Impact of Temperature and Hypoxia on the Asian Shore Crab

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Hemigrapsus sanguineus

Introduction

- The Asian Shore crab is a species that is native to the west Pacific and is now establishing populations on the east coast of North America.
- Their current range in North America spans from the state of Maine to North Carolina, with populations absent south of North Carolina.
- The presence of this species in intertidal communities has negatively impacted food web systems.

Experimental Method

- There were four experimental groups:
  - warm and bubbled
  - warm and not bubbled (low oxygen)
  - room temperature and bubbled
  - room temperature and not bubbled (low oxygen)
- Each crab was housed in a glass jar labeled with their replicate number and kept in their experimental groups; warm groups were kept in a warm-water bath.
- Dissolved oxygen levels were measured using a PASPORT sensor via Bluetooth with SparkVue.
- Experimental groups were fed for one hour long intervals using pellets.

Results

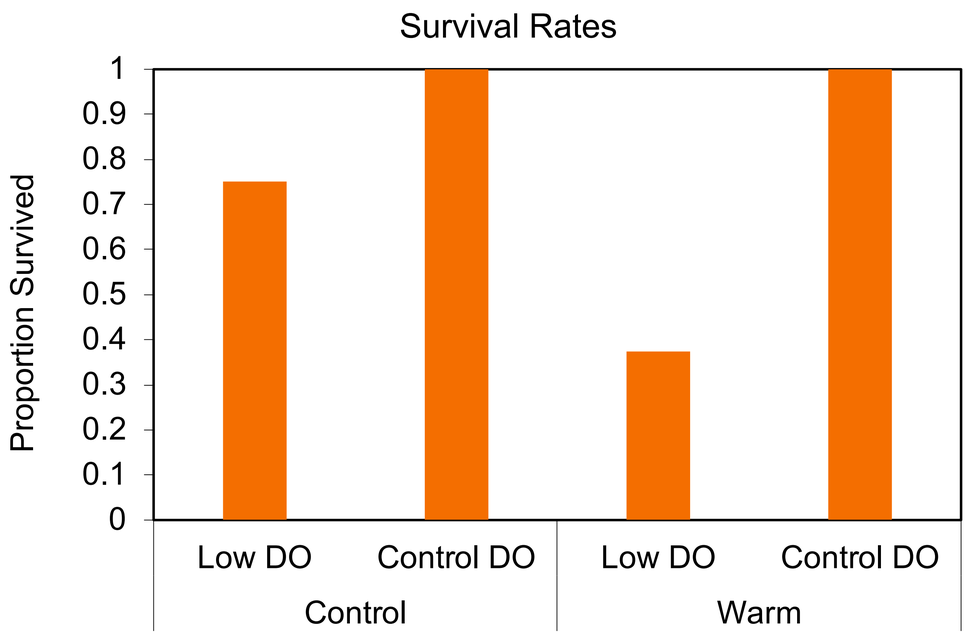

Figure 1

Crabs in the groups with low dissolved oxygen levels experienced lower survival rates in both the control and warm temperatures.

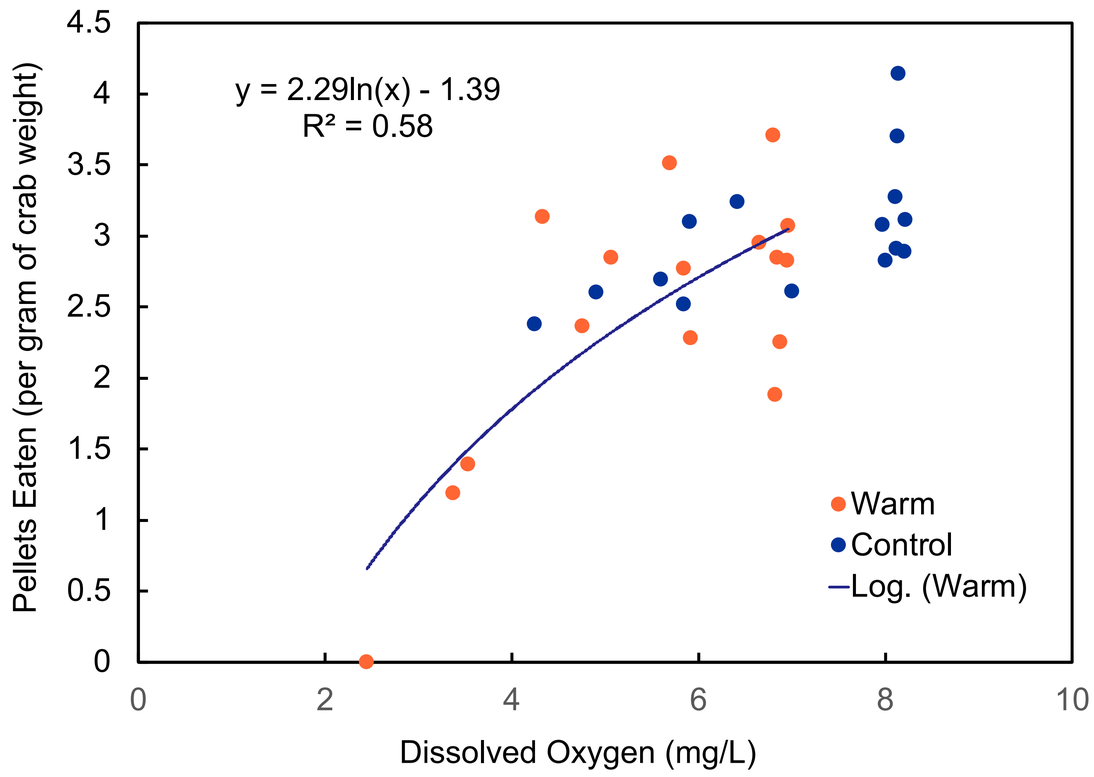

Figure 2

The difference in the number of pellets eaten by the crabs can be explained confidently by the varying dissolved oxygen levels.

Discussion and Conclusion

- The temperature data are not significant, meaning the difference in temperature for the experimental groups did not directly affect the number of pellets eaten by each crab.
- Warm water holds less oxygen which caused a slight correlation between warm temperatures and less pellets eaten compared to the control group.
- The relationship between dissolved oxygen and the number of pellets eaten per gram of weight was highly significant; lower oxygen levels generally equated to less pellets eaten.
- Warm temperatures may not be limiting the spread of this species into southern American waters rather, lower oxygen levels could be the limiting factor.
- Low oxygen conditions may affect the Asian shore crab's invasiveness in coastal environments. A warming ocean could be an opportunity for native species to combat this biological invasion.

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