Meiofauna abundance and biomass in mangrove and marsh ecosystems along the Apalachicola Bay

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Introduction

- Meiofauna are microscopic animals (63-500 µm) that are abundant in coastal and marine sediments.[1]
- Their communities are ecological indicators,[2] playing pivotal roles in nutrient exchange and food-webs.[3]
- In this study we focused on free-living nematodes and copepods from mangrove and salt marsh systems in the Apalachicola Bay.

Methods

Collection of samples

1. Twelve total samples: 3 taken from center and fringe of a mangrove hammock and a nearby salt marsh

Processing and analysis

1. Samples washed over stacked 500 and 63 µm sieves
2. Meiofauna extracted using density separation.
3. Nematodes and copepods counted, picked out, and mounted on glass slides.

Figure 1.
Mangrove: (29.670692°, -84.852825°) Marsh: (29.670753°, -84.852826°). Image: Kevin Engelbert

References

1. Giere, O. (2009) Meiobenthology. The Microscopic Motile Fauna of Aquatic Sediments. 2nd Edition, University of Hamburg. Springer-Verlag, Berlin, Heidelberg.
2. Ridall, A. and J. Ingels (2021). Suitability of Free-Living Marine Nematodes as Bioindicators: Status and Future Considerations. Frontiers in Marine Science 8(863)
3. Schratzberger, M. and J. Ingels (2018). "Meiofauna matters: The roles of meiofauna in benthic ecosystems." Journal of Experimental Marine Biology and Ecology 502: 12-25.

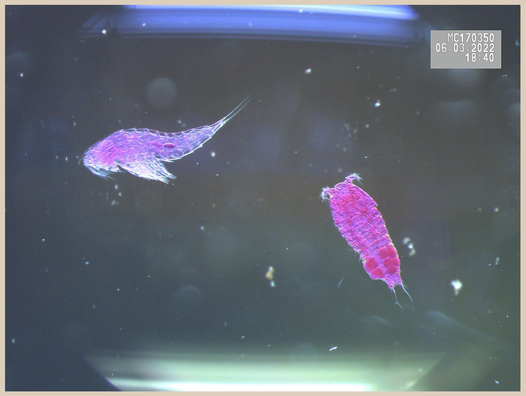

Figure 2.
Two copepods (Image credit: Makena Lang)

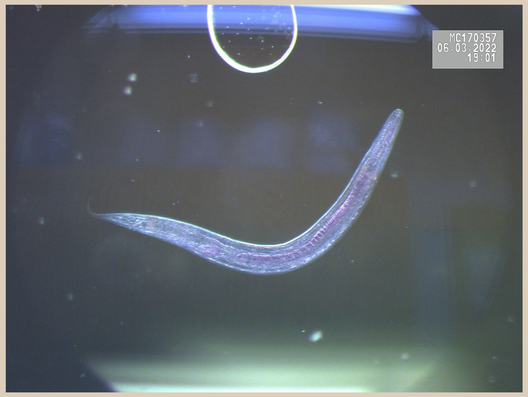

Figure 3.
Nematode (Image credit: Makena Lang)

Figure 4.
Nematode (Image credit: Makena Lang)

Preliminary Results

1 Nematode to copepod ratio

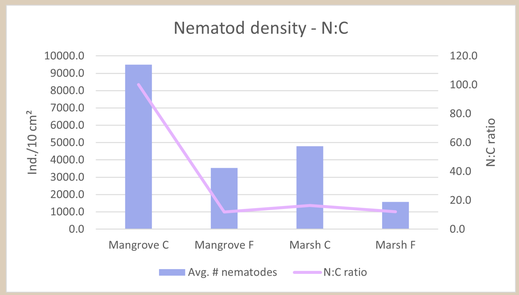

Figure 5.
N:C ratio is very high in the mangrove center sample.

2 Nematode abundance

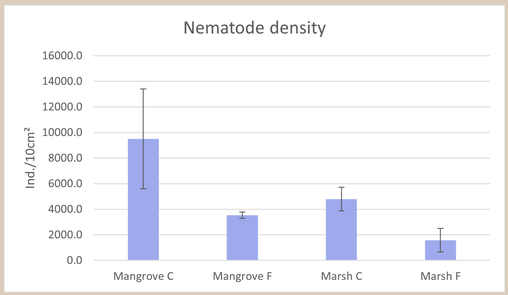

Figure 6.
Nematode abundance is highest in the centers.

3 Copepod abundance

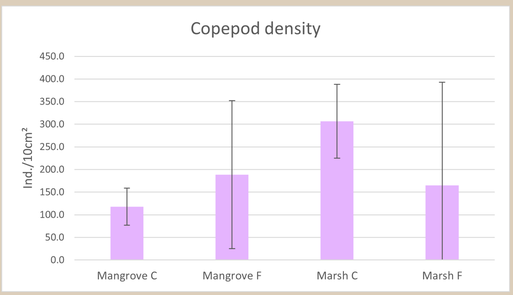

Figure 7.
Copepods are more abundant in the marsh ecosystem.

Discussion and Projections

- Due to increased retention of organic matter in the centers of mangrove and marsh growth, nematode abundance is much higher compared to the fringe.
- Nematodes are more adapted to low-oxygen environments than copepods.
- High N:C ratios indicate a disturbed environment.

Next Steps

- Analyze biomass to distinguish spatial patterns and differences between mangrove and marsh habitats, and the fringe sediments around these habitats.
- This information will provide a glimpse into the miniature life of coastal habitats in the Apalachicola Bay ecosystem, their ecology and their functional roles.