DATE

Dr. Jon Slate

Editor, *Evolution Letters*

Dear Dr. Slate,

Please find enclosed the manuscript entitled, “**Patterns of speciation and parallel genetic evolution under adaptation from standing variation**”, to be considered for publication in *Evolution Letters* as a Letter. In this manuscript, we present a theoretical investigation into the conditions under which two allopatric populations undergo parallel genetic evolution from shared ancestral standing variation and the associated implications for progress toward speciation.

We believe that our article makes several important contributions toward understanding the genetics of (non)parallel evolution and speciation, and outline two of the main contributions below.

An active area of research in evolutionary biology is focused on determining the forces governing whether evolution occurs in parallel—using the same or different alleles—among distinct lineages. Empirical investigation is underway in this field, but there are few theoretical studies treating the question of whether the same alleles are likely to be favoured by selection in populations that are adapting to environments of varying similarity. Accordingly, our results represent some of the first steps toward generating a predictive theory of parallel genetic evolution across environments, providing helpful guidance for future experiments. In particular we find that the degree of parallel genetic evolution decreases far-faster-than-linearly as natural selection tends from parallel toward divergent, meaning that small (and perhaps overlooked) environmental differences can explain large differences in the alleles used for adaptation.

In addition, although adaptation from standing variation is an important topic in evolutionary biology (e.g., Barrett & Schluter 2008, *TREE*, has over 1000 citations), the role of standing variation in speciation—another major topic in evolutionary biology—has never been formally investigated. We find that standing variation has important and non-intuitive effects on progress toward speciation. Specifically, standing variation leads to greater reproductive isolation under divergent natural selection and reduced reproductive isolation under parallel natural selection.

We believe that our article will be of general interest to the broad readership of *Evolution Letters*. Our manuscript has been posted on a preprint server (*bioRxiv*) but is not currently under consideration for publication in another journal. The manuscript consists entirely of our original work. All authors contributed substantially to the manuscript, and have approved the final submission.

On behalf of all authors, I thank you for considering our submission.

Sincerely,

Ken A. Thompson

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