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Dr. Kathryn L. Cottingham

Editor-in-Chief, Ecology

Dartmouth College

Dear Dr. Cottingham,

Please find attached our manuscript entitled “Metabolic differentiation facilitates coexistence in two coral reef fish species” for consideration as a Report in *Ecology*.

Understanding when, where, and why species occur and coexist is one of the greatest challenges in ecology. Substituting species identities with ecological characteristics – often called functional traits – can help shed light on the drivers of species’ distributions and interactions. Yet, while plant ecology has benefitted greatly from the introduction of powerful and precisely measurable traits revolving around the leaf economic spectrum, animal traits are normally restricted to broad categorical descriptors that describe various aspects of species’ phenotypes (e.g. body size, diet).

In our paper, we show that metabolic rate can act as a highly informative, precisely measurable trait that integrates across various dimensions of phenotypic differentiation for animal species to explain coexistence. Specifically, focusing on two sympatric species of sand-dwelling coral reef fishes (the gobies *Fusigobius neophytus* and *Gnatholepis cauerensis*), we demonstrate that morphological, dietary, and behavioral differences are mirrored by strong differences in standard and maximum metabolic rate, despite approximately equal body size. This metabolic differentiation appears to facilitate greater foraging efficiency for both species in mixed-species vs. single-species configurations.

Our work integrates physiological, molecular, morphometric, and behavioral techniques to examine the multiple dimensions of phenotypic differentiation. By combining strong natural history with novel techniques and a promising theoretical framework, we believe that our manuscript is ideally suited for the prime exposure granted by *Ecology*. We hope you agree.

We look forward to receiving your decision.

Sincerely,

Dr. Simon Brandl (on behalf of all authors)

A picture containing indoor, sitting, black, laptop

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