

Prevalence and Implications of Cestode Parasites in West Florida's Red Grouper Fishery

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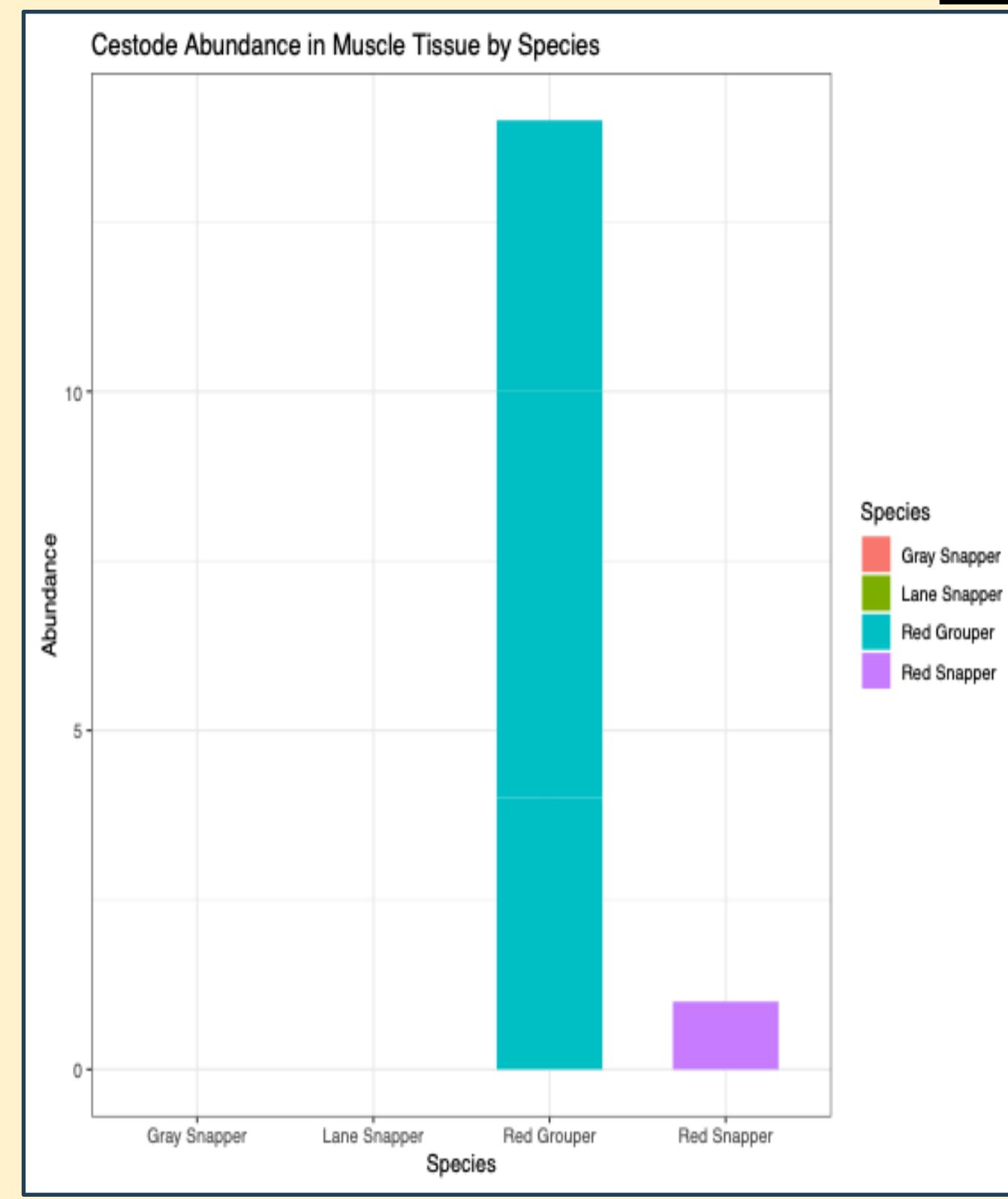


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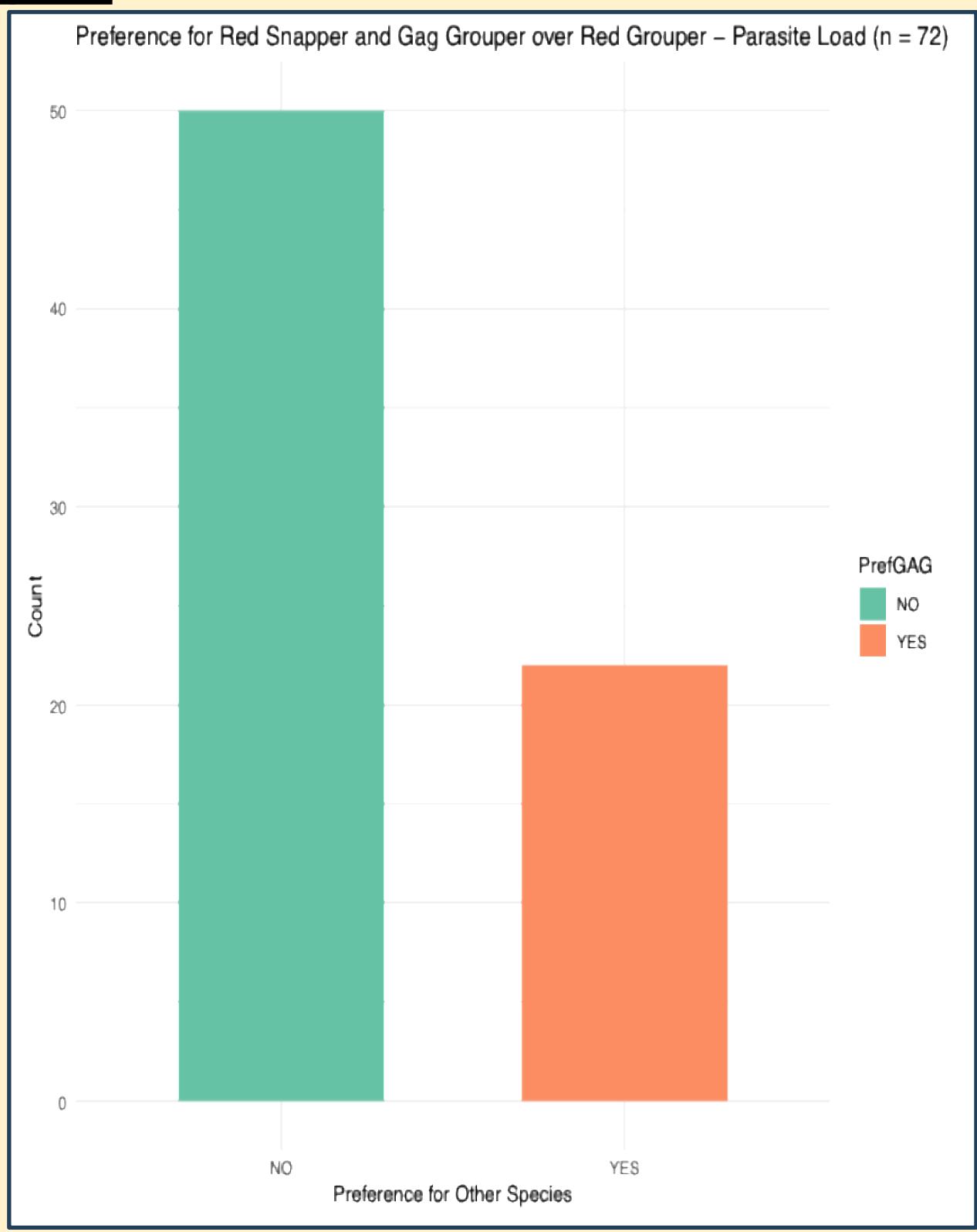
Introduction

Investigation into the prevalence and abundance of cestode parasites in Red grouper in the Gulf of America, is ongoing. Recent survey findings from the fishing community suggest that this parasitic occurrence precedes Red grouper management in U.S. waters. Due to life history traits such as strong site fidelity, habitat engineering, and a wide dietary preference (crustaceans), this species appears particularly susceptible to infection. Biological data taken from 3 Red grouper, 14 Red snapper, 3 Lane Snapper, and 2 Gray snapper in Apalachicola and St. Petersburg, Florida on multiple fishing trips during June and July of 2025, found Red grouper maintain higher prevalence (100%) and mean abundance (4.67) of cestode parasites compared to other reef species ($F = 92.08$, $P > 0.001$). While this research finds consistently high prevalence and abundance of this parasitic species in the Red grouper (southwest Florida), acquiring biological samples across all of west Florida is time-intensive, expensive, and difficult. To augment the biological sampling data, a fishermen's survey was designed to better illuminate differences in parasite prevalence throughout west Florida. The survey found that many fishers harvest Red snapper and Gag grouper more because of the heavy parasite load in Red grouper. Given the economic and cultural significance of these reef species, it is plausible that parasitology has played a sizeable role in altering fishing dynamics for reef species in the Gulf for many years. This internship contributed to an ongoing study being conducted by LMRSCS graduate students at the University of Miami Rosenstiel School of Marine, Atmospheric and Earth Sciences (RSMAES).



Graph 1. Total cestode abundance by species: (3) R. grouper, N=14, (14) R. snapper, N=1, (3) L. snapper, N=0, (2) G. snapper, N=0. ANOVA indicated a significant difference between species and parasite abundance ($F = 92.08$, $P > 0.001$). Red grouper cestode prevalence (no. fish infested/no. fish examined) = 100%, mean abundance (no. parasites/no. fish examined) = 4.67.

Graphs



Graph 2. Total count of respondents who prefer harvesting other reef species, specifically Red snapper and Gag grouper, over Red grouper due to parasite load ("YES", N=22; "NO", N=50).

Methodology

- Analyze the prevalence and abundance of cestode parasites in the muscle tissue of *Epinephelus morio* (Red grouper) and in other economically and ecologically associated species, including *Epinephelus morio* (Red Grouper) **Fig.1**, *Lutjanus campechanus* (Red snapper) **Fig.2**, *Lutjanus griseus* (Gray snapper) **Fig.3**, and *Lutjanus synagris* (Lane snapper) **Fig.4**, collected from two regions of West Florida: St. Petersburg and Apalachicola using a line-casting apparatus. Once collected, biological sampling of specimen took place to uncover possible parasites by removing filets for muscle dissection.

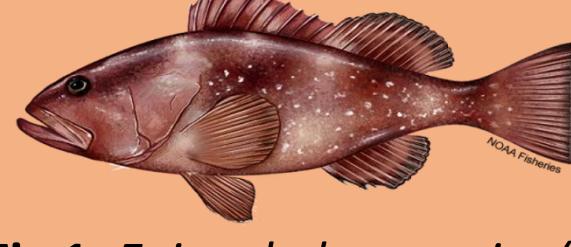


Fig.1 *Epinephelus morio* (Red Grouper)



Fig.2 *Lutjanus campechanus* (Red snapper)

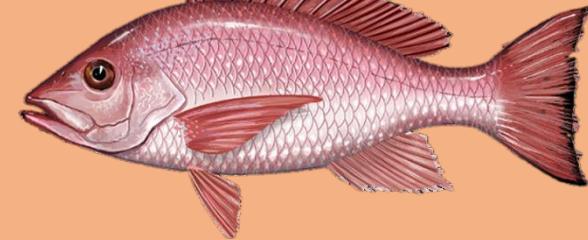


Fig.3 *Lutjanus griseus* (Gray snapper)

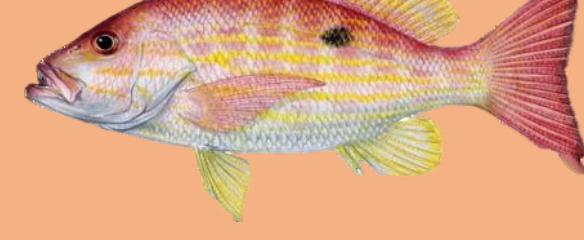


Fig.4 *Lutjanus synagris* (Lane snapper)

- Conduct a fisher survey to address biological data gaps and analyze fisher harvesting preferences based on parasite load in *Epinephelus morio* (Red grouper) across multiple locations along the West Florida coast, including Panama City/Apalachicola **Fig.5**, Dunedin/St. Petersburg **Fig.6**, Sarasota/Cape Coral **Fig.7**, and Fort Myers/Naples **Fig.8**. Survey consisted of 10 questions and total amount of respondents was 72



Fig. 5

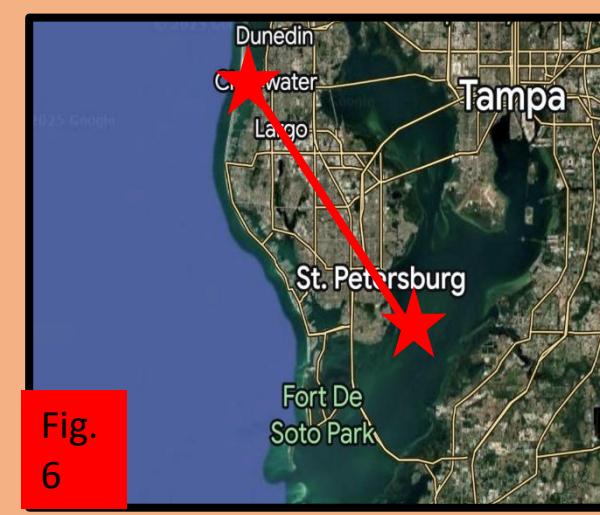


Fig. 6



Fig. 7

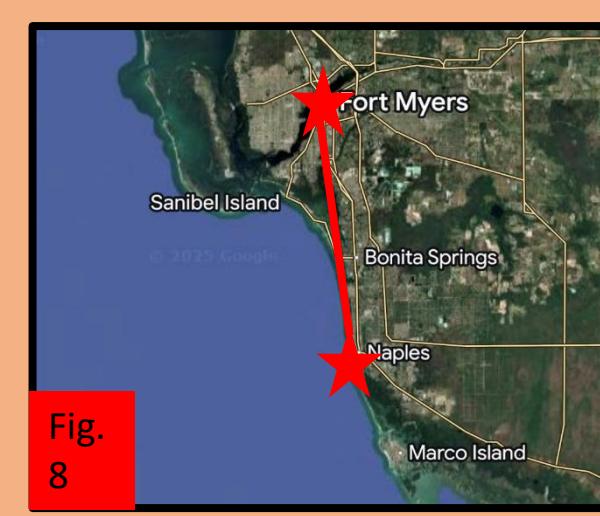


Fig. 8

Figures 5–8. Estimated travel ranges between start and end destinations:

Figure 5. Panama City to Apalachicola.

Figure 6. Dunedin to St. Petersburg.

Figure 7. Sarasota to Cape Coral.

Figure 8. Fort Myers to Naples.

Note: All maps show estimated travel ranges between the specified locations.

CONCLUSIONS

- More biological sampling is needed for this parasite relationship to be understood. Given the lack of cestode abundance in all other species, it is clear there is an aspect of Red grouper ecology that is unique from all other reef species. Based on the findings of our first research objective the hypothesized theories are that

- Red groupers accumulate the cestode by ingesting crab species such as *Hepatus epheliticus* (calico crab). The red grouper functions as the secondary host, while a large elasmobranch, typically a shark, serves as the final host, thereby establishing a parasitic food chain.

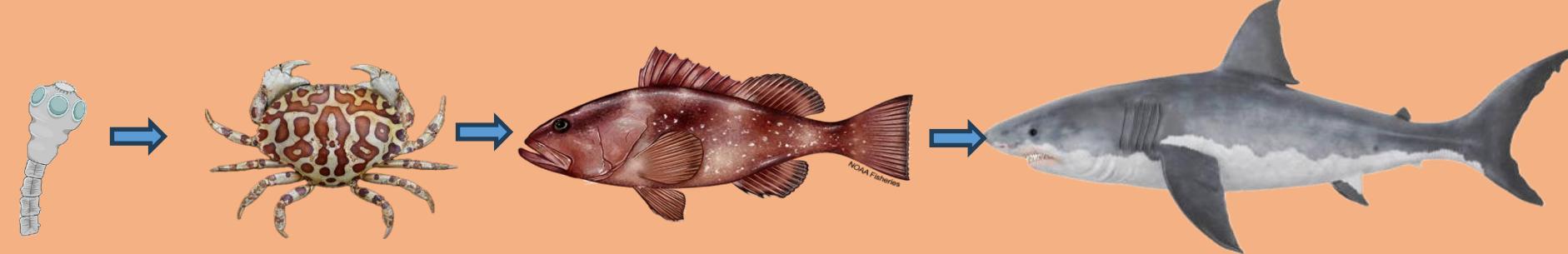


Fig.9. Illustration of a cestode life cycle through a marine food chain.

- Based on the findings of the second objective, it is apparent that the fisherman survey revealed a high prevalence and abundance of this parasite throughout western Florida. **Fig.10-11** The parasite load in red grouper has led a substantial portion of respondents to prefer harvesting other species.



Fig.10 Cestode removed from red grouper muscle

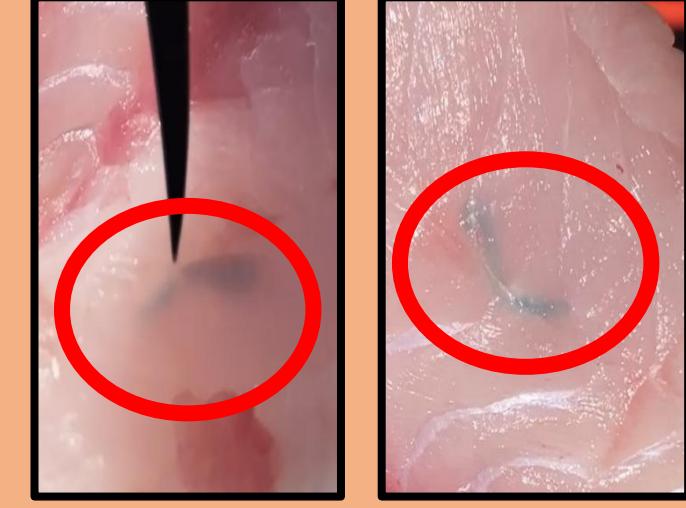


Fig.11 Cestodes in two different areas of muscle tissue of a red grouper

Considering the long-term fishing pressure experienced by many vulnerable reef species in western Florida, it is likely that parasitism has played a significant role in shaping fishery dynamics in the Gulf through preferential harvesting and altered species selection.

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