

Investigating the presence of *Midichloria mitochondrii* in Dorset

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Aims

The aim of this project was to identify the frequency and distribution of ticks with *Midichloria mitochondrii*. Twenty five ticks were profiled for the presence of this endosymbiotic bacterium.

Methodology

- A random selection of ticks collected by volunteers from across Dorset were used. They were photographed and details (such as location and gender) were recorded.
- The tick heads were removed and the DNA was extracted.
- Tick DNA, *Midichloria* primers, distilled water and GoTAQ are added into an Eppendorf tube. DNA was amplified using 35 cycles of PCR in a thermal cycler.
- DNA samples and a ladder were pipetted into an electrophoresis gel and run at 150V for roughly 30mins to separate the DNA fragments.
- The DNA bands are visible under a blue light.



Fig 1. Equipment used to extract and test DNA.

Background information

Midichloria mitochondria is an endosymbiotic bacterium that inserts itself into a host tick's mitochondrial DNA. Its presence may be linked to host reproduction as it's commonly found in the ovum of the different female tick species.

Techniques

- Micro pipettes were used for precise measurements.
- PCR was used to amplify the amount of DNA in each sample.
- Gel electrophoresis was used to separate the DNA strands allowing us to see any positive results.

Results

	Positive	Negative	Unsure
No. ticks	7	14	4

Of our 25 ticks tested, 7 appear to be positive for *Midichloria mitochondrii*. The ticks location (Fig 2.) was plotted onto a map of Dorset but there was no obvious correlation between the presence of *Midichloria mitochondrii* and their location.

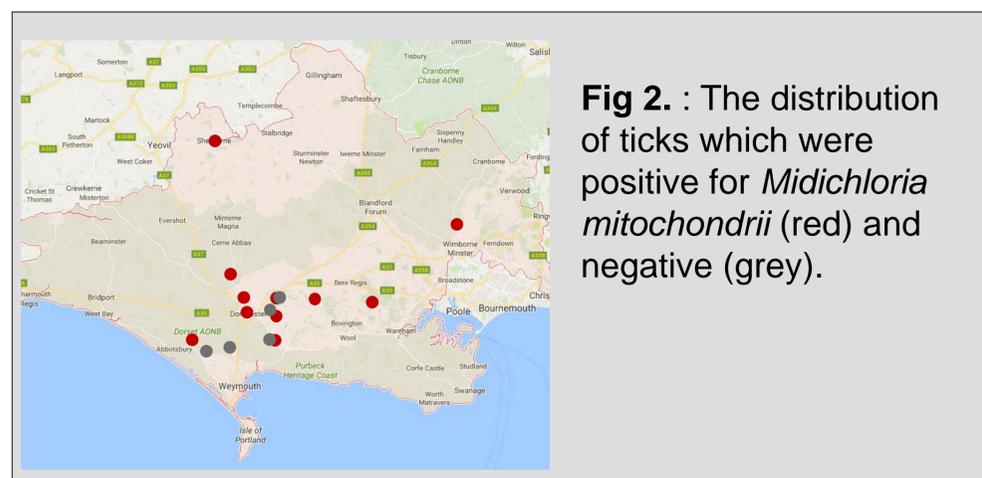


Fig 2. : The distribution of ticks which were positive for *Midichloria mitochondrii* (red) and negative (grey).

Conclusion

In conclusion, there is a moderate prevalence of ticks with *Midichloria mitochondrii*, but no visible pattern of distribution within Dorset.

Evaluation

To improve, we would continue testing more ticks, to identify the distribution in Dorset we needed more data to make a meaningful conclusion. If we were to repeat this experiment, then including a positive control to help identify false positives and be more certain with the accuracy of our results would be added. Using a different primer that was more specific to the endosymbiont would mean faint bands that were caused by the primer annealing to itself, and so produced primer-dimer bands could be eliminated.