



Odum School of Ecology

November 13, 2023

Dear Senior Editors:

We are delighted to present our article titled, “Abiotic and biotic factors jointly influence the transmission of ranavirus in larval amphibian communities” for consideration for publication in *Functional Ecology*.

We present theoretical and empirical evidence for mechanistic interactions between abiotic and biotic factors that determine the transmission of generalist pathogens affecting animal communities. Within the field of disease ecology, diversity-disease relationships are generally lacking in mechanistic understanding. Our study of ranavirus transmission in amphibian communities addresses this knowledge gap with explicit consideration of the effects of environmental conditions, host community abundance, and composition, generating conceptually novel results that bring new insights to the timing and location of disease outbreaks in nature.

By focusing on host community composition, host abundance, and the environmental persistence of the pathogen, we develop a mathematical model that can assess each of these factors independently and together. We learn that each of these factors can contribute significantly to transmission and that the joint influence of these factors can produce synergistic effects. We connect this model to empirical data of ranavirus infections across communities of amphibians and demonstrate that transmission-promoting states of each of these factors commonly co-occur and drive prevalence. Consideration of both biotic and abiotic factors and the mechanistic rationale that we provide contributes significant new knowledge to our understanding of ranavirus outbreaks and is also likely to apply to many other generalist pathogens with both contact and environmental transmission.

We believe that *Functional Ecology* is the ideal destination for this research because of the journal’s record of promoting the importance of mechanism in disease ecology.

The research was conducted, in part, at the University of Georgia Savannah River Ecology Laboratory (SREL) in Aiken, SC. The SREL is operated under a cooperative Agreement with the United States Department of Energy (DOE). Under the terms of this agreement with DOE, we are required to request that you add a disclaimer (provided at the end of our manuscript) to our

manuscript should it be accepted for publication. However, it is solely up to your discretion, as publisher, whether or not to include the language and honor our request.

Sincerely,

Daniel C. Suh
Doctoral Candidate