The Impact of Peatland Restoration on Ticks

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Background

Ixodes ricinus ticks can carry several disease-causing pathogens, such as *Borrelia burgdoferi* sensu lato, the agent of Lyme borreliosis. *I. ricinus* and tick-borne disease incidence are increasing in the UK and there is growing interest in how land use changes are driving tick population changes. A major land use change is peatland restoration: how will this impact on tick numbers?

Aims

(i) to test the likely impact on *I. ricinus* tick abundance of changing forest back into blanket bog, via different ages of restoration felling

(ii) to elucidate the likely mechanisms for the effects found

Methods

The study was conducted at Forsinard RSPB reserve using surveys of ticks (using 10x1m blanket drags), deer (using dung counts) and vegetation in June, July and August 2011. Eight areas were surveyed, each comprising areas of forest, restoration felling (from 5 to 13 years old) and undamaged blanket bog.

For statistical analysis, GLMMs using the glimmix procedure in SAS Version 9.3 were conducted and a Poisson log-normal model specified. Fixed factors included: deer, vegetation, month, temperature, relative humidity. Area was entered as a random effect.

Results

Tick abundance declined significantly from forest to restoration felling to blanket bog (Fig. 1), and with restoration felling age (Fig. 2).

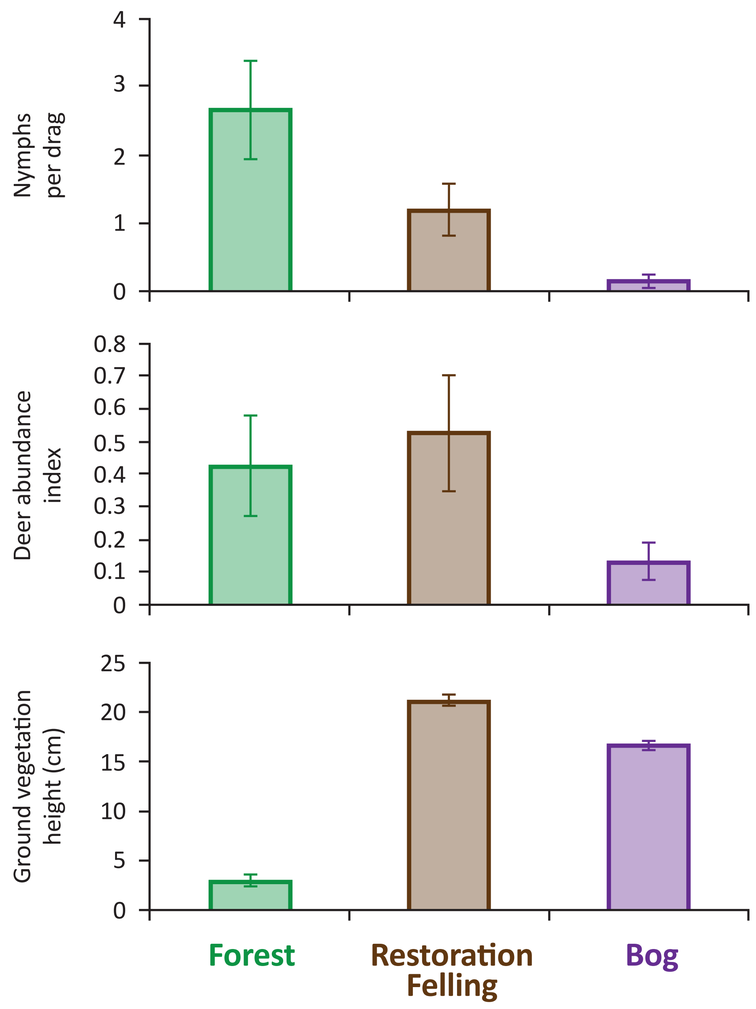

Fig. 1. Differences between habitats in indices of relative abundance of (a) questing *Ixodes ricinus* nymphs , (b) deer and (c) ground vegetation height.

Other factors significantly positively associated with tick abundance were deer abundance (Fig. 3), vegetation height and relative humidity, and nymph ticks quested more in July than June or August.

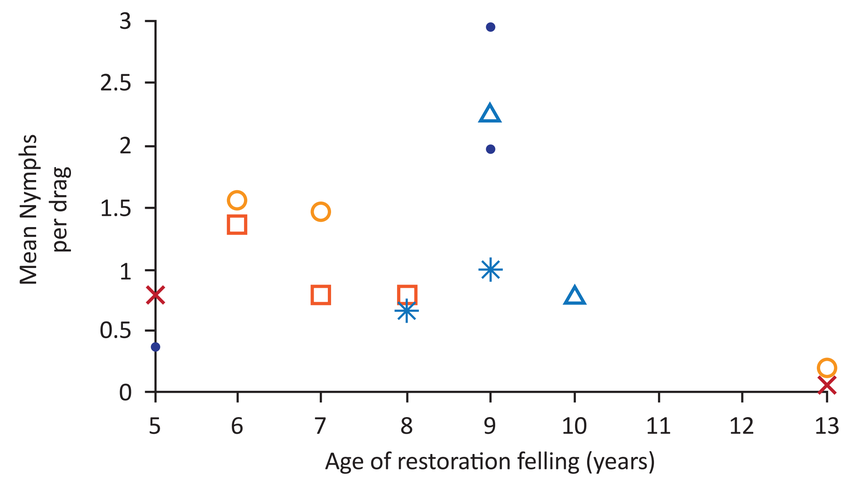

Fig. 2. Ticks were more abundant in recent restoration felling than older restoration felling. The different symbols represent the different areas surveyed.

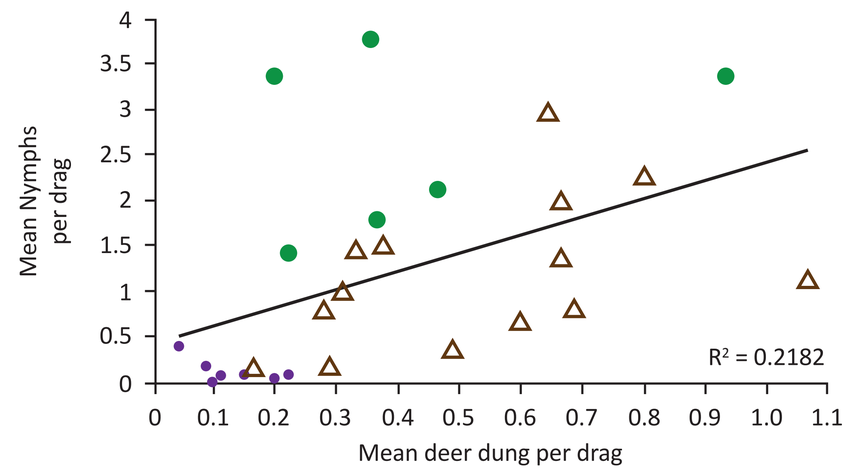

Fig. 3. Ticks were more abundant where there were more deer. Symbols represent the different habitat types: forest (larger green circles), restoration felling (open brown triangles) and blanket bog (smaller purple dots).

Similar to the patterns of ticks with habitat, there was less deer dung on blanket bog than restoration felling or forest, and less deer dung in older restoration felling (Fig. 1).

Further comparisons with vegetation height and humidity suggested that the likely mechanisms for the reduction in ticks through the process of changing forest to bog are deer abundance coupled with the mild, humid micro-climate caused by the forest canopy or ground vegetation (Fig. 1).

Acknowledgements:

I am indebted to Norrie Russell and the RSPB for access to Forsinard, and to David Fergusson for conducting fieldwork. The work was funded by the Scottish Government Rural and Environment Science and Analytical Services Division.

Conclusion

Peatland restoration from forest is likely to cause a dramatic reduction in tick abundance, due to deer habitat preferences and changes in vegetation, with positive implications for reducing disease risk.