Anthropogenic Debris Increases Antagonistic Behavior in Dusky Gregory Damselfish, *Segastes nigricans*

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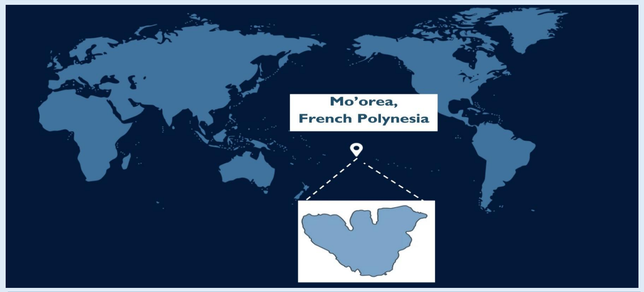
Abstract

Coral reef ecosystems are increasingly threatened by anthropogenic stressors. In particular, plastic pollution can cause entanglement injuries, habitat smothering, and can be consumed when mistaken for food. Although the physical impacts of plastic pollution have been studied, the behavioral effects on fish communities remain largely unexplored. Here, we examine the behavioral responses of *Stegastes nigricans*, a territorial herbivorous damselfish, to plastic trash that can enter coastal waters in Mo'orea, French Polynesia. We conducted 109 thirty-minute experimental trials, video recording behavioral responses (circling, hovering, biting, charging, removing, camera interaction, and "ambient activity") to three different-sized empty chip bags and two experimental controls, one with nothing and the other a common rafting seaweed. Results revealed that fish exhibited significantly ($p = 0.002$-1.000) higher levels of aggressive behaviors, actively inspecting, biting, charging, and removing all items placed in their territories. The presence of trash amplified overall aggressive behavior, demonstrated by increased aggression towards objects outside of the territory, like the camera, raising concerns that fish may spend excessive time reacting to trash instead of engaging in essential activities like growth and reproduction. This study highlights the need to expand on behavioral studies on the potential threat plastic waste poses to fish and other marine life.

Main Objective

Explore how anthropogenic debris, specifically plastic waste, affects fish behavior.

Mo'orea, French Polynesia



Dusky Gregory Damselfish, *Stegastes nigricans*

* "Farmer" fish to filamentous algae called turf
* Highly territorial

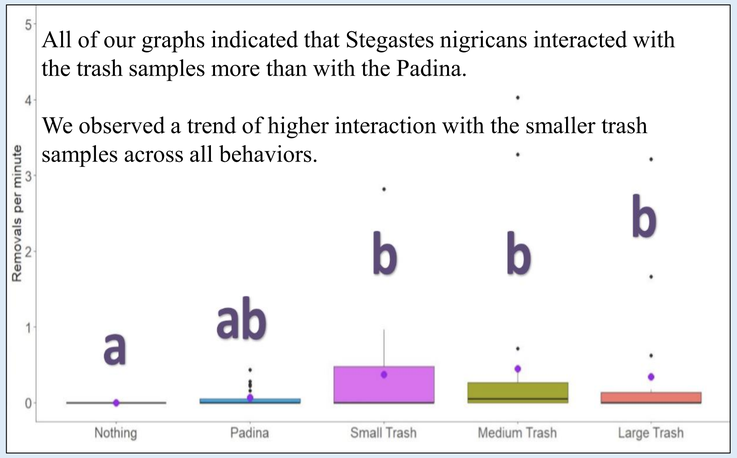
Identifying Territories

Food Source, Shelter, Mating Ground, Nesting Site

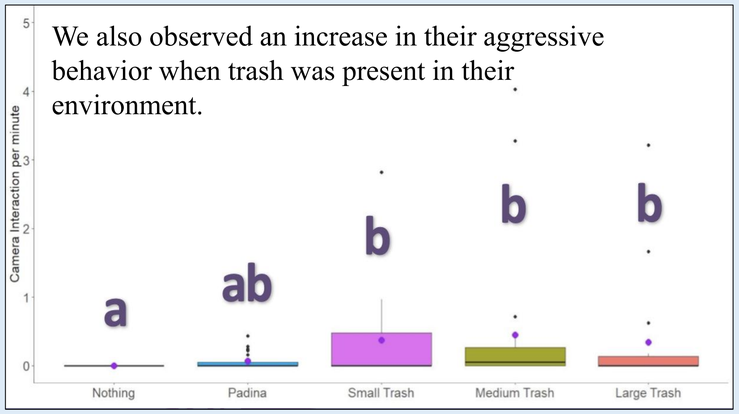
Damselfish Responses to Trash

All of our graphs indicated that Stegastes nigricans interacted with the trash samples more than with the Padina.

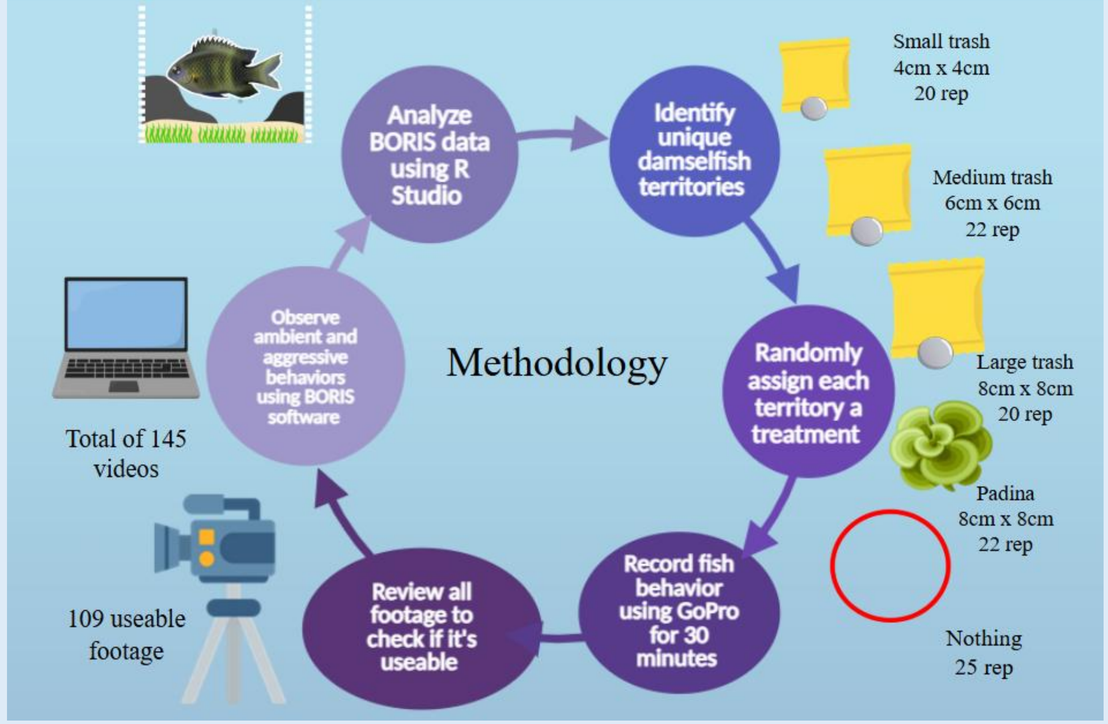
We observed a trend of higher interaction with the smaller trash samples across all behaviors.



We also observed an increase in their aggressive behavior when trash was present in their environment.



Methodology



Implications/Conclusions

- The time and energy invested in the trash takes away from the energy budget that the fish have to focus on their feeding, mating, and farming.
- Camera interaction results imply that trash amplifies the overall aggressive behaviors of the damsels.

In conclusion, we must reduce plastic pollution because they are affecting organisms physically and behaviorally

Acknowledgements

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