

In Hot Water: Analyzing Mortality Patterns in Soft Shell Clams Under Thermal Stress

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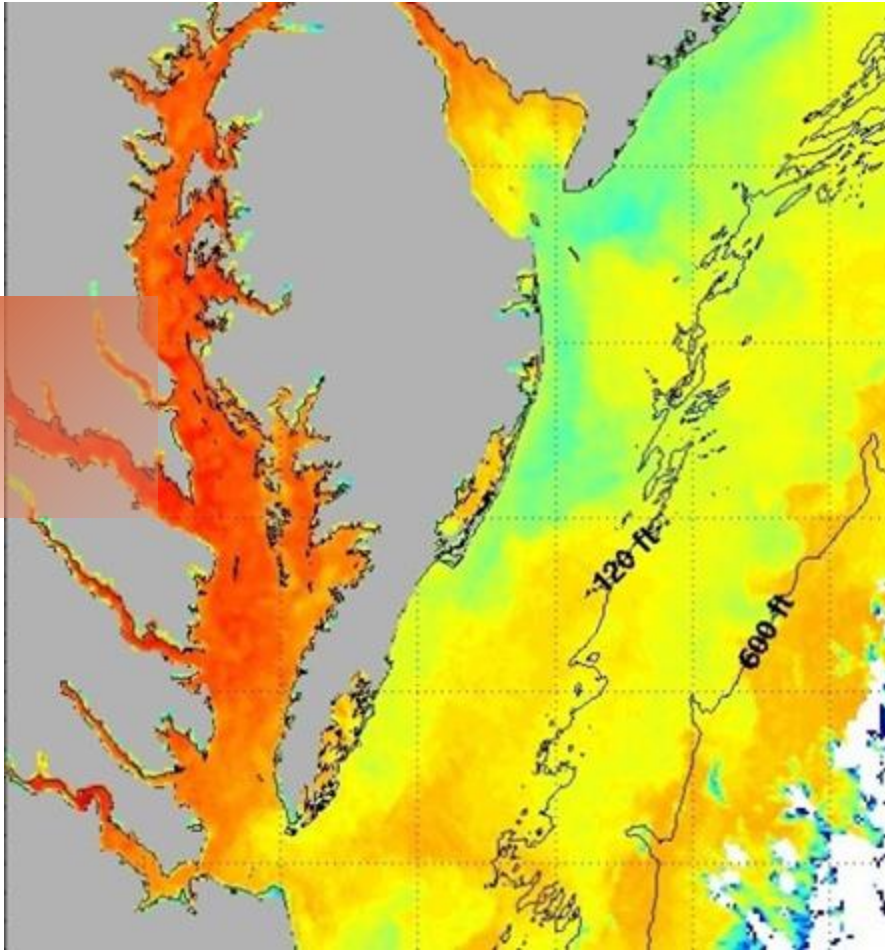
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BACKGROUND

01



ABOUT THE PROJECT

- The need for aquaculture resilience
- Soft shell clam as a candidate... heat as a problem

Project Goals

Assess heat-stress mortality via three factors

1. Size
2. Age
3. Gear

Determine genetic control of heat tolerance

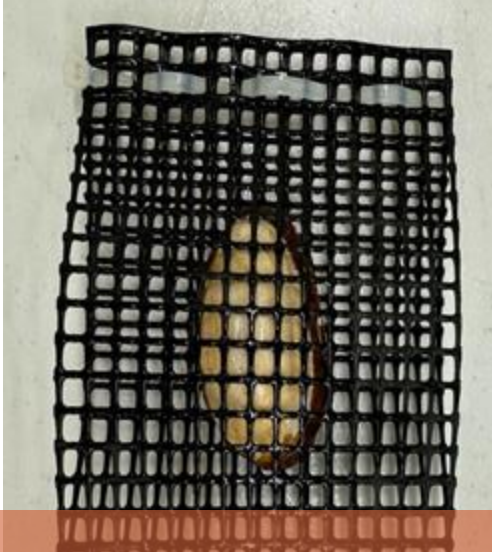
1. Determine gene sequence with tissue samples
2. Selectively breed a heat-tolerant clam

METHODS

A photograph of three people working in a laboratory. On the left, a man with glasses and a grey t-shirt is wearing blue gloves and working with small dark objects on a tray. In the center, a person with reddish hair is also working. On the right, a woman with brown hair tied back, wearing a blue and white patterned t-shirt, is looking down at a laptop. The table is cluttered with various lab supplies: a large clear plastic container, a box labeled 'SAMPLE 200N', a box of pipette tips, a bottle of white liquid, a yellow liquid in a beaker, and several papers. The background shows a typical lab environment with shelves, a door, and equipment.

02

Experimental Design



Grouping

Tank 1: Naked (n=223)

Tank 2: Sandwich (n=94)

Tank 3: Sand Bottle

(n=75)

Tank 4: 1 and 2 year old
juveniles (n=323, 119)

Temperature

Tanks were ramped at 1°C per day until a temp of 28°C or higher from natural water temp

Monitoring

Mortality checks were performed

daily

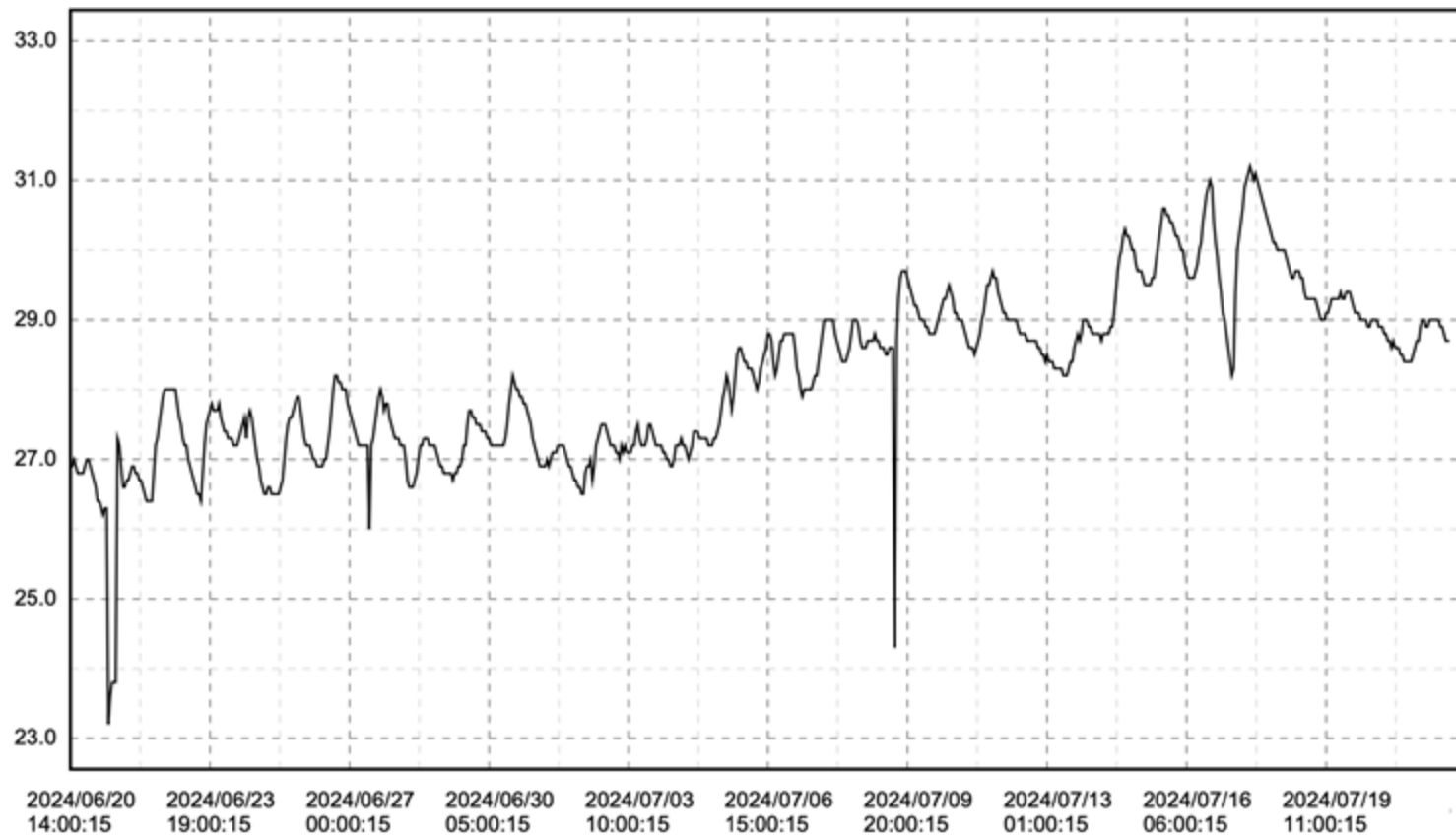
Genetic sampling was performed

on all frozen mortalities

Temp was continuously recorded

and water changes were performed as needed

Temperature Monitoring



Genetic Sampling



Clams were
given a tag and
had their size
recorded



Then, adductor
muscle tissue
samples were
collected and
preserved for
analysis

Total Dead Clams: 765

Time Spent Sampling: 25 hours

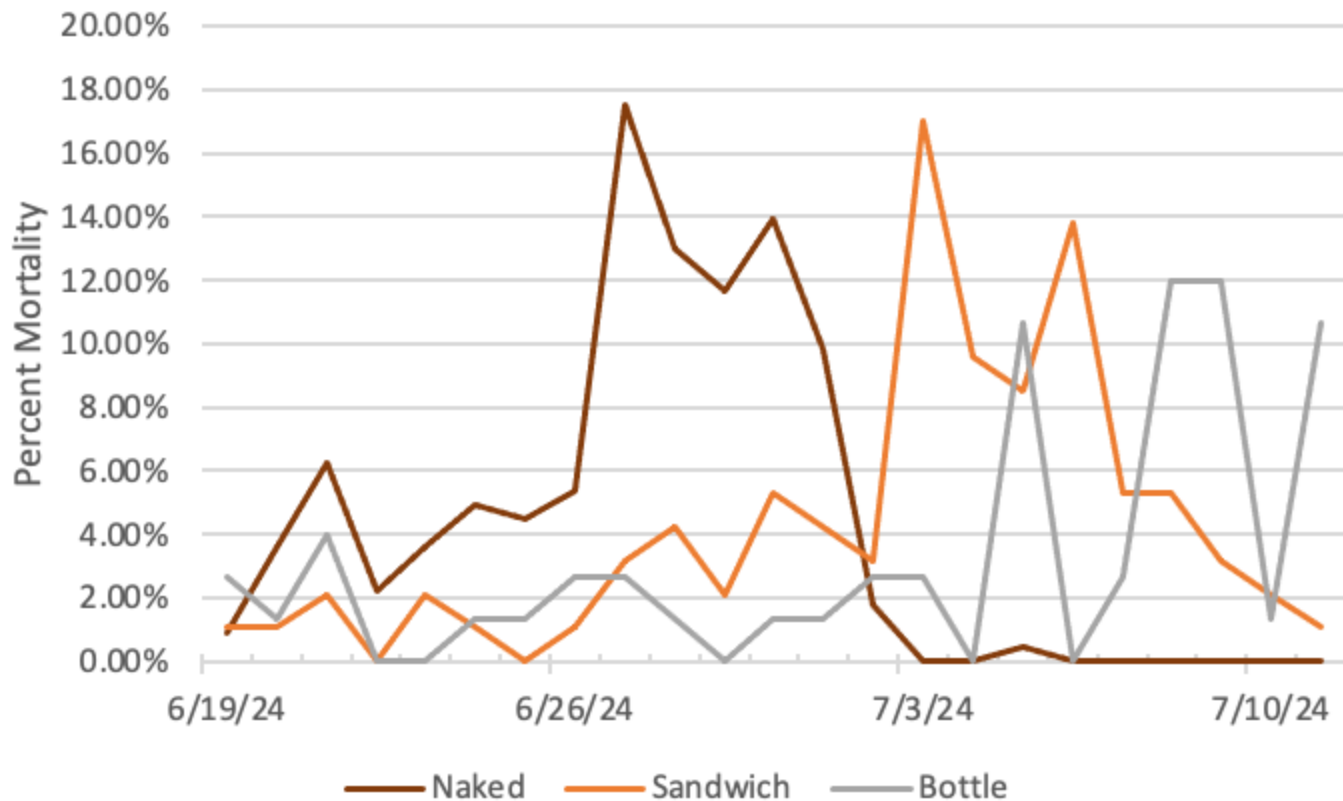
Total Caliper Distance: 105 feet



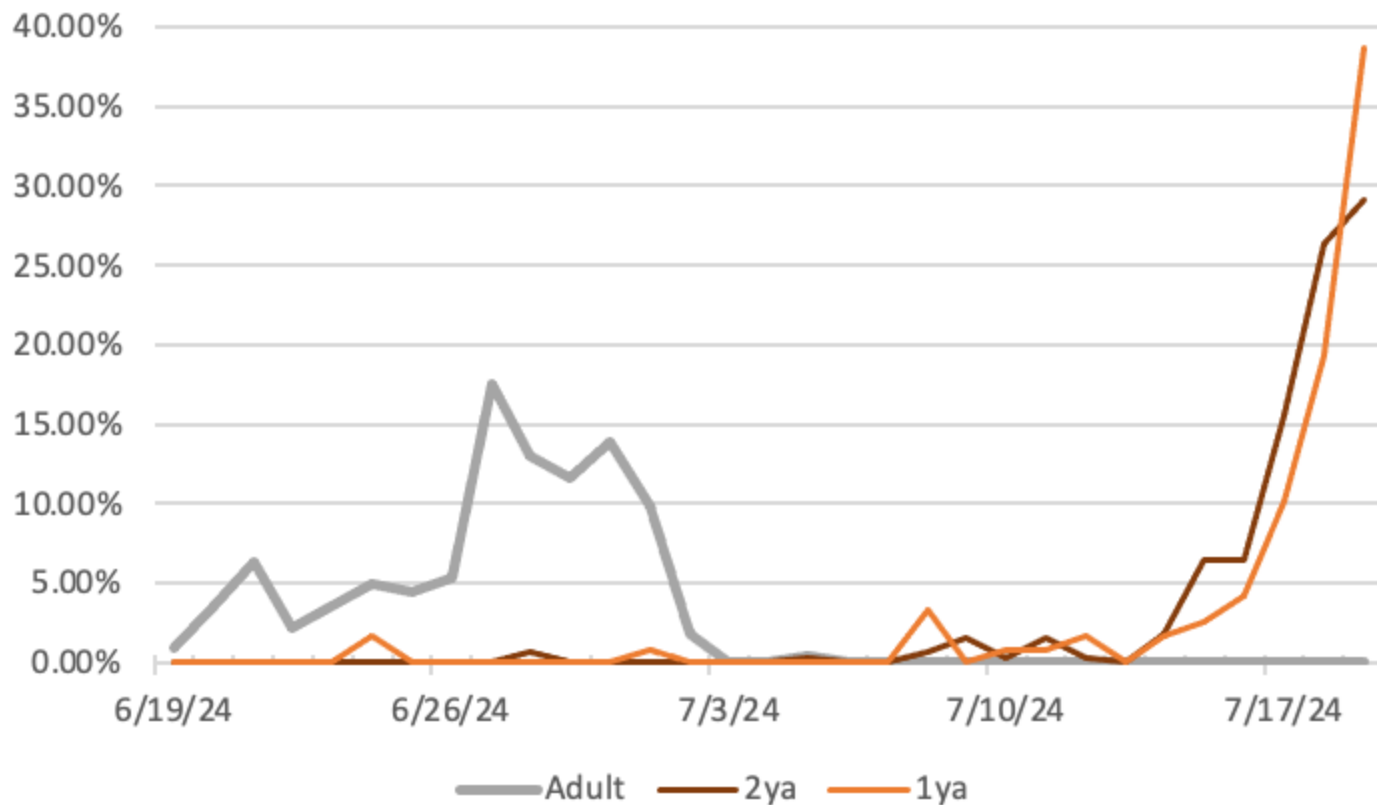
RESULTS

03

Mortalities by Group



Mortalities by Age

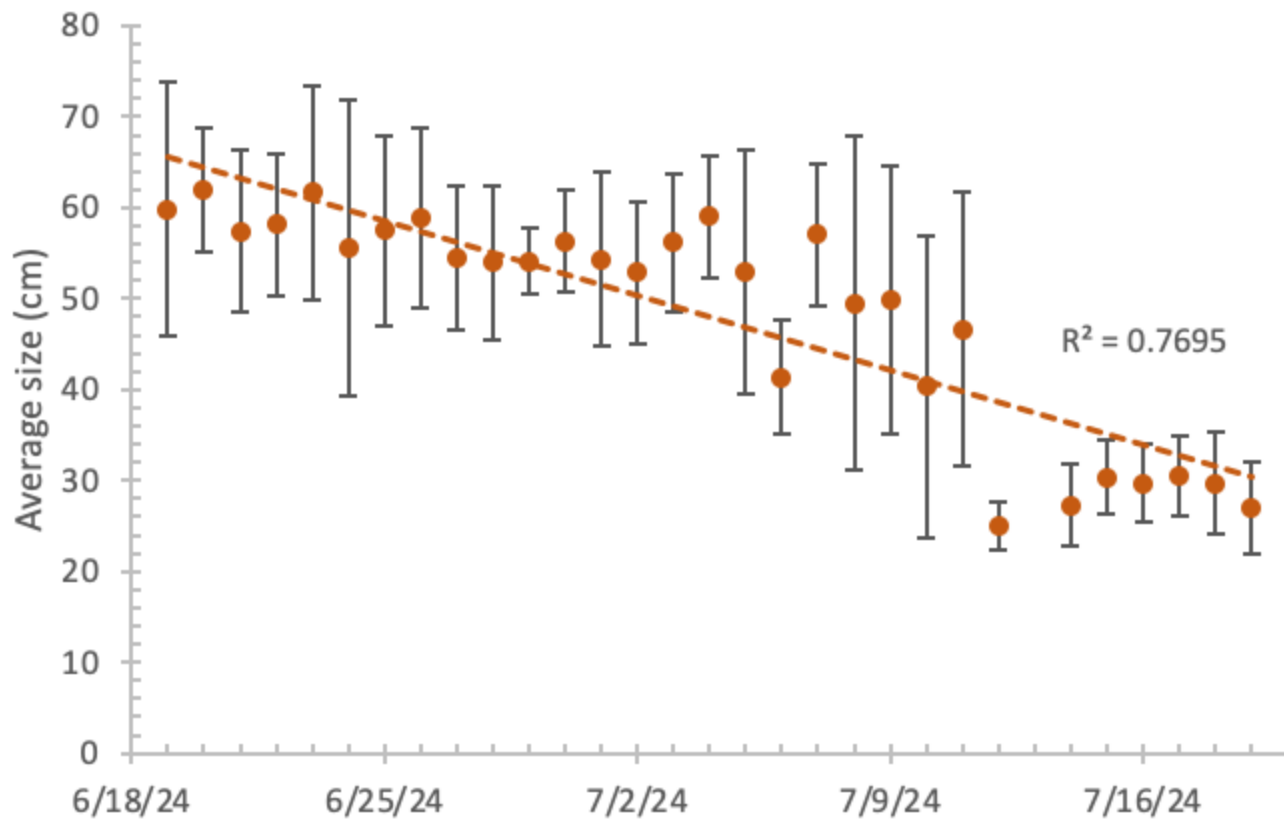


Average Sizes-
1ya 22mm

Adult: 56mm

2ya: 31mm

Average Size by Day





And, we have our survivors for future broodstock



CONCLUSIONS

A photograph of a biology laboratory. In the foreground, a female student with brown hair in a ponytail, wearing a grey t-shirt, is seated and looking through a microscope. To her right, a male student with blonde hair, wearing a black t-shirt, is standing and looking down at a large, clear plastic bag. On the lab bench, there are two white plastic cups with blue labels that read '7/24-082' and '7/24-082'. There are also pipettes and other lab equipment. In the background, another student is partially visible, and a glass partition with several small photos pinned to it is in the background.

04

Conclusions

Age

Juvenile soft shell clams have stronger heat tolerance than adults

Gear

Sand based housings allow for the longest periods of heat tolerance, and compression gears are better than loose (naked) clams

Size

While there is some correlation between size and heat tolerance, the large margin of error doesn't allow for a relationship to be declared

Genetics

We have all genetic samples and survivors for the future work of gene determination and line creation

Acknowledgements



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1. Brittany, Ming, Leigh, Jon, and Randy for their guidance
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6. U.S. Senators Ben Cardin and Chris Van Hollen
7. All the other interns who provided support along the way
8. The Aquaculture Intern Tape Ball ♥

Tape ball Weight: 211g

A photograph of three young people in a workshop or classroom. On the left, a person with glasses and a blue shirt is working at a table. In the center, a person with blonde hair and a dark shirt is standing. On the right, a person with a mustache and a grey t-shirt is smiling. The t-shirt has a logo that says 'MARY'S' and 'EST. 1971'. The background shows shelves with various items and a wooden structure. A large orange semi-transparent rectangle is overlaid in the center, containing the text 'Thank You' in white. There are also orange semi-transparent rectangles in the top right and bottom left corners.

Thank You