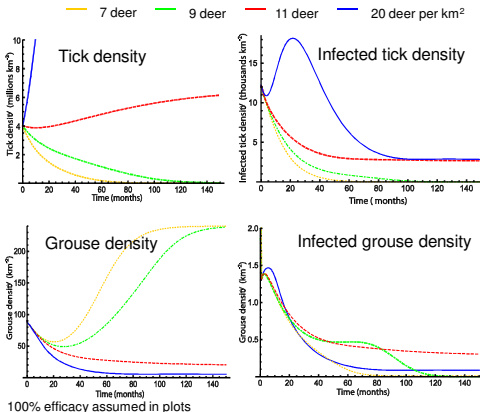
- Removing wild tick hosts by fencing or culling
- Sheep can be vaccinated and dipped in acaricide to kill ticks which try to attach
- Acaricide treated sheep may reduce tick population and help protect red grouse

## Sheep Tick Mops

Can sheep treated with acaricides be used as "tick mops" to protect red grouse?



Model predictions for adding 50 treated sheep per km<sup>2</sup>



100% efficacy assumed in plots

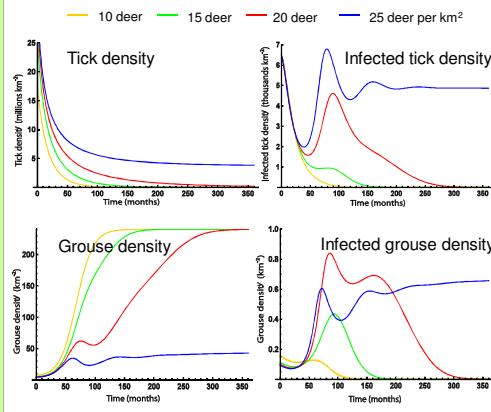
## Deer Tick Mops

Deer are important tick hosts and impact on the effectiveness of sheep tick mops.

Could deer be treated with acaricides to act as tick mops?

- Commercial acaricides not currently licensed for wildlife in UK
- Ethical implications
- Deer used as human food source
- However, some success in US in reducing tick population using treated deer feeders

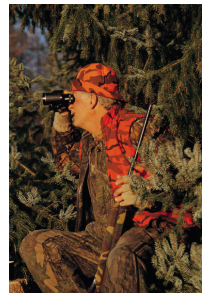
Model predictions for adding acaricide of 70% efficacy to deer



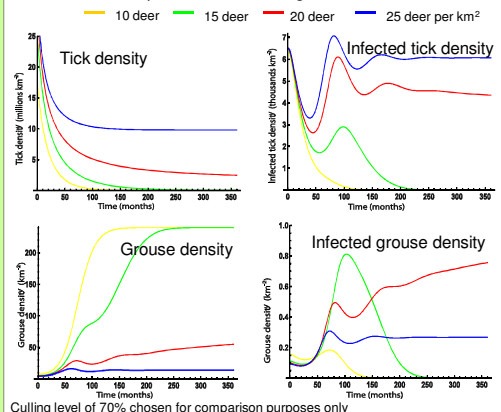
## Deer Culling

How does deer culling compare to deer treated with acaricides?

- Deer culling already used for habitat management and tick control
- Deer stalking another source of income



Model predictions for culling 70% of deer



Culling level of 70% chosen for comparison purposes only

## Conclusions

- Sheep tick mops may reduce ticks and LIV in red grouse if deer density is low (<10 per km<sup>2</sup>) but less effective at higher (>10 per km<sup>2</sup>) deer densities; consistent with empirical trials
- When deer are present treating deer as tick mops may reduce ticks and LIV in red grouse
- Deer tick mops are less effective at high deer densities.
- Deer culling alone is less effective than deer tick mops alone
- Culling deer before acaricide treatment may be more effective
- Tick reduction strategies may benefit other tick borne diseases
- However, treating wildlife with acaricides has legal, ethical and health implications

