August 27, 2023

Dear Dr. David J Beerling,

Please find the attached manuscript entitled, "Tick-tock, racing the clock: Parasitism is associated with decreased sprint performance in the Eastern Fence Lizard," submitted for your consideration and publication in Biology Letters.

This manuscript represents the first study to show parasitism is associated with decreased sprint performance, providing unique insights into the immunocompetence-handicap hypothesis (ICHH). While previous research has focused mainly on experimental or hormonal manipulations of hosts to understand the effects of ectoparasitic levels, our study leverages previous work on the Eastern Fence Lizard to assess the predictions of ICHH. This species serves as a unique model for exploring physiological trade-offs in a natural setting, given its pronounced sex and ontogenetic differences in hormonal profiles. Furthermore, previous work has shown that hormonal manipulations in wild males, such as with exogenous testosterone implants, can influence rates of tick infection.

Our results provide new insights into the ecological implications of parasitic infection, revealing a higher prevalence of tick infections in male lizards compared to females. Furthermore, larger males were more likely to experience tick infection than smaller males. The higher prevalence of tick infections in adult male lizards could be attributed to age as well as the immunosuppressive effects of testosterone. Infected lizards appeared to display an energetic trade-off between increased immune function and reduced locomotor performance, which is consistent with the immunocompetence-handicap hypothesis. Interestingly, tick infection did not significantly affect the overall body condition of the lizard hosts.

These findings hold broader ecological meanings by enriching our understanding of host-parasite dynamics and exposing the evolutionary trade-offs for hosts within natural ecological contexts.

We declare that we have no conflict of interest with this research and that all research activities were conducted under appropriate institutional and governmental approvals.

Thank you for your consideration of the manuscript. Please contact me if there are any concerns or issues that I may address.

Sincerely,

Kristoffer H. Wild

School of BioSciences

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Parkville, Victoria