

## Evolution of host resistance to parasite infection in the snail–schistosome–human system

Yiding Yang · Zhilan Feng · Dashun Xu · Gregory J. Sandland · Dennis J. Minchella

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**Abstract** The evolutionary strategies that emerge within populations can be dictated by numerous factors, including interactions with other species. In this paper, we explore the consequences of such a scenario using a host–parasite system of human concern. By analyzing the dynamical behaviors of a mathematical model we investigate the evolutionary outcomes resulting from interactions between *Schistosoma mansoni* and its snail and human hosts. The model includes two types of snail hosts representing resident and mutant types. Using this approach, we focus on establishing evolutionary stable strategies under conditions where snail hosts express different life-histories and when drug treatment is applied to an age-structured population of human hosts. Results from this work demonstrate that the evolutionary trajectories of host–parasite interactions can be varied, and at times, counter-intuitive, based on parasite virulence, host resistance, and drug treatment.

**Keywords** Host–parasite dynamics · Schistosomiasis · Invasion · Evolutionary stable strategy

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Y. Yang · Z. Feng (✉)  
Department of Mathematics, Purdue University, West Lafayette, IN 47907, USA  
e-mail: zfeng@math.purdue.edu

D. Xu  
Department of Mathematics, Southern Illinois University Carbondale, Carbondale, IL 62901, USA

G. J. Sandland  
Department of Biology, University of Wisconsin–La Crosse, La Crosse, WI 54601, USA

D. J. Minchella  
Department of Biological Sciences, Purdue University, West Lafayette, IN 47907, USA