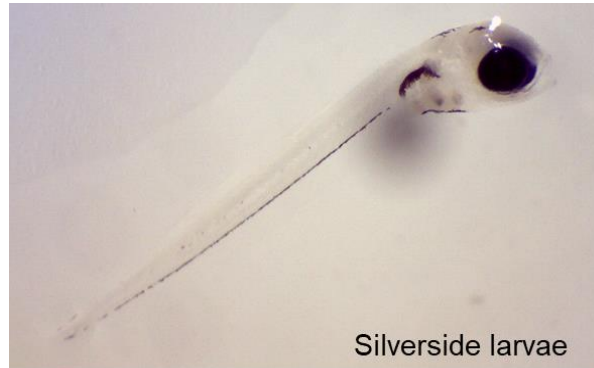


IMPACTS OF PLASTICS: Research Activity & Questions

Prodigious Plastic Pollution



The inland silverside (*Menidia beryllina*) is a euryhaline teleost endemic to shallow water estuaries along the Atlantic coast from Massachusetts Bay on Cape Cod to the Gulf of Mexico in Vera Cruz, Mexico. Introduced populations occur in San Francisco Bay estuary and other California rivers. *M. beryllina* are known to frequent tidal salt marshes, seagrass meadows, and shore zones and generally prefer lower salinities, although they may be found seasonally across the entire salinity gradient. *M. beryllina* feed on a variety of zooplankton, including copepods, amphipods, and mysid shrimp.

Mysid shrimp (*Americamysis bahia*) are small crustaceans inhabiting coastal estuarine benthos from Narragansett Bay, Rhode Island to the Gulf of Mexico that are commonly used for toxicity testing. *A. bahia* feed on zooplankton and are regarded as important links in aquatic food webs in estuaries on every continent and contribute to biogeochemical mixing, bioturbation, and nutrient cycling. Due to their ecological role and abundance in a myriad of different environmental conditions.

Behavior is resultant from various cellular, biochemical, and neural processes that makes it critical to understand behavioral analysis and toxicity testing. Several studies have drawn links between the biogeochemical and ecological consequences of environmental contamination by demonstrating that subtle changes in fish behavior indicate stress. Swimming and feeding behavior, frequency of activity, and velocity have been established as reliable responses to measure sublethal toxicity stress in fish. Recent studies in microplastic exposures to aquatic organisms have measured behavior responses using EthoVision software, a video tracking system specifically developed for analyzing activity and movement in fish and invertebrates. The current experiment synthesized methods of early and recent studies to

measure several of these historically documented stress responses as well as growth in *M. beryllina* and *A. bahia* using periodic light and dark cycles as introduced stimuli.

[Behavior Video Link](#)

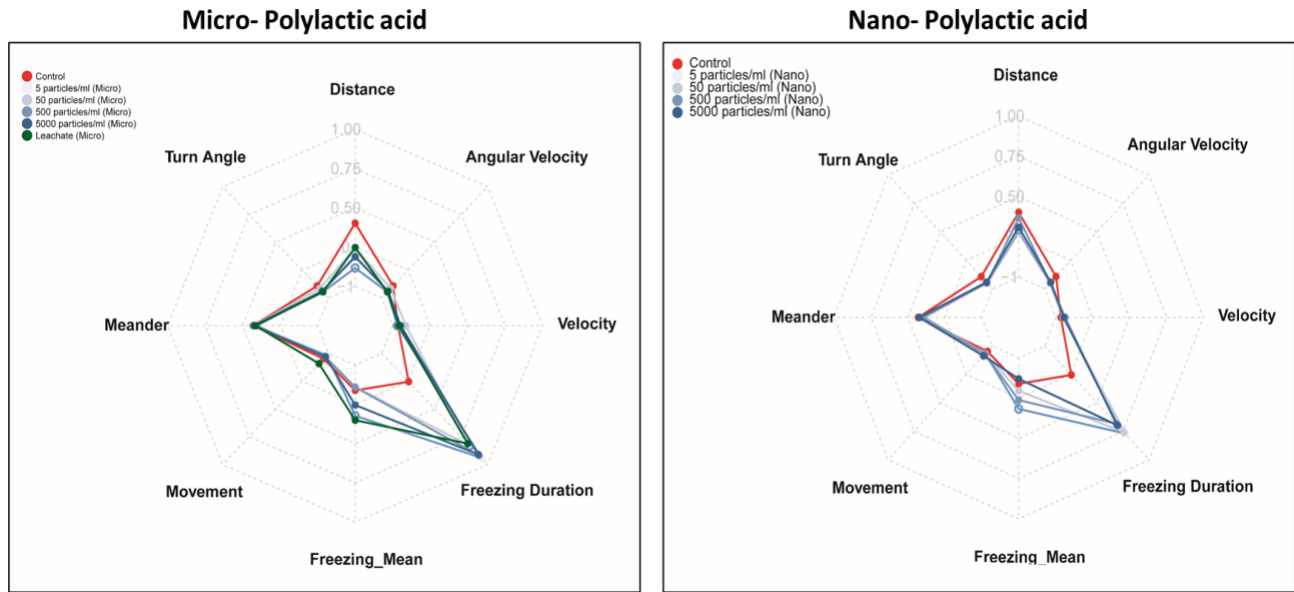


Fig 1. Radar plots for Mysid Behavior exposed to Poly lactic acid for 7 days

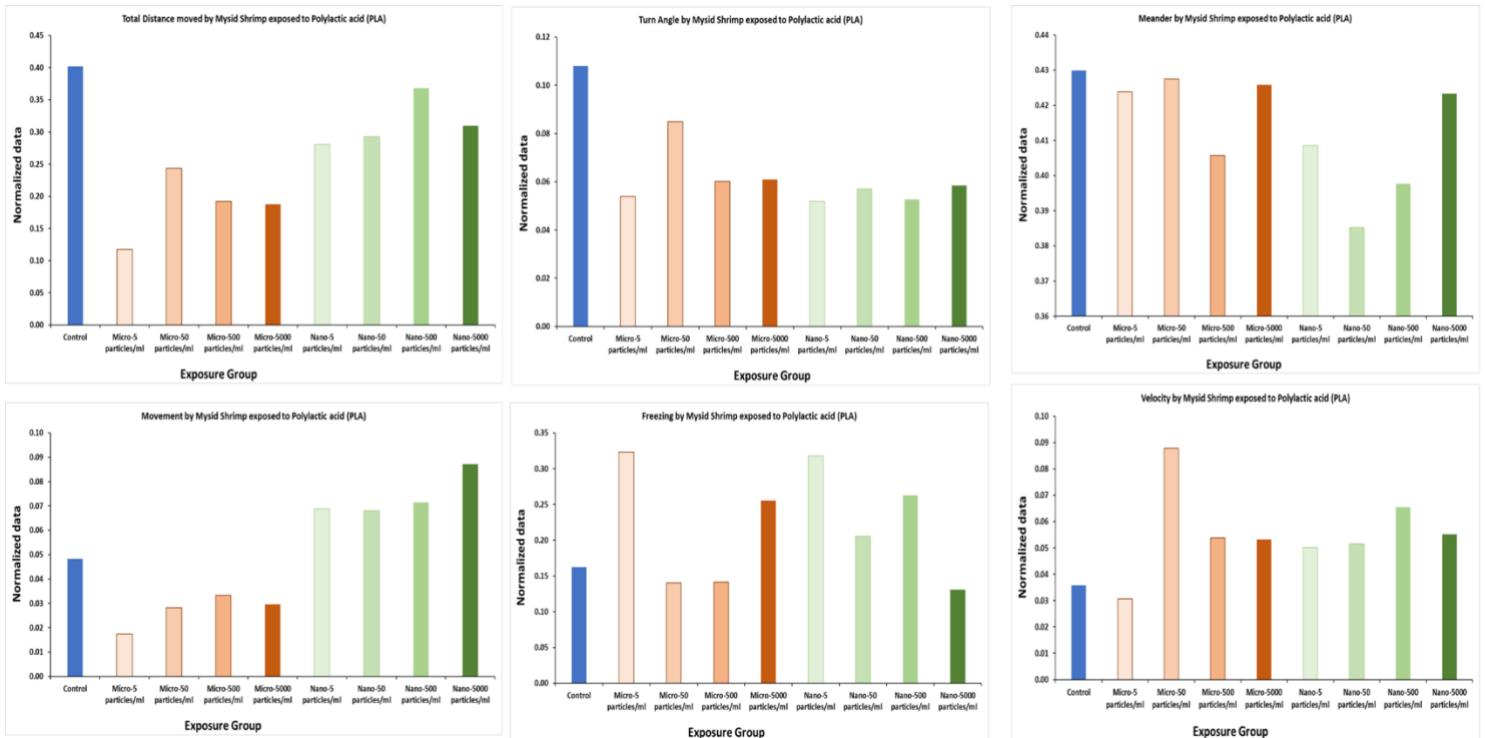


Fig. 2 Bar plots for Mysid Behavior exposed to Poly lactic acid for 7 days

PLA- Behavior

- 1) When Mysid shrimps exposed to PLA which group moved faster?
- 2) Except control when Mysid shrimps exposed to PLA which group moved slower?
- 3) When Mysid shrimps were exposed to PLA which group demonstrated more freezing?
- 4) When Mysid shrimps were exposed to PLA which group demonstrated least freezing?
- 5) When Mysid shrimps were exposed to PLA which group moved to minimum turn angle?
- 6) What type of trend do you find in each graph? Sketch using pen:

Growth

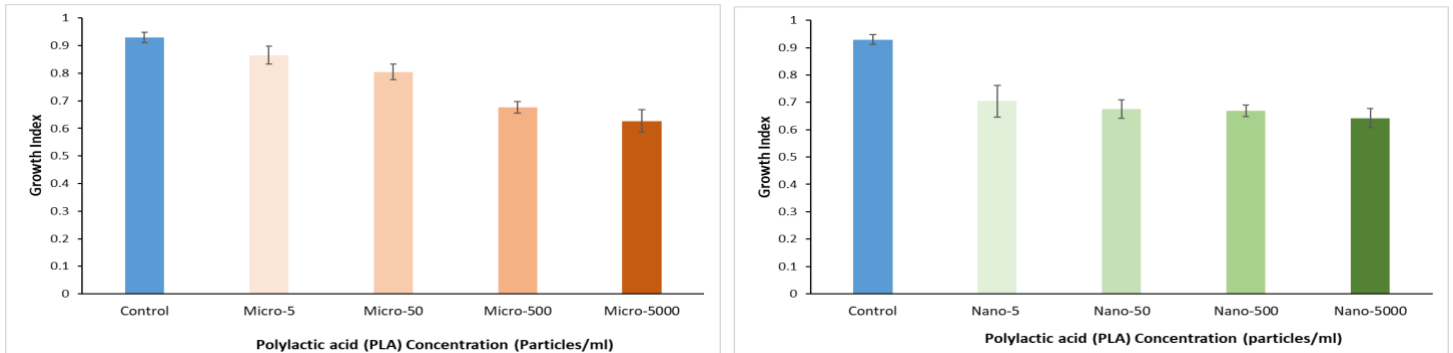


Fig. 3 Growth Bar Plots- Mysid exposed to PLA for 7 days

PLA- Mysid Shrimp

- 1) When Mysid shrimps are exposed to PLA which group shows highest growth?
- 2) When Mysid shrimps are exposed to PLA which group shows lowest growth?
- 3) What type of trend do you see in each graph?

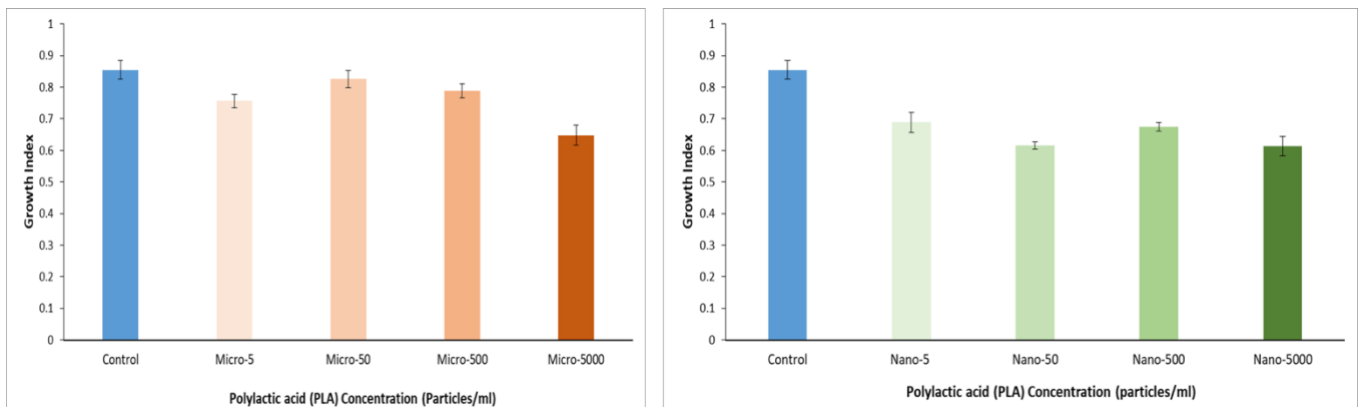


Fig. 4 Growth Bar Plots- Silverside fish exposed to PLA for 7 days

PLA- Silverside

- 4) When Mysid shrimps are exposed to PLA which group shows highest growth?
- 5) When Mysid shrimps are exposed to PLA which group shows lowest growth?
- 6) What type of trend do you see in each graph?

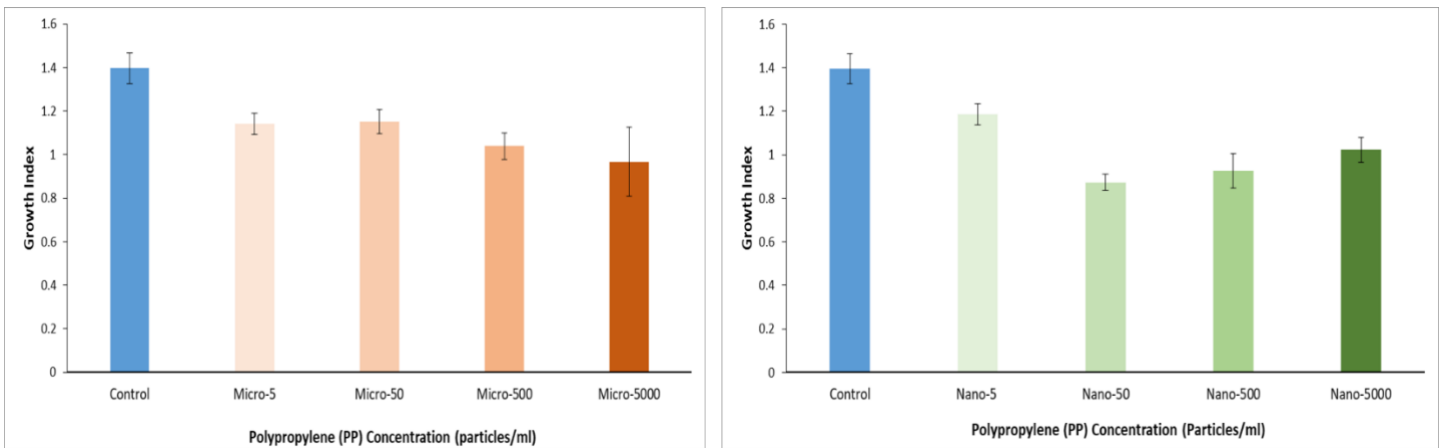


Fig. 5 Growth Bar Plots- Mysid exposed to PP for 7 days

PP- Mysid Shrimp

- 7) When Mysid shrimps are exposed to PP which group shows highest growth?
- 8) When Mysid shrimps are exposed to PP which group shows lowest growth?
- 9) What type of trend do you see in each graph?

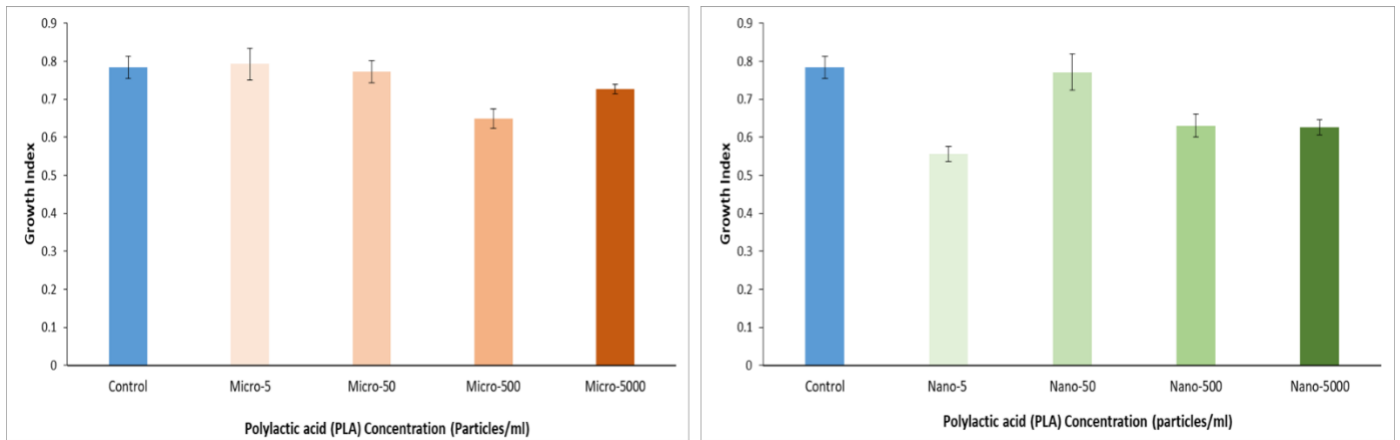


Fig. 6 Growth Bar Plots- Silverside fish exposed to PP for 4 days at 5 ppt salinity

PP- Silverside

10) When Mysid shrimps are exposed to PP which group shows highest growth?

11) When Mysid shrimps are exposed to PP which group shows lowest growth?

12) What type of trend do you see in each graph?

Reflection:

- What does this data reveal about plastic pollution in our oceans?
- How might this affect other species?
- What might this data reveal for other species?
- What is your main takeaway from this research?