



The University of Georgia

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October 30, 2017

Re: Carry-over effects of larval microclimate on the transmission potential of a mosquito-borne pathogen

Dear Editor:

Please find enclosed with this letter our manuscript “Carry-over effects of larval microclimate on the transmission potential of a mosquito-borne pathogen” which we submit for publication as a Research Article in *Proceedings B*.

This manuscript reports the results of a semi-field experiment exploring the influence of cross life-stage carry-over effects on mosquito-borne disease. Given its strong influence on mosquito life history, temperature is a strong predictor of mosquito-borne disease in mechanistic models of disease transmission. However, the net-effect of field-based environmental variation in the larval environment on adult life history traits relevant to disease transmission in adults is unknown. Here, we use data collected from a semi-field experiment investigating dengue dynamics in *Aedes albopictus* mosquitoes across relevant environmental variation to parameterize a mechanistic dengue transmission model, allowing comparison to models that omit carry-over effects of the larval environment. We found that the larval environment significantly influenced mosquito susceptibility to dengue virus, and inclusion of these effects in a mechanistic model weakened the relationship between temperature and transmission potential considerably. Given the growing use of mechanistic models in the prediction of mosquito-borne disease risk to human populations, determining which aspects of mosquito ecology are relevant to disease transmission is crucial to improving model accuracy. Our findings identify carry-over effects of the larval environment as one such phenomena that can drastically alter predictions of disease transmission potential, and warrants further investigation.

I can be reached by email (mvevans@uga.edu), phone (703 725 9580), or post (Odum School of Ecology, University of Georgia, Athens GA 30602). Thank you for your consideration.

Sincerely,
Michelle Evans

We confirm that this manuscript has not been published, is not in press, and is not under review elsewhere. All data and R code needed to reproduce the analysis and plotting will be deposited on Figshare upon acceptance.