ABSTRACT

RESEARCH PAPER: Does land-use affect the host-diversity-begets-parasite-diversity hypothesis?

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Studies of biodiversity and the role of humans in changing biodiversity have typically overlooked parasite diversity even though parasites are ubiquitous. In addition, parasites are responsible for shaping ecosystems through the regulation of host populations as well as altering trophic interactions within and across ecosystems. Parasite diversity is hypothesized to be positively related to host diversity (i.e., host-diversity-begets-parasite-diversity hypothesis); however, this relationship could change depending upon the organism and the human impact. Human impact may include human activities such as fishing or changing the surrounding land-use. The surrounding land-use has been shown to influence the populations of potential hosts for parasites, inherently affecting the population of the parasites as well. For example, forested areas have been shown to increase the diversity of potential hosts, thus increasing parasite diversity as well. The purpose of our study was to determine how land-use affects the relationship between freshwater fish diversity and parasite diversity in Indiana streams. We expected to find a positive relationship between host richness and parasite richness, but with lower parasite richness in heavily agricultural areas compared to forested sites. Land-use of sampling sites was categorized using the upstream watershed boundaries, a novel approach using contemporary GIS tools and
data sets. Fishes were collected by seining. Necropsies of fishes were performed and inspected for parasites using standard parasitology techniques. We found trematodes, cestodes, nematodes, and acanthocephalans in numerous fishes. No trends were noted, however, evidence for the host-diversity-begets-parasite-diversity warrants further research due to implications for disease ecology and biodiversity response to human activities.