Modelling the evolution of how vector-borne parasites manipulate the vector's host choice

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Many parasites can manipulate their hosts, thus increasing their transmission to new hosts [1]. This is particularly the case for vector-borne parasites, which can alter the feeding behaviour of their hosts. However, predicting the optimal strategy is not straightforward because three actors are involved and the interests of the parasite may conflict with that of the vector. There are few models that consider the evolution of host manipulation by parasites [but see 2-4], but there are virtually none that investigated how parasites can manipulate the host choice of vectors. Even on the empirical side, many aspects of this choice remain unknown. Gandon [5] develops a simple evolutionary epidemiology model that allows him to formulate clear and testable predictions. These depend on which actor controls the trait (the vector or the parasite) and, when there is manipulation, whether it is realised via infected hosts (to attract vectors) or infected vectors (to change host choice). In addition to clarifying the big picture, Gandon [5] identifies some nice properties of the model, for instance an independence of the density/frequency-dependent transmission assumption or a backward bifurcation at R0=1, which suggests that parasites could persist even if their R0 is driven below unity. Overall, this study calls for further investigation of the different scenarios with more detailed models and experimental validation of

general predictions.

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Appendix

Reviews by Samuel Alizon and Nicole Mideo, authors' replies and recommender's decisions:
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