

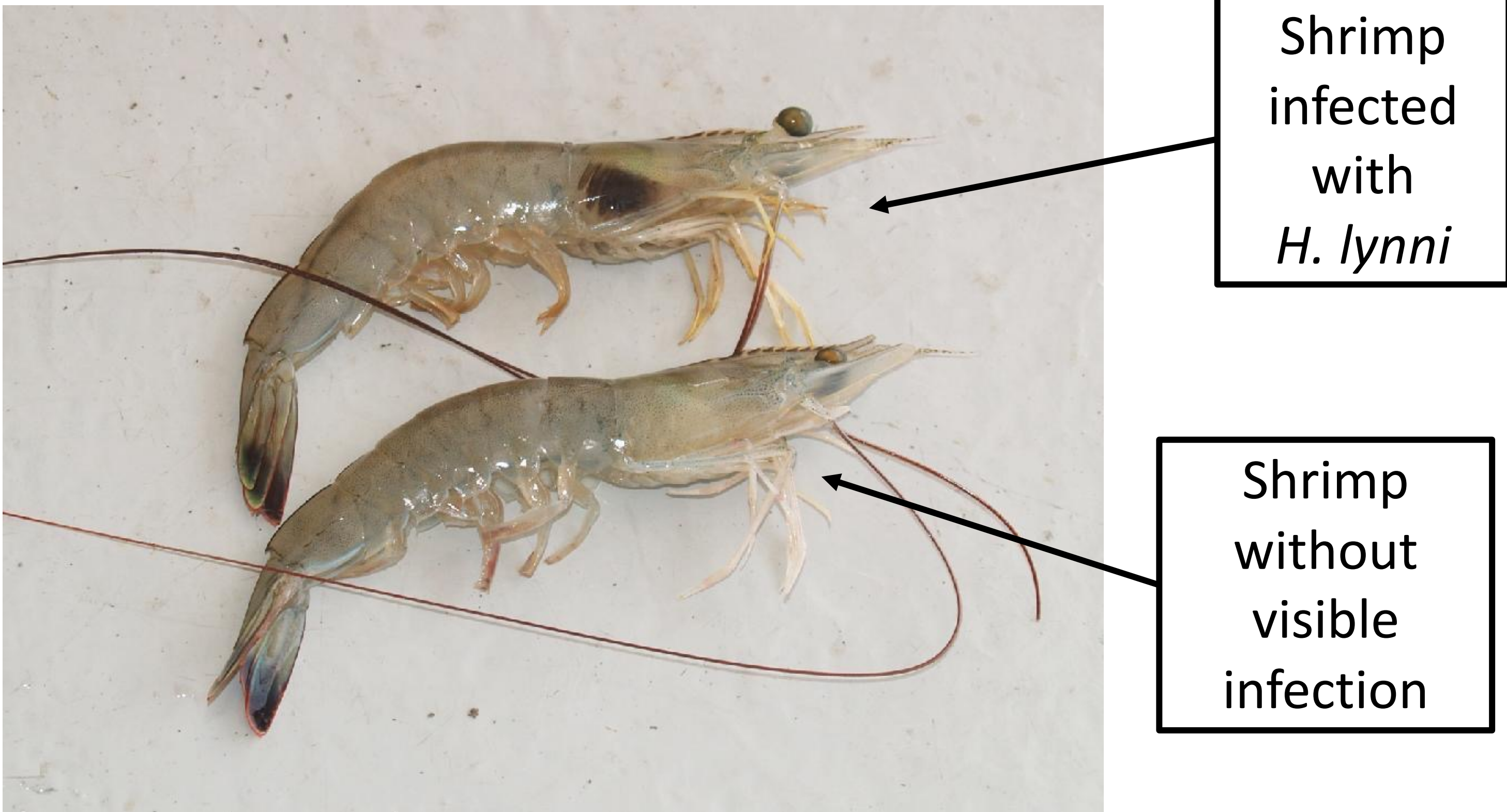
# Assessing the impacts of *Hyalophysa lynni* infection on oxygen consumption of commercial shrimp

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Motivation

- Hyalophysa lynni*, a ciliate that infects shrimp off the Southeastern US coast, may be responsible for recent declines in commercial shrimp populations
- H. lynni* attaches to host gills, which are responsible for oxygen intake and often darken upon infection (commonly called “black gill disease”)

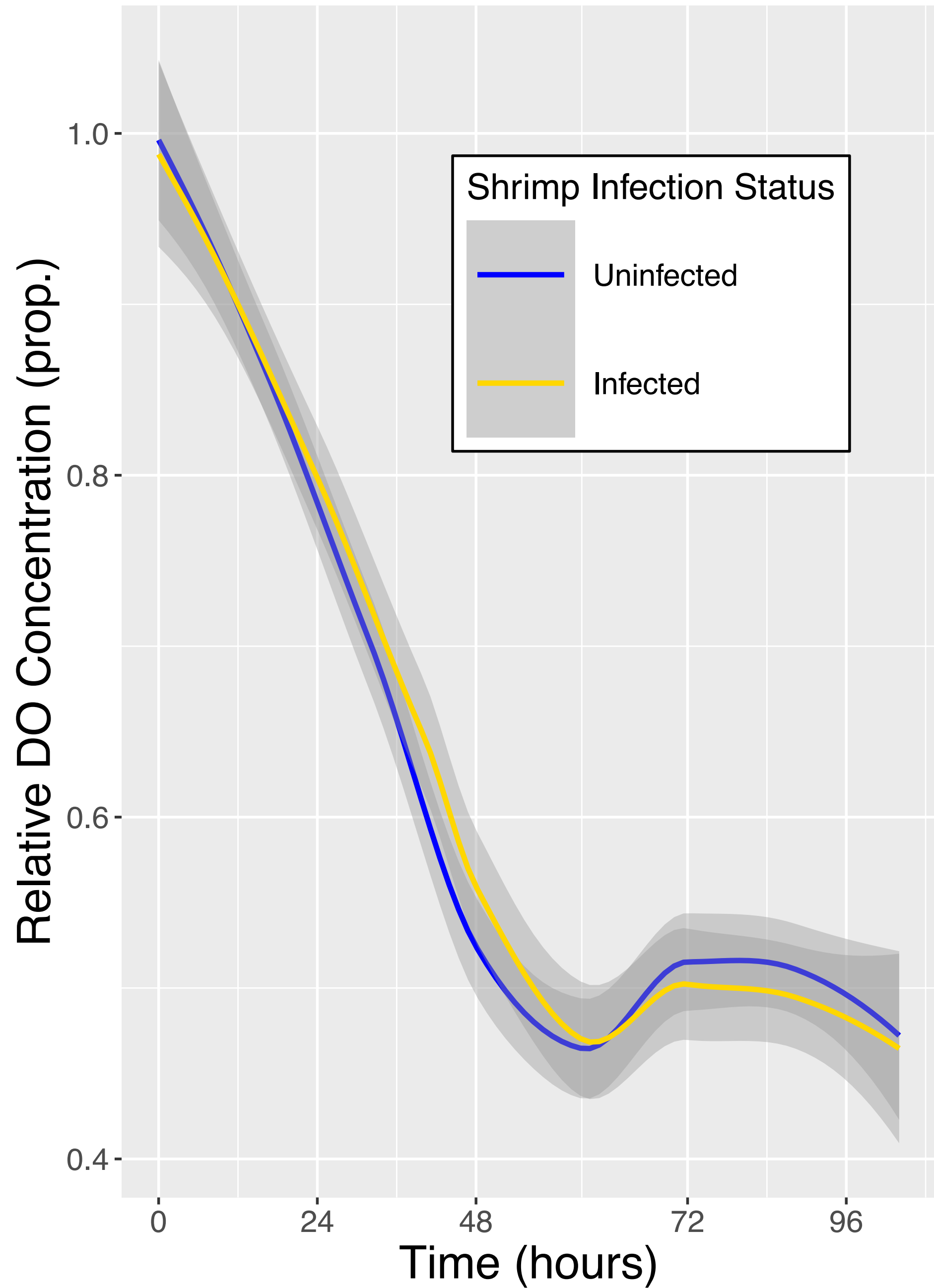


- To investigate *H. lynni*’s impact on host oxygen consumption, we tracked dissolved oxygen levels of experimental systems holding infected or uninfected shrimp

Research Questions

- How does *H. lynni* infection impact host oxygen consumption?
- What variables are predictors of commercial shrimp oxygen consumption?

*H. lynni*-infected shrimp and uninfected shrimp do not consume dissolved oxygen at different rates



**Figure Legend:** Changes in dissolved oxygen (DO) concentration of shrimp systems by *H. lynni* infection status, averages with 95% confidence intervals. DO concentration scaled proportionally relative to initial measurements taken when introducing shrimp into containers.

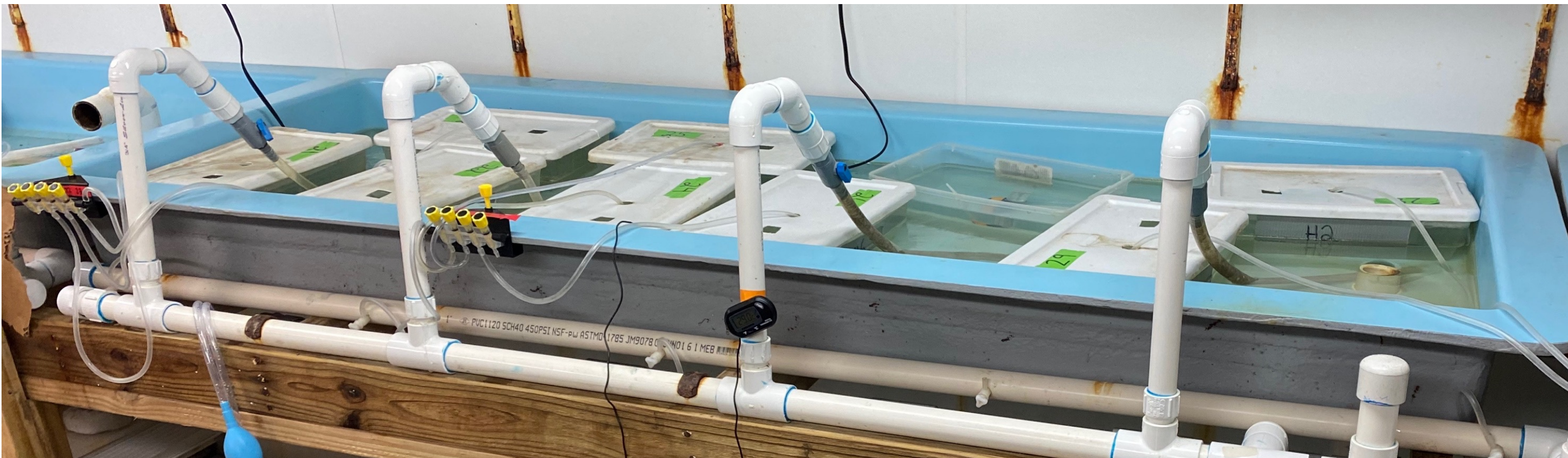
Variable	Coef.	p-value
time	-0.031	<2e-16
sex	-0.044	0.015
gill color	-0.044	3.0e-05
length	-0.004	5.8e-09
temp.	0.017	5.4e-06

**Table Legend:** Summary of variables and coefficients representing a multiple linear regression model of relative DO concentrations. Multiple R-squared =.4518, p-value = <2.2e-16.

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Methods

- Shrimp from local bait shops were individually housed in containers filled with artificial seawater (below) for five days
- A dissolved oxygen probe was used to measure the DO concentration of every shrimp’s water multiple times a day



- Dead shrimp had their gill tissue pulled, scored visually for its color, and ‘diagnosed’ with *H. lynni* infection via a PCR assay
  - Shrimp still alive at the end of the study were euthanized before gill pulling and tissue analysis
- Statistical analysis (including linear modeling) was done in R

Results and Conclusions

- Data visualization, statistical analysis, and modeling all suggest that *H. lynni* infection status is not associated with host oxygen consumption under these particular conditions
  - Other factors though, such as shrimp length, sex, and gill coloration after death, do appear to have significant impacts
- The effects of *H. lynni* infection on other key gill functions (which include acid-base balance and ammonia excretion) warrant further investigation