



Parasite Party: Investigating Ecological Drivers of Trematode Parasite Prevalence Across the Isles of Shoals



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Introduction:

- Host - parasite interactions play a critical role in both ecological and evolutionary processes (1).
- Obligate parasites rely on the presence of both intermediate and final hosts to complete their life cycle (2,3,4,5), making them excellent indicators of overall ecosystem health.

Trematode Life Cycle:

Trematodes are obligate helminth parasites whose life cycle requires both invertebrate and vertebrate hosts. The life cycle of trematode parasites found in the Isles of Shoals (**Figure 1**) includes periwinkle snails and mummichog fish, both common in the intertidal zone. Gulls and cormorants serve as final hosts in this system (6).

Research Questions:

- Does the spatial distribution of trematode prevalence in intermediate hosts reflect the distribution of final hosts across the Isles of Shoals?
- If so, what might that tell us about human influence on the ecology of these islands?

Methods:

Location: Isles of Shoals Archipelago **Timeline:** June - August 2025

Field and Laboratory Procedures:

- 100 snails of each species (300 total) were collected haphazardly from seven sites across 6 islands
- Snails were dissected per methods from Blakeslee and Byers (2008)
- Mussel-baited bucket and minnow traps were set in four tidepools at each site and were pulled after 24 hours
- Mummichogs caught were frozen and dissected (n=45)
- Birds counts were completed at each site
- Knowledge of the human interaction with seabirds on each island was collected



Figure 2. Retrieval of a bucket trap on Cedar Island



Figure 3. Snail dissection setup

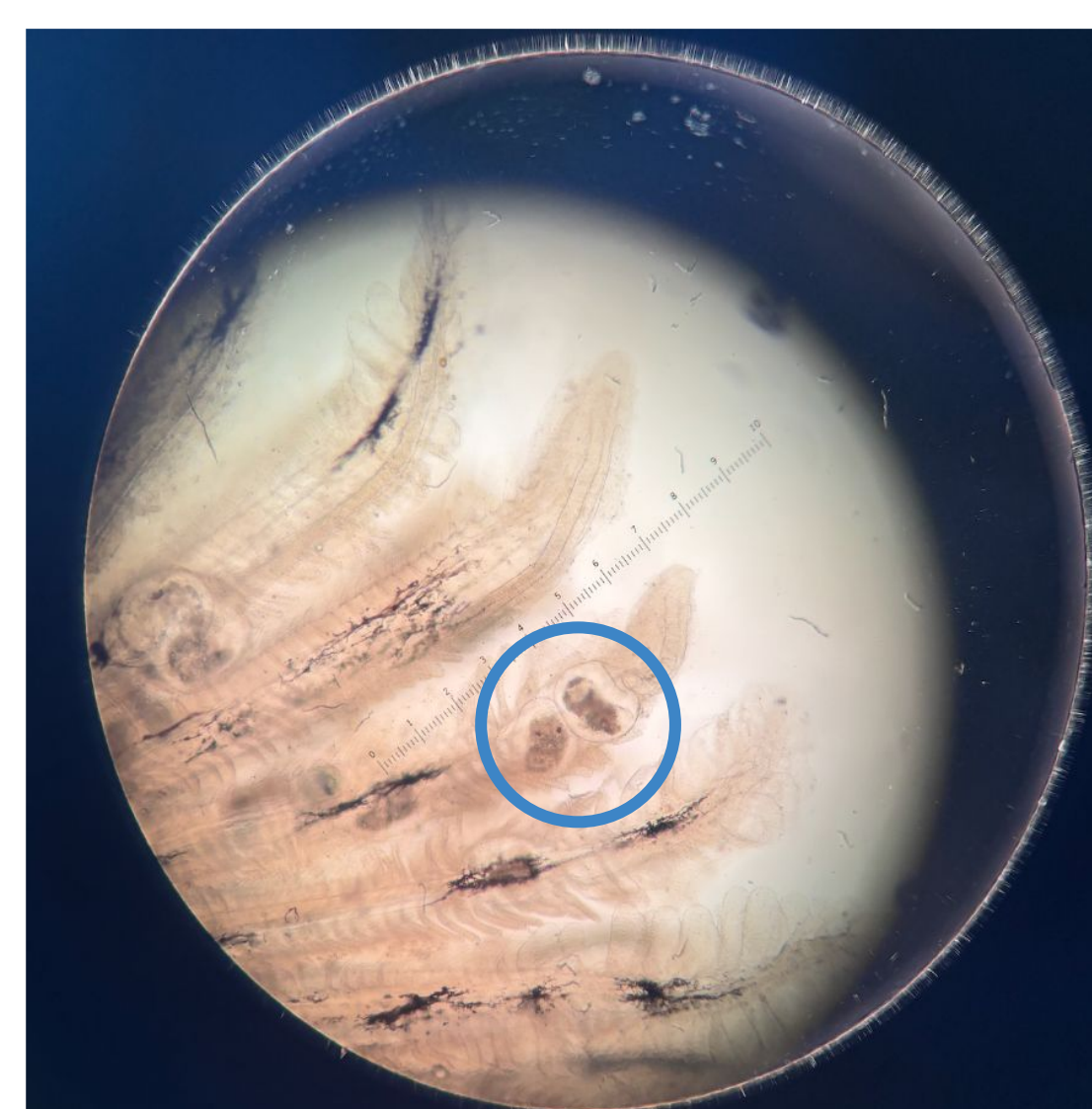


Figure 4. *C. lingua* cyst infection discovered on mummichog gills under a light microscope

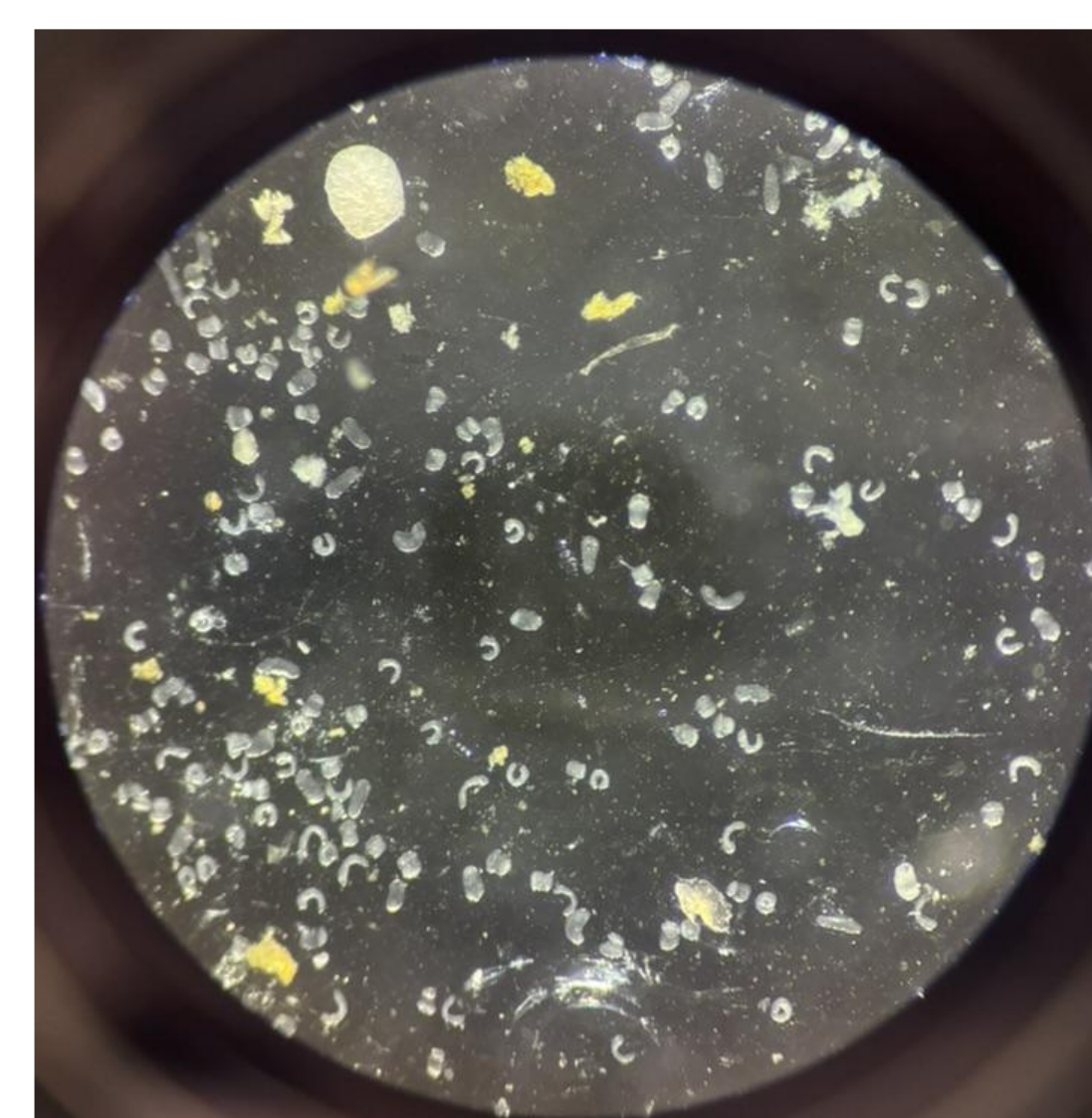


Figure 5. Trematode cercariae infection in a snail under a dissecting microscope

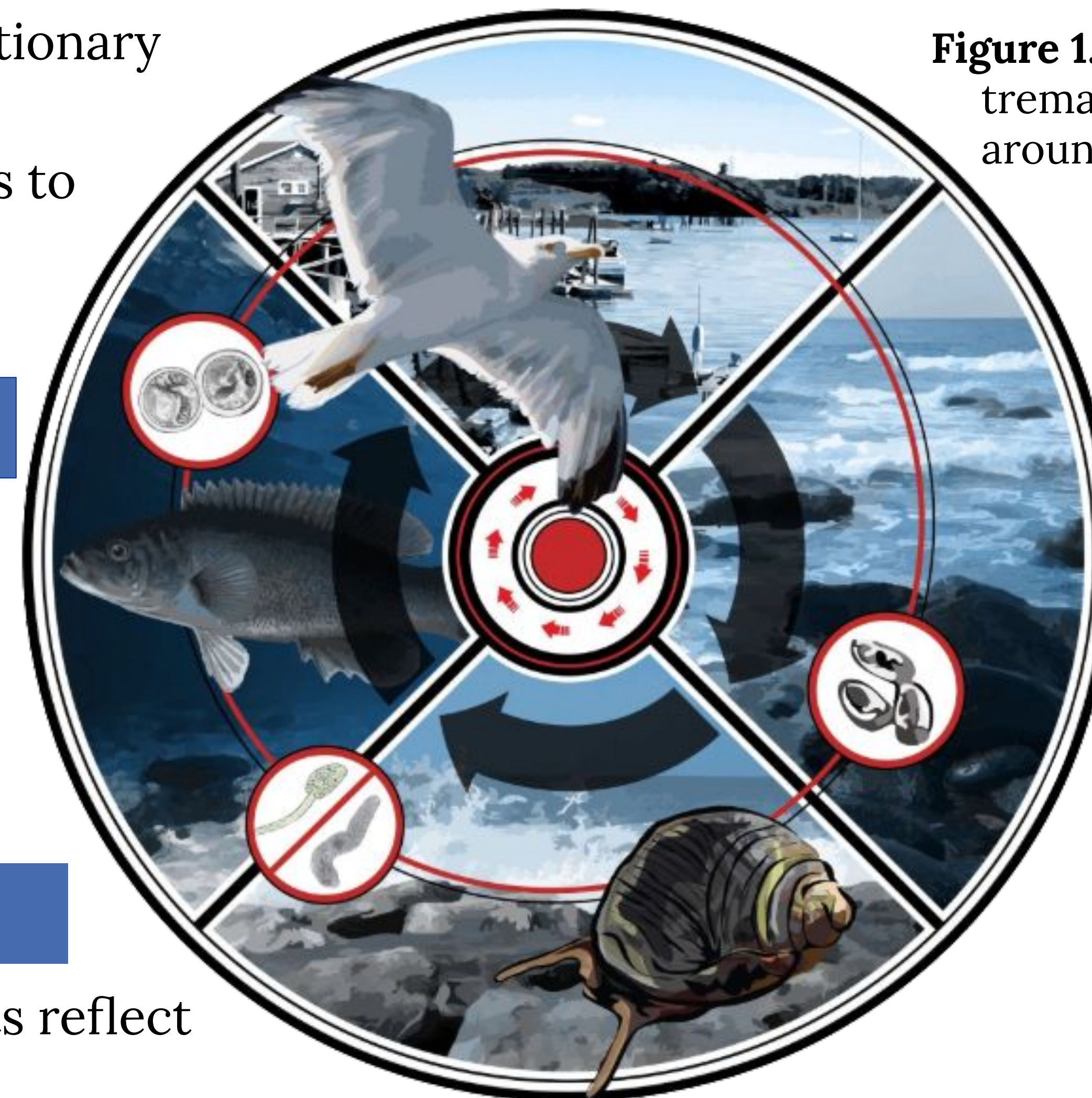


Figure 1. Life cycle of trematode parasites around the Isles of Shoals (6)

Results:

Figure 6. Map of the Isles of Shoals archipelago with pie charts indicating infection prevalence of sampled snails (n=2093). Larger bird icons indicate higher proportion of gulls and cormorants. Human interaction seems to influence this proportion.

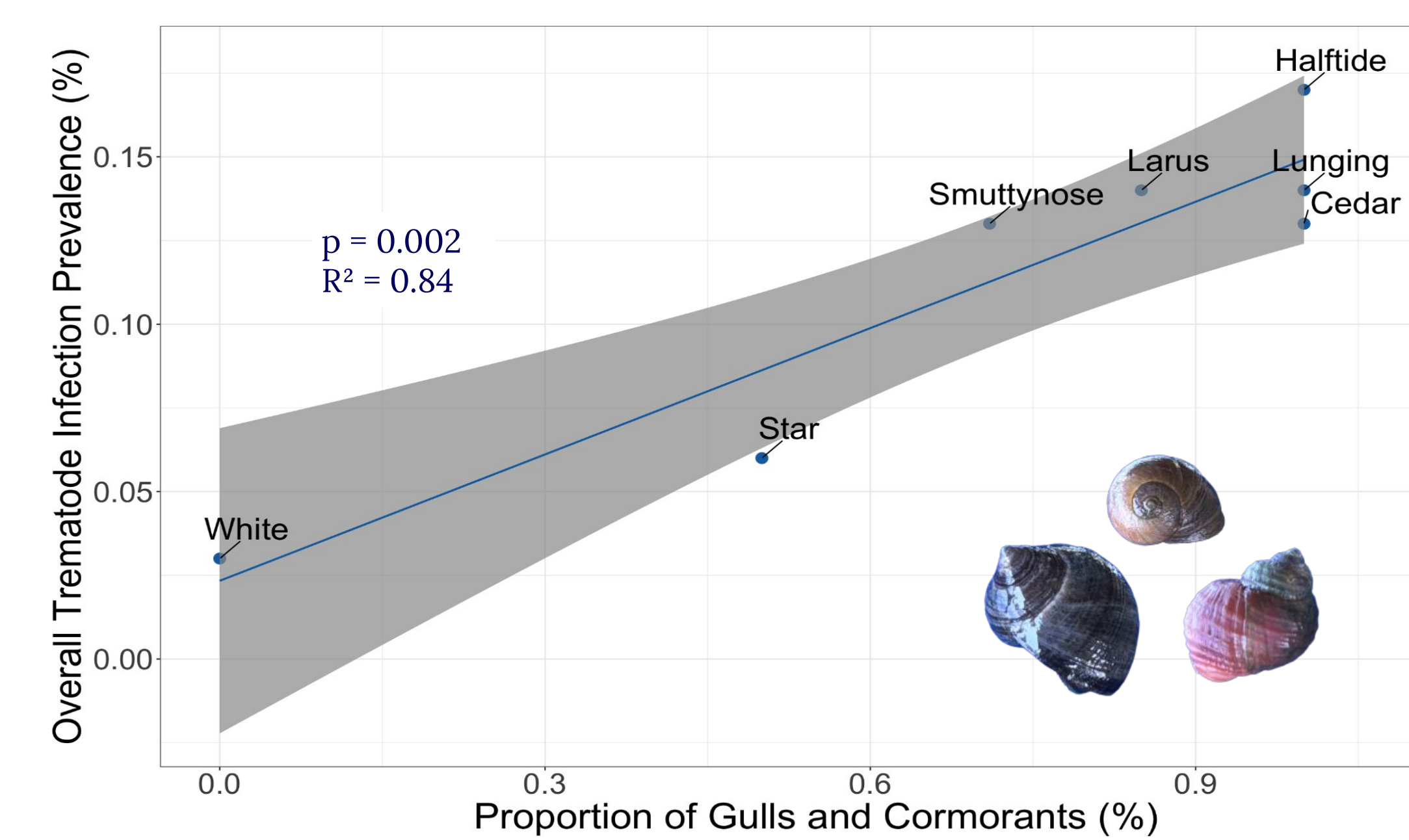


Figure 7. As the proportion of gulls and cormorants (final hosts) on an island increases, so does the overall trematode infection prevalence in snails (first intermediate host)

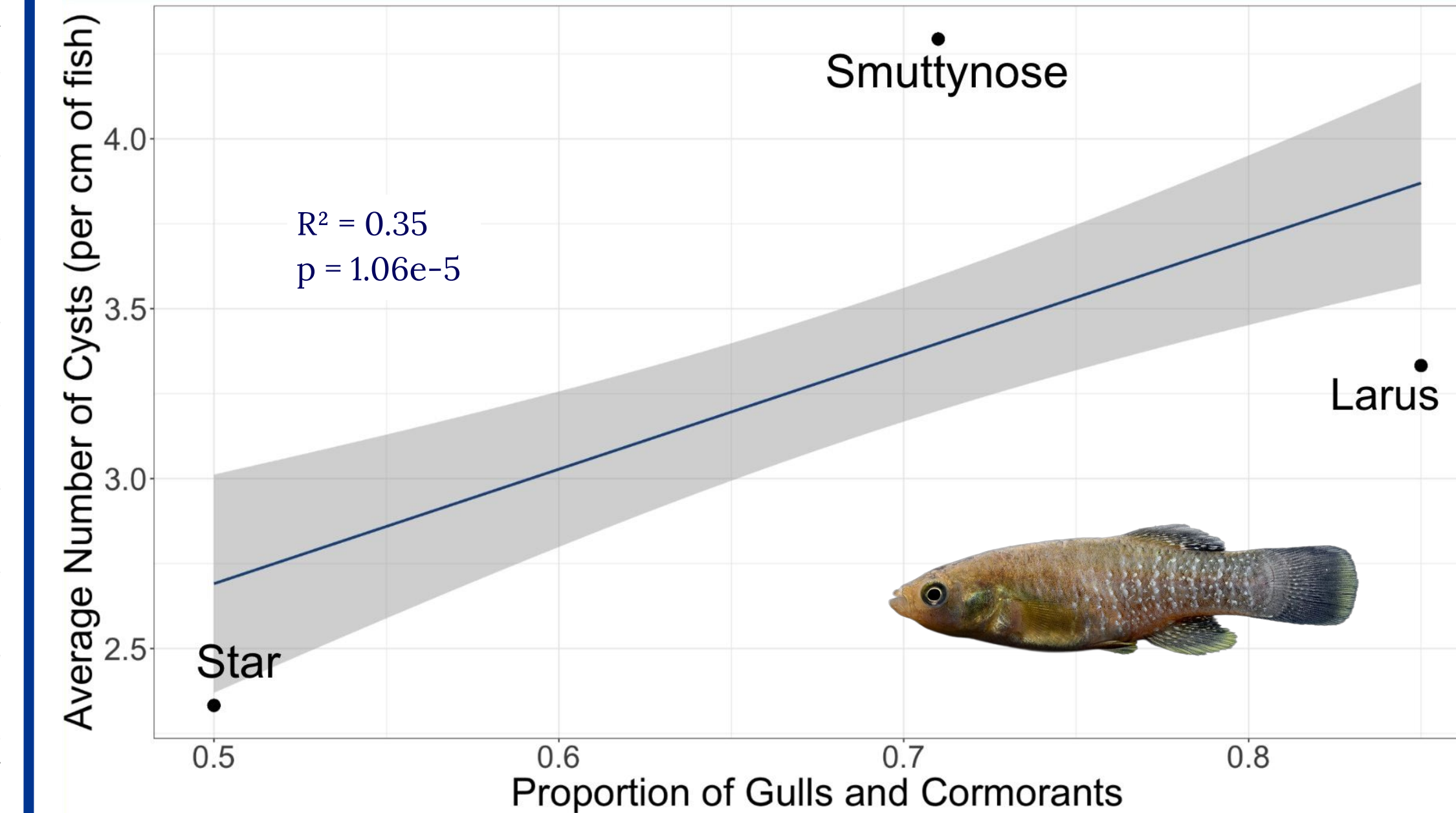


Figure 8. As the proportion of gulls and cormorants (final hosts) on an island increases, so does the average number of trematode cysts on mummichogs (second intermediate host)

Discussion & Why You Should Care:

- I observed that on islands with lower human influence, and a higher proportion of gulls and cormorants, trematode prevalence increases in snail and mummichog intermediate hosts
- I observed that trematode prevalence can serve as an indicator of human influence on final host species
- Parasites are an extremely understudied group of organisms, so any research increases our understanding
- Parasites play a huge role in their ecosystems by serving as conservation proxies and bioindicators (1,7)

References:

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