



Peer Community In Ecology

Limited dispersal in a vector on territorial hosts

Adele Mennerat based on peer reviews by **Shelly Lachish** and 1 anonymous reviewer

Amalia Rataud, Marlène Dupraz, Céline Toty, Thomas Blanchon, Marion Vittecoq, Rémi Choquet, Karen D. McCoy (2019) Evaluating functional dispersal and its eco-epidemiological implications in a nest ectoparasite. Missing preprint_server, ver. Missing article_version, peer-reviewed and recommended by Peer Community in Ecology.
<https://doi.org/10.5281/zenodo.2592114>

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Parasitism requires parasites and hosts to meet and is therefore conditioned by their respective dispersal abilities. While dispersal has been studied in a number of wild vertebrates (including in relation to infection risk), we still have poor knowledge of the movements of their parasites. Yet we know that many parasites, and in particular vectors transmitting pathogens from host to host, possess the ability to move actively during at least part of their lives. So... how far does a vector go – and is this reflected in the population structure of the pathogens they transmit? This is the question addressed by Rataud et al. [1], who provide the first attempt at using capture-mark-recapture to estimate not only functional dispersal, but also detection probability and survival in a wild parasite that is also a vector for other pathogens. The authors find that (i) functional dispersal of soft ticks within a gull colony is very limited. Moreover, they observe unexpected patterns: (ii) experimental displacement of ticks does not induce homing behaviour, and (iii) despite lower survival, tick dispersal was lower in nests not containing hosts than in successful nests. These results contrast with expectations based on the distribution of infectious agents. Low tick dispersal within the colony, combined with host territoriality during breeding and high site fidelity between years should result in a spatially structured distribution of infectious agents carried by ticks. This is not the case here. One possible explanation could be that soft ticks live for much longer than a breeding season, and that they disperse at other times of year to a larger extent than usually assumed. This study represents one chapter of a story that will likely keep unfolding. It raises fascinating questions, and illustrates the importance of basic knowledge of parasite ecology and behaviour to better understand pathogen dynamics in the wild.

References:

[1] Rataud A., Dupraz M., Toty C., Blanchon T., Vittecoq M., Choquet R. & McCoy K.D. (2019). Evaluating functional dispersal and its eco-epidemiological implications in a nest ectoparasite. Zenodo, 2592114. Ver. 3 peer-reviewed and recommended by PCI Ecology. doi: [10.5281/zenodo.2592114](https://doi.org/10.5281/zenodo.2592114)

Reviews

Evaluation round #2

DOI or URL of the preprint: [10.5281/zenodo.2592114](https://doi.org/10.5281/zenodo.2592114)

Version of the preprint: 2

Authors' reply, 13 March 2019

The requested changes have now been made. Many thanks for suggested revisions.

Best wishes, Karen McCoy (on behalf of all authors)

Decision by [Adele Mennerat](#), posted 25 February 2019

last minor changes prior to recommendation

Dear authors,

Considering your reply to reviewers and the changes made in your preprint, I am willing to recommend it. I have found a couple of minor edits. Could you please correct them and upload the final version?

Discussion paragraph 2 (4th line p10): a low probably -> a low probability Discussion end of paragraph 2 (p10): making clear predictions [about behavior and detection] are not obvious -> either clear predictions are not obvious, or making predictions is not obvious

Sincerely,

Adele Mennerat.

Additional comments of the managing board:

We'll soon send you a message with specific requirements. So please do not upload the new version of your preprint before we send you this message.

Evaluation round #1

DOI or URL of the preprint: [10.5281/zenodo.1477851](https://doi.org/10.5281/zenodo.1477851)

Version of the preprint: 1

Authors' reply, 19 February 2019

[Download author's reply](#)

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Decision by [Adele Mennerat](#), posted 17 January 2019

Revise

Dear authors,

We have now just received the second review necessary to evaluate your preprint. I find this preprint well written and the study neatly designed and carried out. This preprint represents a nice addition to current knowledge, both on soft tick biology and more generally in host-parasite ecology.

I would be willing to recommend this preprint after you have addressed the points raised by the reviewers. In particular, Dr Lachish made many useful and constructive comments that need an answer.

I would in particular like to raise the following points:

- I do understand that there may be little knowledge on the biology of this parasite-host system, and acknowledge that you state this at several places in your preprint already – but I think you should highlight it even more. For example, if you could provide a more comprehensive picture of how much – or how little – we know about the life cycle of these ticks (number of moults, number of nymphal stages, adult lifespan – see also comments from both reviewers on the last point), it would make your preprint even more interesting and novel.
- Is there information you could add on the seabird hosts, in particular some that could help explain the mismatch between the non-structured distribution of pathogens and low dispersal in vectors - or other unexpected results in this preprint? For example, I was wondering: if engorged female ticks leave successful nests to lay their eggs another place (as your results suggest), where do they go, i.e., what would a good egg-laying spot be for a tick? My guess would be another nest nearby, at an earlier stage in the breeding cycle. You mention unpublished results indicating that the presence of mobile chicks in the colony did not affect dispersal of ticks – but how synchronised do these gulls breed? Is there a large span in breeding dates? Can we rule out vertical transmission of pathogens in the vector (from tick mother to offspring)?

Looking forward to receiving a revised version of your preprint,

Sincerely, Dr Adele Mennerat

Reviewed by anonymous reviewer 1, 17 January 2019

This study uses capture-mark-recapture studies to examine dispersal of a soft tick, *O. maritimus*, within a colony of yellow-legged-gulls. The general results are that ticks survive with a higher probability in nest that are successful (chicks present), no homing behavior was observed, and tick dispersal between nests was low. The methods used by the authors are sound and the results support the conclusions. There are a few concerns that needs to be addressed.

First, there have been other studies on hard ticks using mark-recapture studies that have not been cited or discussed.

Second, a major concern is the duration of the mark-recapture study in relation to the lifespan of soft ticks (or ticks in general). Some species of soft ticks have been documented to live multiple months to even years between blood meals. Thus, even on failed breeding season might not be long enough to induce dispersal. This should be discussed more directly as a limitation of this study.

Third, the survival probability seems to be limited. Only three dead ticks were found. This could have only be a random occurrence, even though this was noted to be different between successful failed nests. This needs to be clarified.

Fourth, the authors cite unpublished data to support a few points in the discussion. These seems to some points of moderate importance, but should be used only as secondary support.

Fifth, the author discuss that there might be a lack of gene flow, but this might have been missed due to the duration of the study and could create a disconnect between actual dispersion and measured dispersion. It is mentioned that genetic studies are necessary, but this should be more clear.

Reviewed by [Shelly Lachish](#), 01 December 2018

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