

Disease as a selective force precluding widespread cannibalism: a case study of an iridovirus of tiger salamanders, *Ambystoma tigrinum*

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ABSTRACT

Question: Do realistic models predict that infectious disease will select for altered life histories? Specifically, under what conditions can trophic disease transmission influence life-history evolution in tiger salamanders by selecting against cannibalistic morphs?

Data: Previous information from laboratory and field studies on *Ambystoma tigrinum nebulosum* populations from the Kaibab Plateau and Mogollon Rim regions of northern Arizona.

Features of model: Differential equation model incorporating ecological, epidemiological, and genetic structure of tiger salamander populations.

Conclusions: The model can replicate observed patterns of density, phenotypic and genotypic frequency of cannibal morphs, but only by assuming very high disease levels. Disease-induced mortality of both aquatic and terrestrial adults is necessary to reduce the genotypic frequency of cannibalism to observed levels. Given the high forces of infection required to reduce genetic propensity towards cannibalism, other life-history trade-offs may also constrain the genotypic frequency of cannibalism in tiger salamanders. More generally, cannibalism and infectious disease may interfere with each other by reducing population densities, limiting disease-induced selection against cannibalism.

Keywords: *Ambystoma tigrinum*, cannibalism, disease, iridovirus, selection.

INTRODUCTION

As ubiquitous drivers of population and community dynamics (McCallum and Dobson, 1995), parasites can also shape host life histories (Galvani, 2003). The presence of lethal parasites should generally select hosts for earlier reproduction and (potentially) earlier senescence

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