

Referee Report on *Mutualists construct the ecological conditions that trigger the transition from parasitism v2* by

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Evaluation

I am still of the conviction that this paper is quite topical and will be of broad interest. Compared to the previous revision, the paper is much improved. In particular, my technical concerns have all been tended too and I am satisfied in this regard. Aside from specific comments below, I would just state the structure of the paper comes off a bit *blocky*. It would be nice to make the writing more fluid, especially between subsectioned content that appears to just be different paragraphs of the same section. Although I found the structure of this paper abnormal, it was still digestible. In the pace of modern science it seems higher priority to communicate basic results than to finesse a literary achievement. Hence, I'm content with the *blockyness*.

Introduction

Overall, I think this introduction is very well written and does a great job at reviewing previous work and thinking on this topic. Other than the “eucaryote -> eukaryote” typo on line 136, I have just one suggestion:

- Since not everyone is familiar with the book *Major transitions in evolution* (particularly myself), beginning with this reference in the first sentence may only resonate with a fraction of the audience I believe would be interested in reading this paper. Perhaps discussing major transitions in biology more generally, without such an explicit reference to a specific book or paper, would be a more inclusive way to motivate this paper.

Discussion

In the Discussion section, the authors did a great job illustrating the mechanics of this transition from parasitism to mutualism. I have just a few minor comments here.

- line 313: The sentence “Mutualistic symbionts, which help globally dispersing hosts, would be counter-selected” seems to imply all mutualistic symbionts specifically help globally dispersing hosts. To clarify the point, perhaps something more like “Mutualistic symbionts (which help all hosts, globally dispersing hosts in particular), would be counter-selected”.
- line 337: The sentence beginning with “The transition needs some time to occur...” feels both abrupt and like it's starting a new paragraph.
- line 424: Can you please expand on this sentence a bit? Just give us a taste of what we're about to get into.

Appendix

Response to Author Responses

Overall, the authors have done a fantastic job responding to reviewer comments. However, there is just one point I would like to return to:

5.13 Mutation process

I searched for the word “Methods” in the revised manuscript and found no match. Where is the Methods section?