

Investigating cost-effective and efficient ways to set oyster (*C. virginica*) larvae

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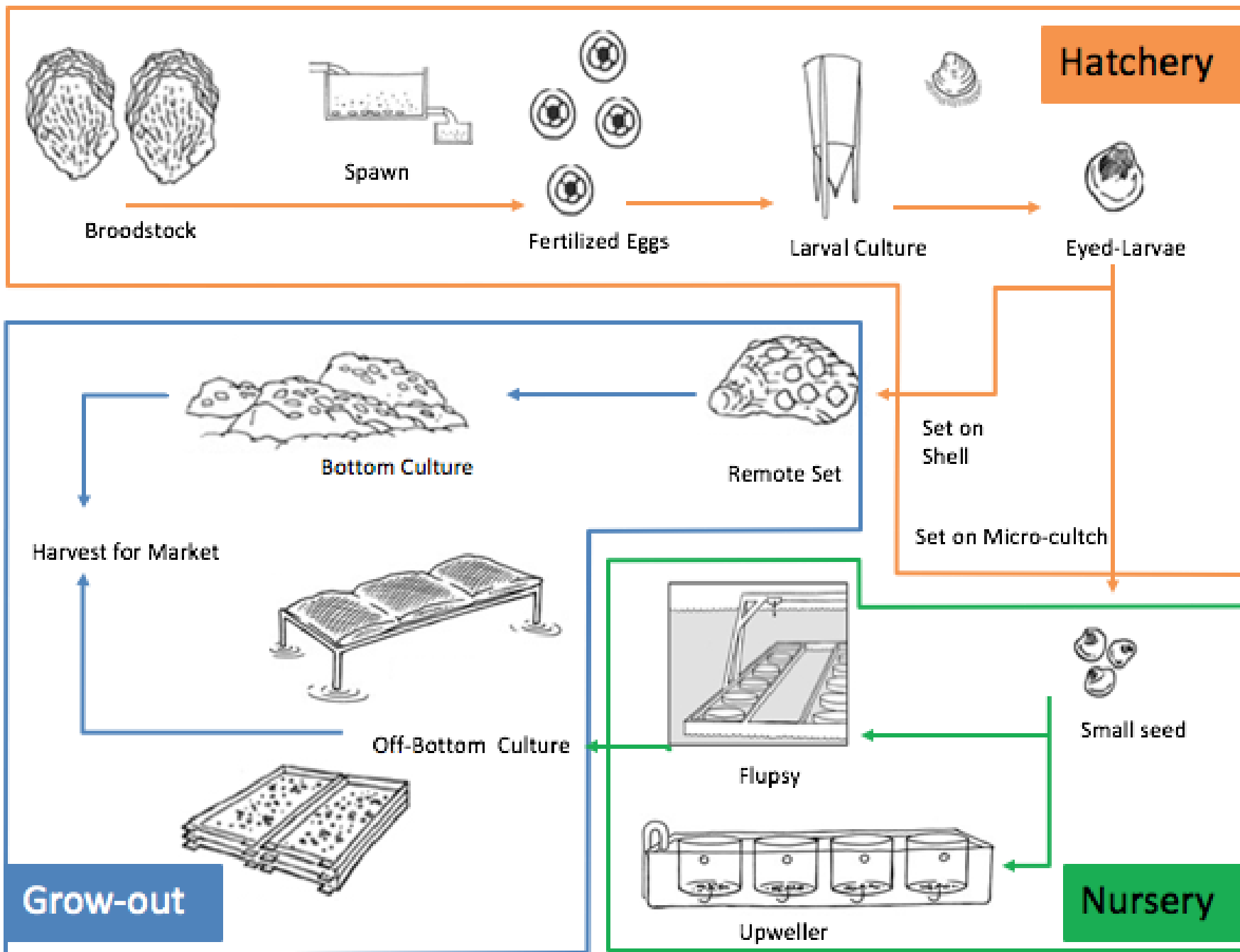
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Importance

- Finding a more cost-effective way to set oyster larvae would benefit both aquaculture and restoration
 - Production of more oyster seed/spat from same amount of larvae/increased setting efficiency
 - Methods could easily be used in both farm operations and restoration projects using existing equipment





What affects oyster settlement?

- Oyster culture is affected by factors such as:
 - temperature and salinity
 - water circulation
 - the presence and condition of substrate
 - availability of food
 - presence of predators and disease

Research Questions

- How does different cultch affect oyster settlement (micro-cultch shell, aragonite, sand)?
- How do different dissolved calcium levels affect oyster settlement?

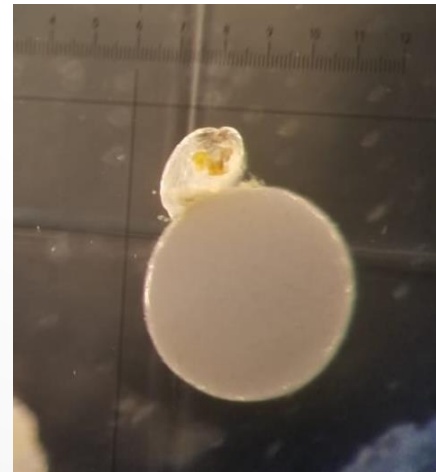
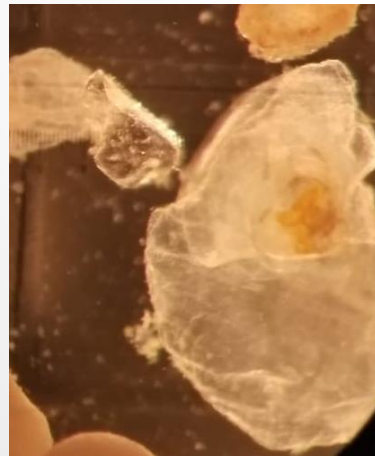


Cost

- Shell Flour- \$9-10/pound
- Aragonite- \$11/50 lbs
- Sand- \$5/50 lbs

Hypothesis

- I hypothesize that higher dissolved calcium levels will increase oyster settlement. Additionally, oysters will best settle on the shell flour, followed by aragonite, and then sand.

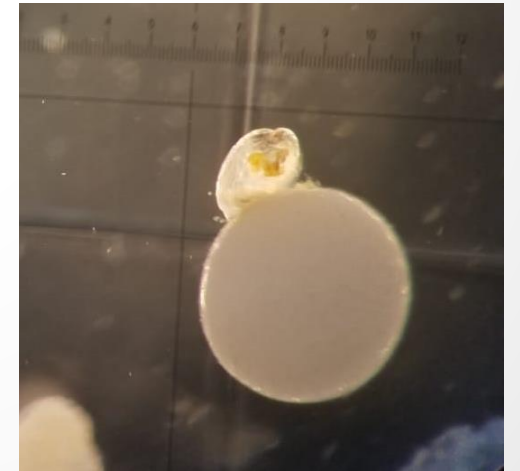


Methods

Experiment #1

- 1 tank, 3 silos/tank
- 3 types of media mixed together (pulverized), 1 tbsp each:
 - Aragonite (M1)
 - Sand (M2)
 - Shell (M3)
- salinity level: 10 ppt

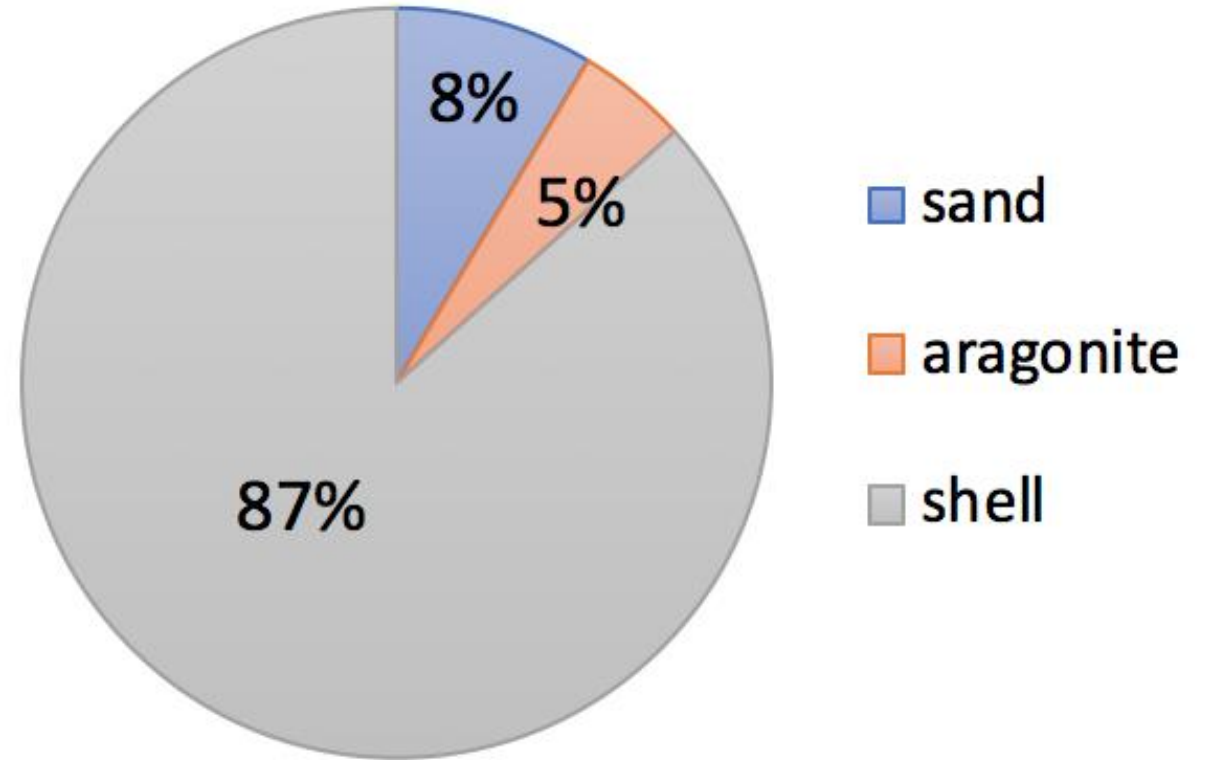
- Quantify how many larvae have set in each treatment
- Distinguish conversion rate from larvae to seed between kinds of media



Results

Result #1

Oyster set rate in different substrates

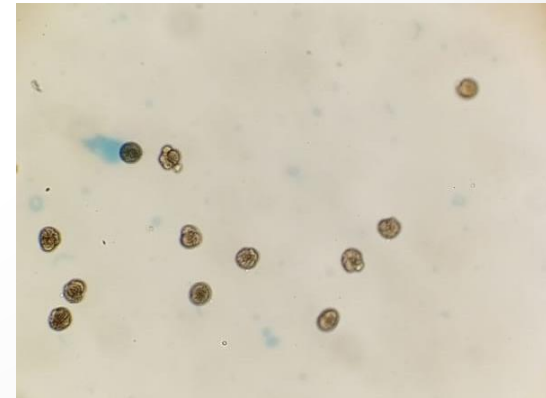
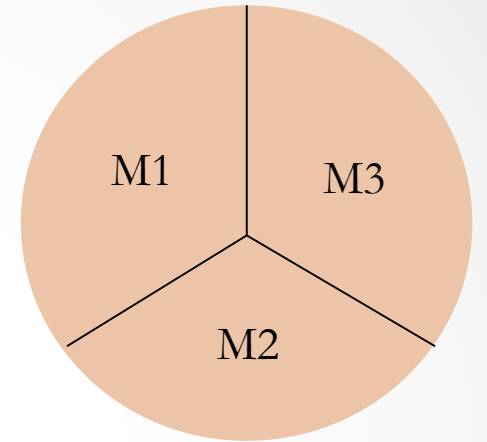


Percentage of oyster larvae set in different substrates.

Methods

Experiment #2

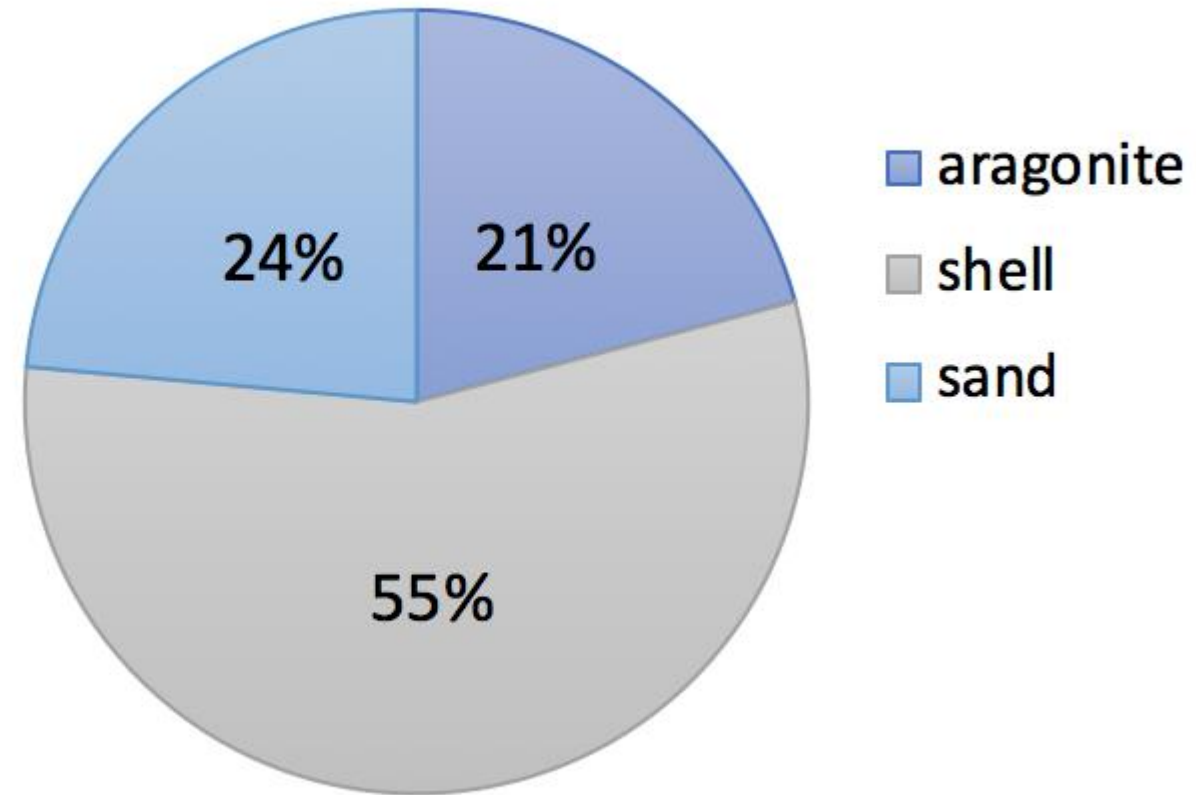
- 1 tank, 3 silos/tank
- 3 types of media (pulverized), 1 tbsp each:
 - Aragonite (M1)
 - Sand (M2)
 - Shell (M3)
- salinity level: 10 ppt
- Distinguish conversion rate from larvae to seed between kinds of media



Results

Result #2

Oyster larvae set (%)

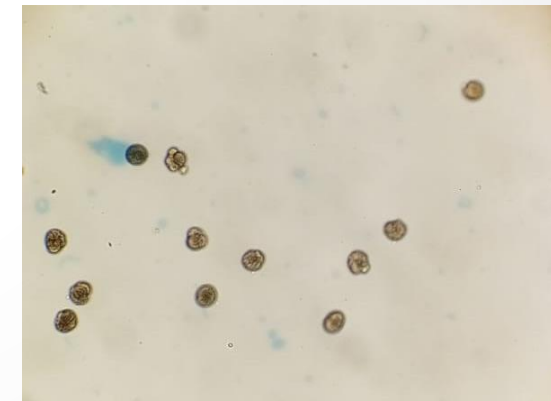
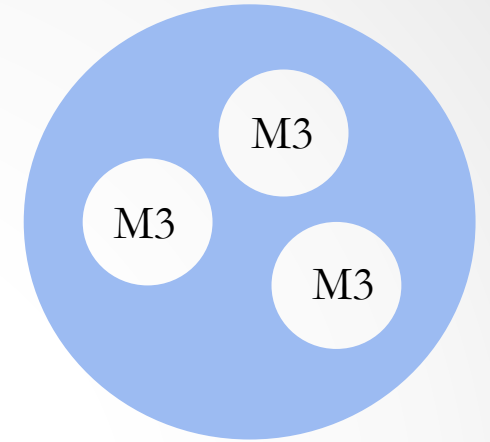


Percentage of oyster larvae set in different substrates (n=9, Kruskal Wallis, $P > 0.05$).

Methods

Experiment #3

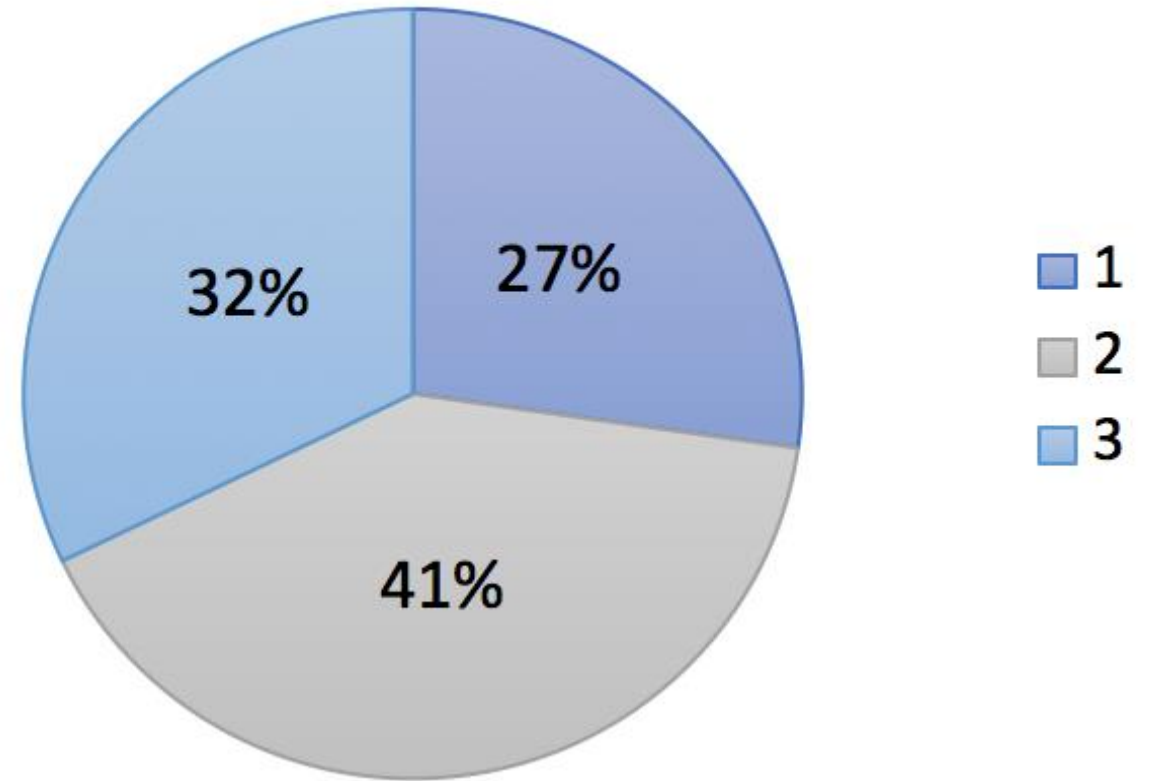
- 3 tanks total, 3 silos/tank
- 1 tbsp of pulverized shell flour (M3)
- salinity level: 10 ppt
- dissolved calcium levels:
 - 150, 300, 350 mg/L
- Distinguish conversion rate from larvae to seed between treatments



Results

Result #3

Oyster set rate at different calcium levels



Calcium levels (mg/L)

Tank 1 = 325

Tank 2 = 350

Tank 3 = 180 (raw river water)

Oyster set rate on shell flour in differing calcium levels (n=3, ANOVA, $p > 0.05$).

Statistical Analysis

- For experiment #2
 - A Kruskal Wallis test was used to determine whether there was a statistical significant difference between the set rates in the different substrates
- For experiment #3
 - An ANOVA test was used to test if there was a significant difference in larvae conversion rate due to the concentration of dissolved calcium

What
could've been
done better?

- A method to quantify the amount of material/larvae taken from the silos in Experiment 1
- Making all the micro-cultch the same size
- A better and more reliable calcium test kit
- More research needs to be done on adjusting the calcium levels in brackish water
- More time allowed for oysters to set and grow

Other Experiences

- Collecting oyster larvae from larval culture tanks
- Feeding oyster larvae
- General oyster husbandry
- Oyster spawning (strip and natural)
- Zooplankton collection in the mesocosm tanks



Thank you!

Amber - For teaching me so much, always advising me

Jon Farrington - Helping with the experiment, funding this project, setting up
the place

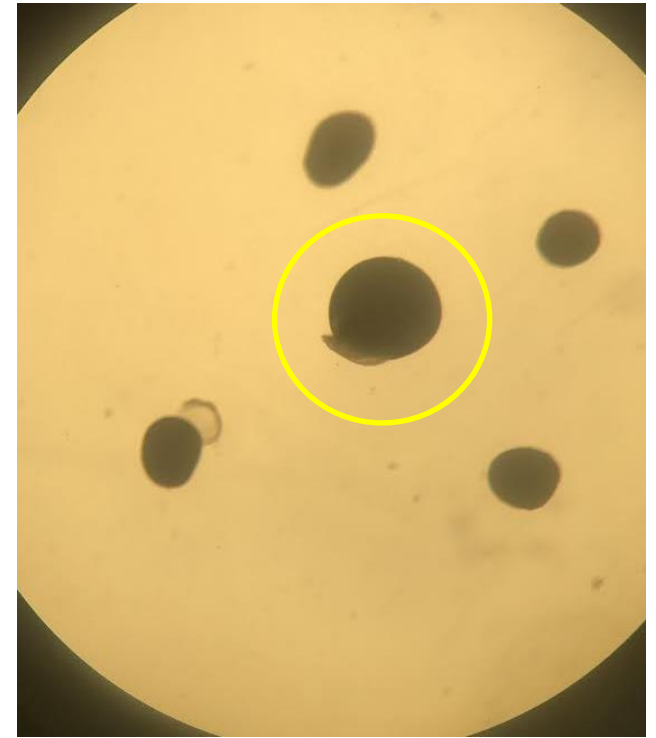
Richard L. - Constant help with anything going on

PEARL Lab

shell



Questions?



aragonite