The effect of female round goby (*Neogobius melanostomus*) size on startle response

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Introduction

- Round gobies (*Neogobius melanostomus*) are a bottom-dwelling fish from the freshwater region of Europe's Black and Caspian seas that has invaded the Great Lakes (Jude et al., 1992).
- Boldness is a behavior that can influence successful invasions (Groen et al., 2012).
- Round gobies in invasion groups have a higher proportion of females (Brownscombe & Fox, 2012).
- In invasion groups, the females have a better physical condition than the males (Brander et al., 2018).
- Male boldness is well described, but it is unknown how females vary in their behavioral response to a startle, a common measure of animal boldness.

Figure 1: Captive Round Goby at SUNY Oswego

Hypothesis & Prediction

Larger female gobies will be more bold and have reduced response to a startle.

- P1: Larger female gobies have a lower latency to resume swimming after a startle.

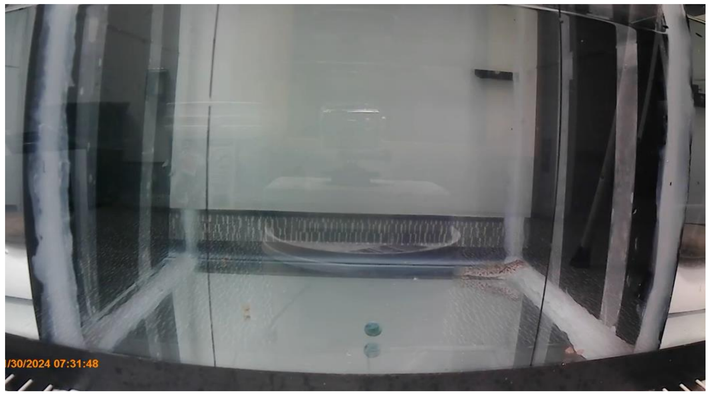

Figure 2. The experimental set up including the marble.

Results

- Seven of out of eight females froze after the startle.
- Larger females seemed to be slower to resume swimming than the smaller females, but there was no significant relationship ($F=0.812$, $df= 1,6$, $p= 0.40$; Figure 3).

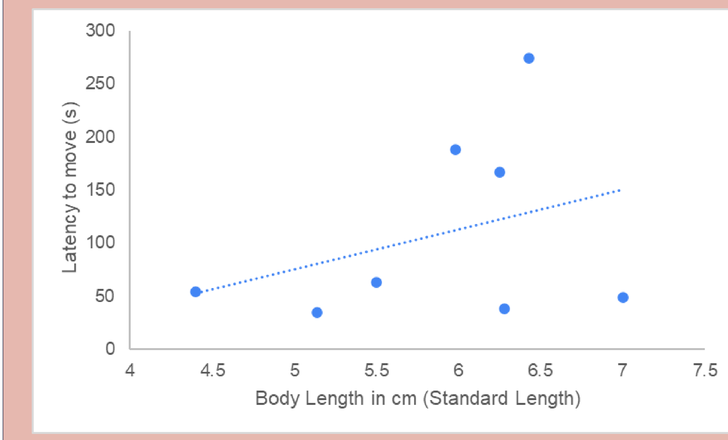

Figure 3. The effect of standard body length on latency to resume swimming after a startle in female round gobies. Higher latency values mean that the individual female was slower to resume swimming.

Methods

- Female gobies (n=8) were collected offshore Lake Ontario using minnow traps and acclimated to lab environments in Summer 2024.
- We assessed startle response in a 40-gallon "test-tank" with two clear acrylic dividers that separated ~⅓ of total volume (Fig 2).
- Females were placed in the tank and after a short time a marble was dropped to stimulate a startle response.
- After trials, fish were measured for standard length (tip of snout to base of caudal fin).
- We recorded initial response to the marble as well as latency to resume swimming for 15 minutes from video recordings using a stopwatch
- We assessed the effect of female size on behavior using linear models.

Discussion

- There was no significant difference between standard body size and latency to move in reaction to the startle response.
- If larger females are less likely to move, it would refute our hypothesis, suggesting similarities to male behavior responses (Synyshyn et al. 2021).
- If size does not have a significant correlation with response, it may suggest that size does not play a role in invasion patterns.
- A startle response behavior in female gobies may not be correlated with standard body length in a lab setting.

Future Directions

- Observe startle response in natural populations of Lake Ontario to determine if behavioral responses in the lab are authentic.
- Determine how reproductive status affects boldness.
- Assess the effects of female size on boldness to inspect a non-startling novel object.
- Measure how the size, shape, and coloration of the startling object affects behavior.

References

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