



MORGANTM

PATUXENT ENVIRONMENTAL AND
AQUATIC RESEARCH LABORATORY

Comparisons of Three Algae Diets for Eastern Oyster Production

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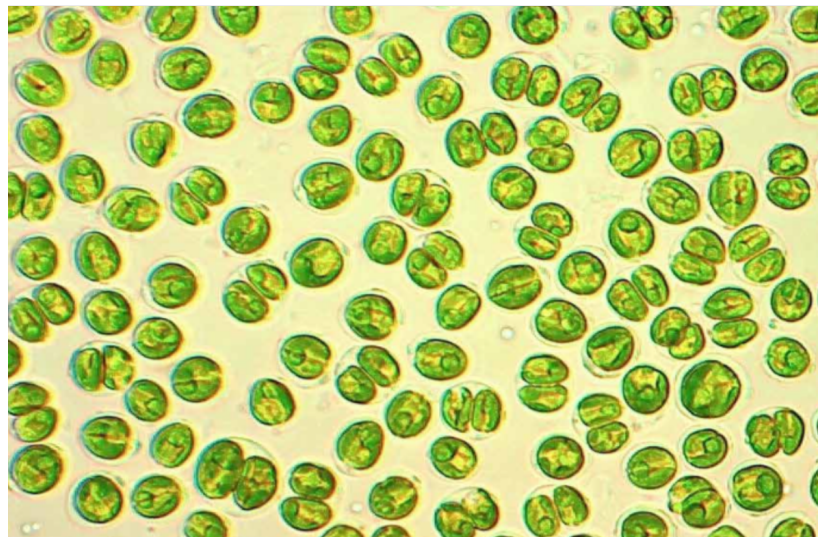
August 5th 2021

Background

- Hatchery plays an important role in oyster aquaculture by producing oyster seed for growers. Work towards survival and growth.
- Microalgae, the food of oysters, is a critical element throughout the whole process of oyster production in the hatchery.



PEARL Hatchery



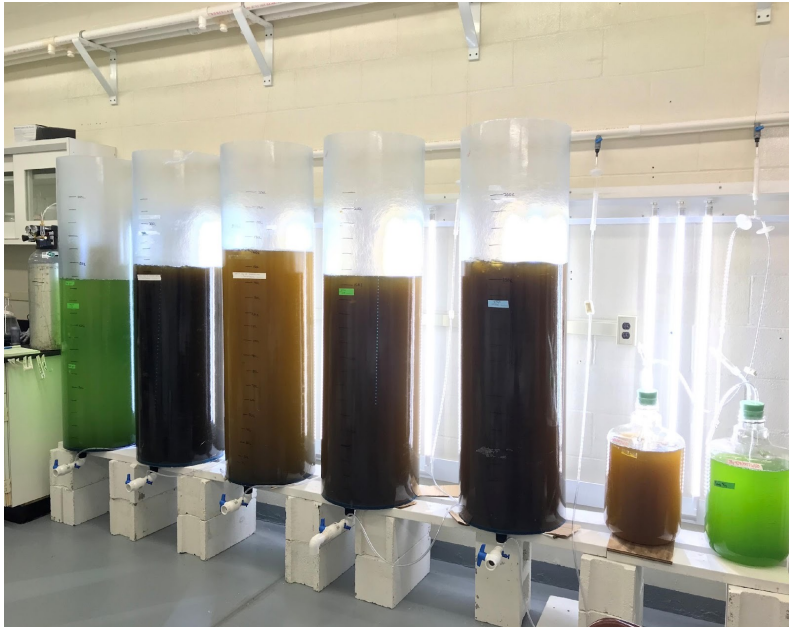
Microalgae, *Photo By Eric C Henry*



Oyster Seed

Three Microalgae Products:

Which algae product positively impacts not only the growth of oysters, but the quality and quantity of their larvae?



Lab cultured live algae

Pros:

- Live algae, fresh

Con:

- Labor intensive, expensive, easily contaminated



Shellfish Diet

Pros:

- Low cost, easily stored, dense, little for a lot

Cons:

- dead algae



Avespa

Pros:

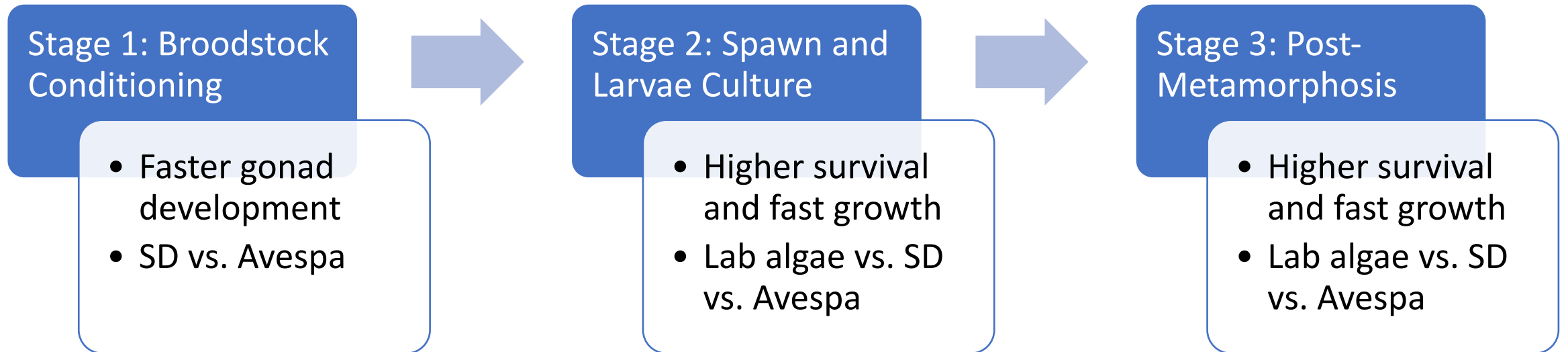
- Live algae, high density, easy to store/use

Cons:

- Cost

Objective:

Compare the effectiveness of three algae products in eastern oyster broodstock fecundity, larvae growth and survival, and validate the Avespa algae product as an alternative feed with a potential for commercial-scale oyster aquaculture.



Stage 1: Brood-Stock Conditioning

- 4/15-4/22, increase the water temperature 1 °C per day, and stay at 22 °C
- 4/23, start feeding with the algae at the same density
- Record the daily temperature and salinity of ambient water and the tank water
- Clean the tank three times per week
- Used peristaltic pump



Stage 1: Broodstock Conditioning

- Visual fecundity
- Comparison of weight



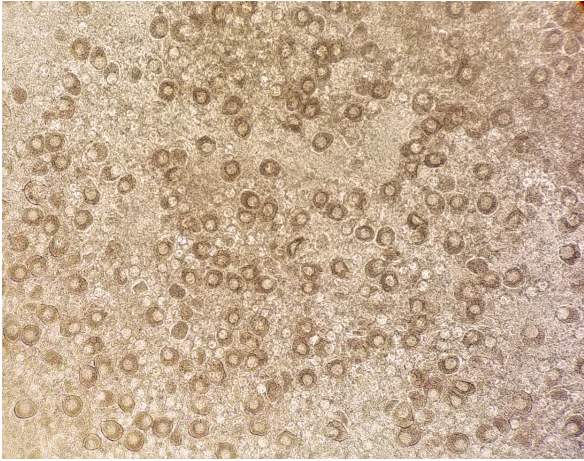
Shellfish Diet



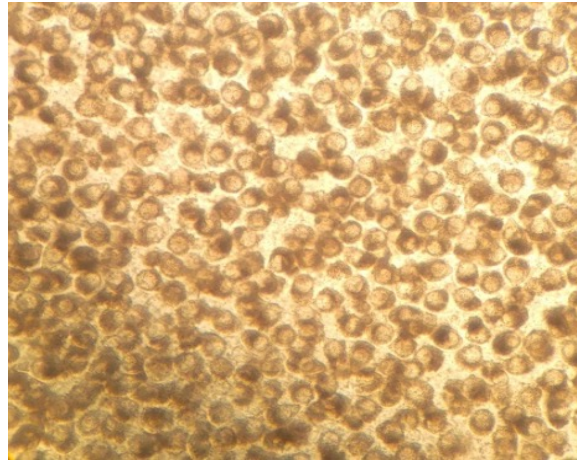
Avespa

Gamete Grading

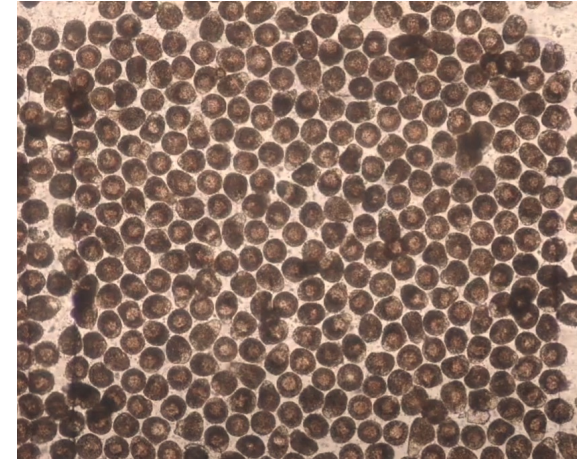
Gamete Grading: May 24th



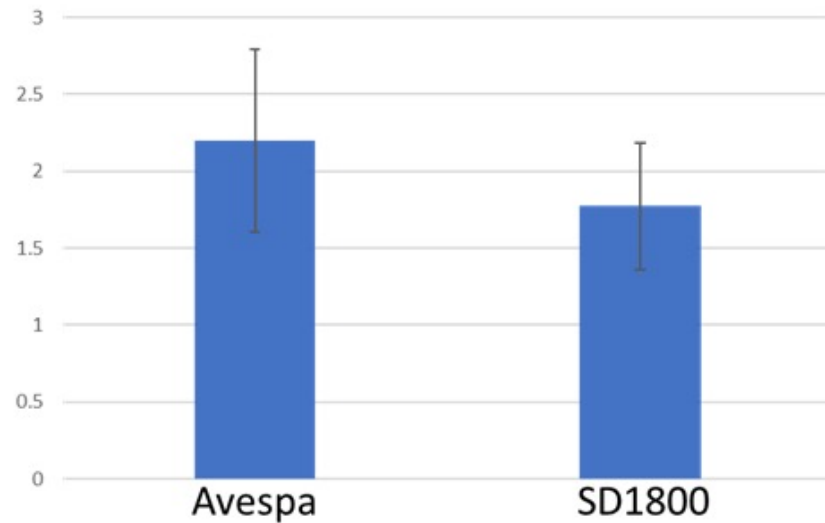
Grade 1



Grade 2



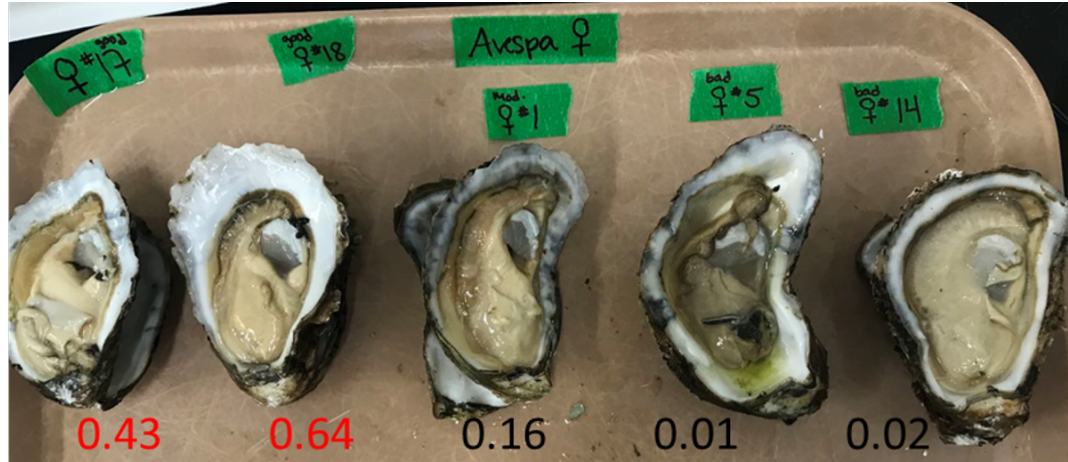
Grade 3



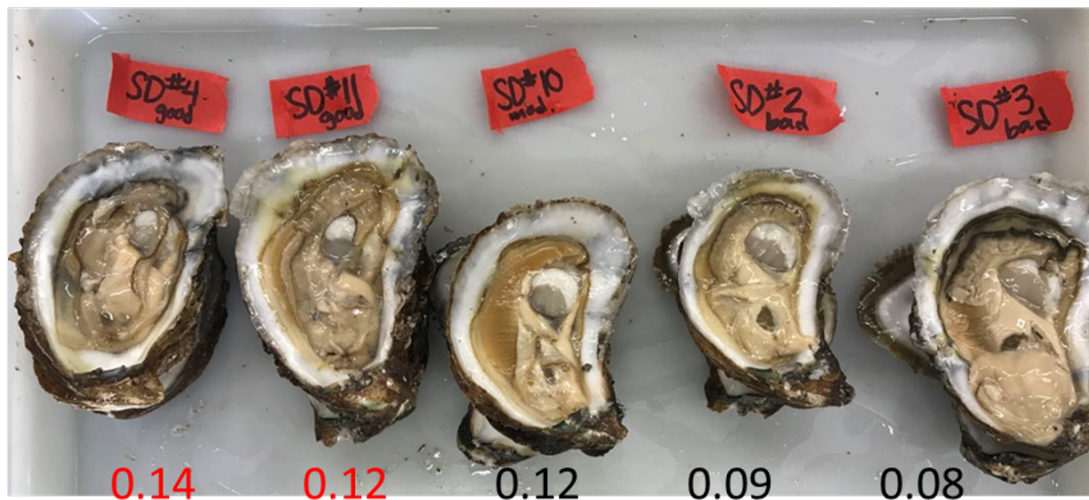
T-Test P = 0.02

Stage 1: Broodstock Conditioning

- Relative egg number = absolute egg number/meat weight



- Sampled 5 females from each group
- Chose the 2 best and 2 worst
- Counted their absolute egg number/meat weight



Stage 2: Spawn and Larvae Culture

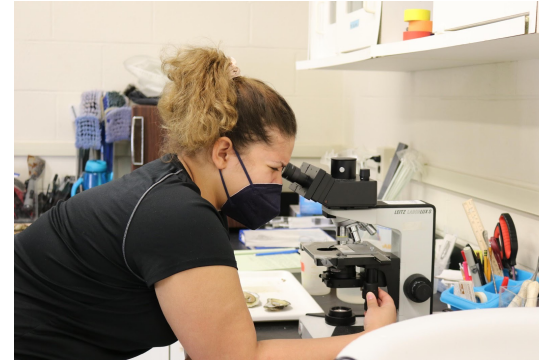
- Spawning process



Shuck oysters



Sample



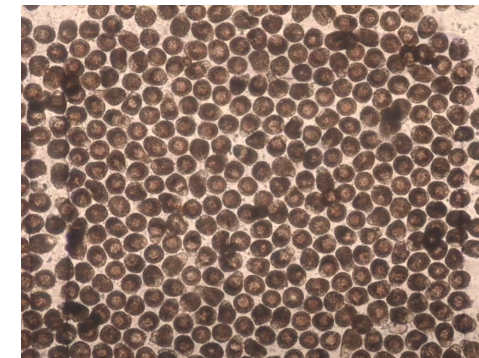
Sex Identification



Male Sperm



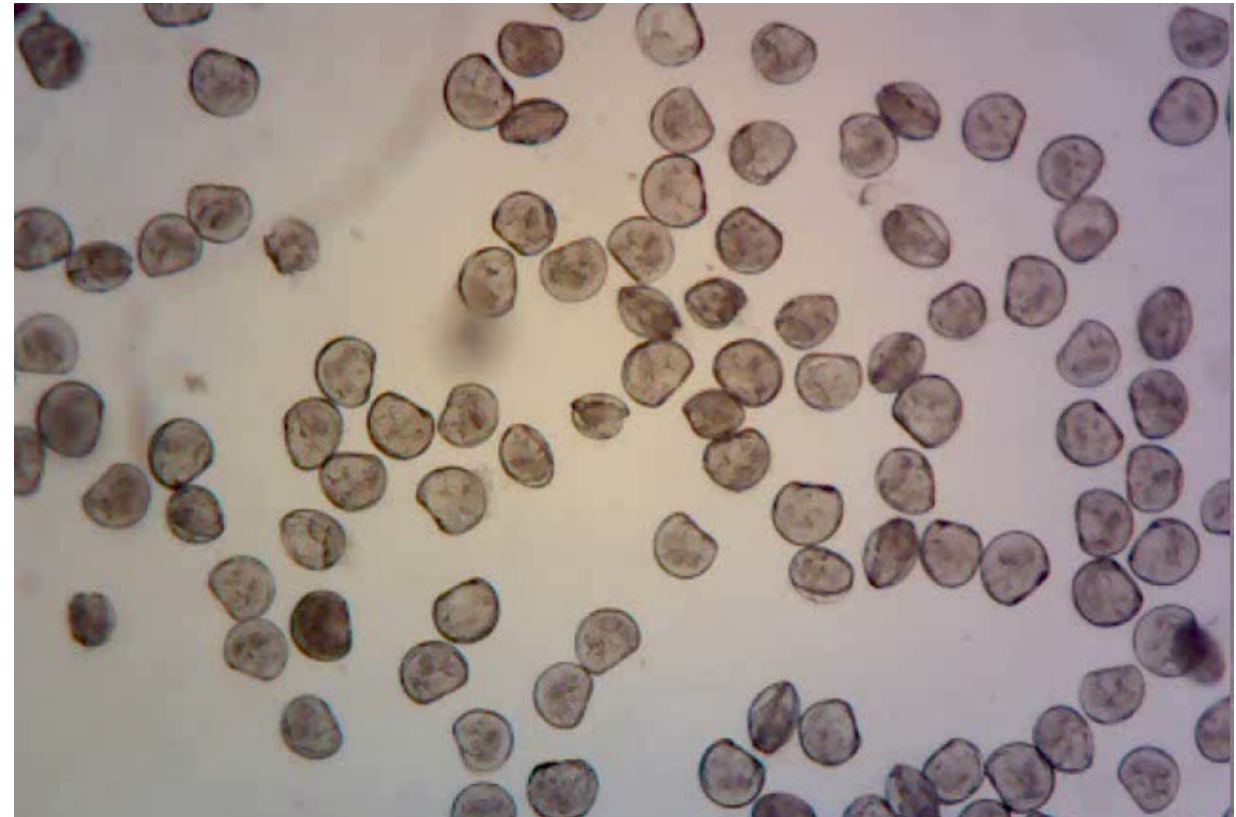
Strip Spawning



Female Eggs

Stage 2: Spawn and Larvae Culture

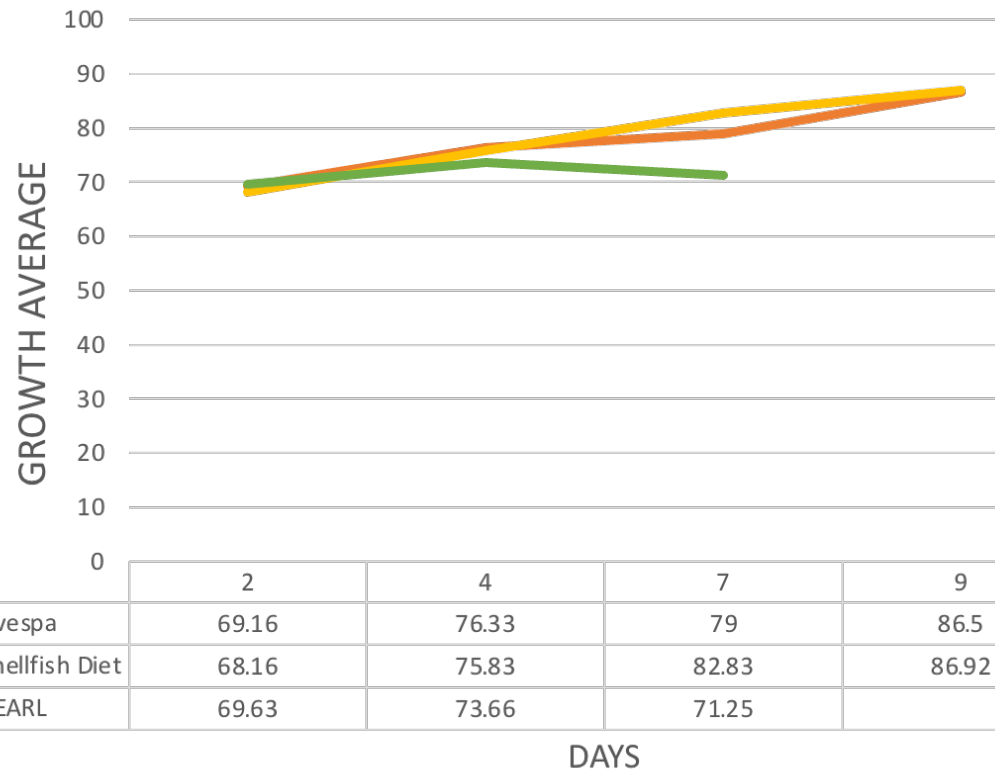
- Tank setup



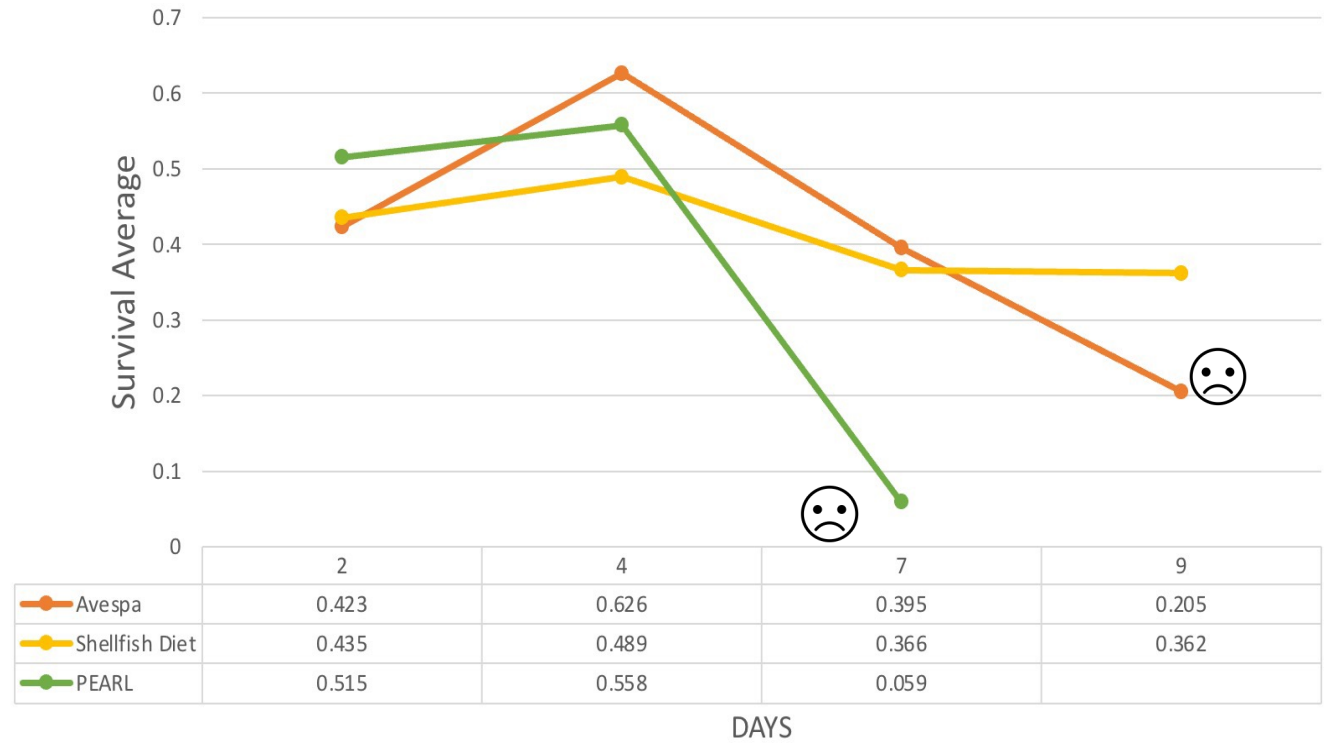
Larvae Growth and Survival Data

- Larvae growth and survival

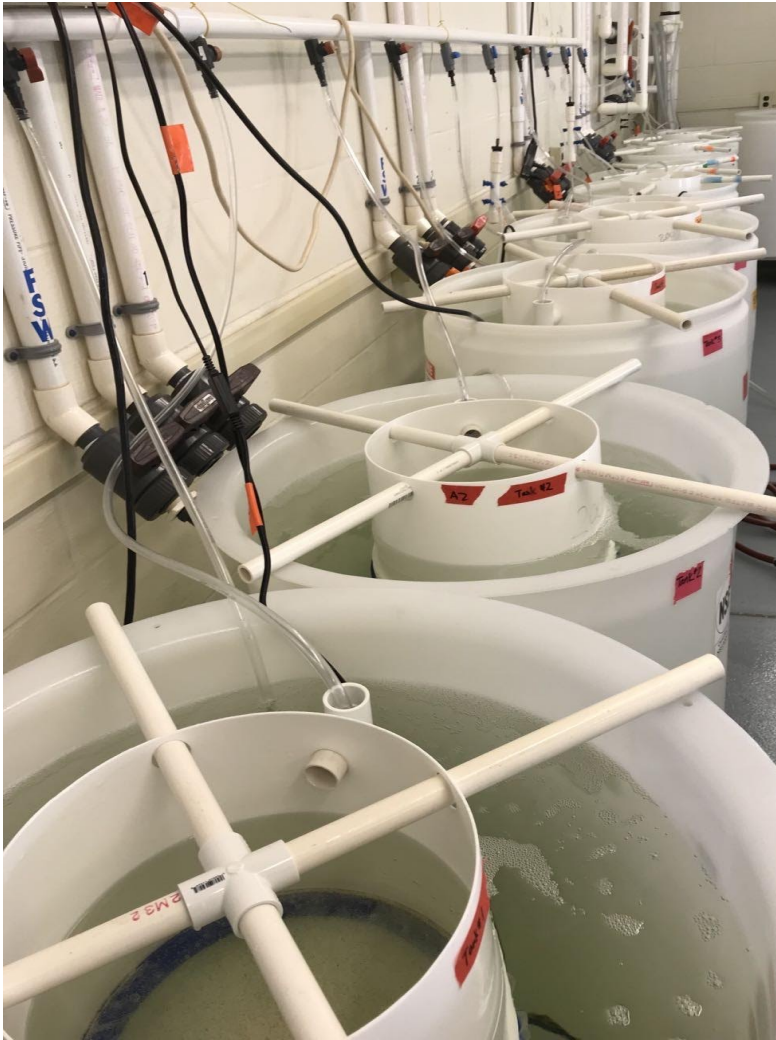
Larvae Growth



Larvae Survival



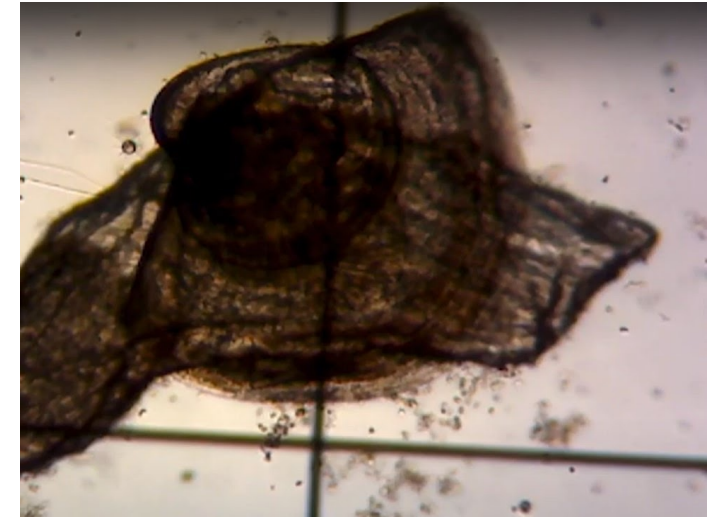
Stage 3: Post Metamorphosis Larvae Culture



Downweller



Eyed larvae before metamorphosis

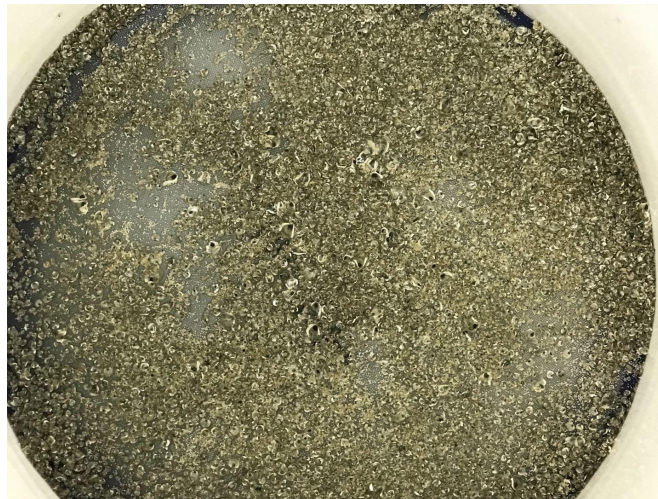
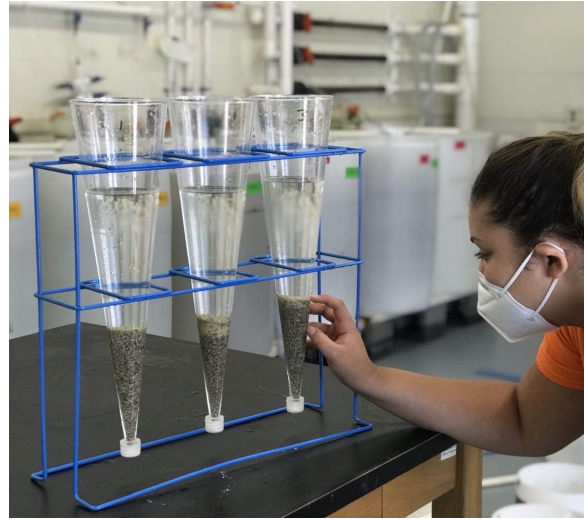


After metamorphosis, settle on micro cultch

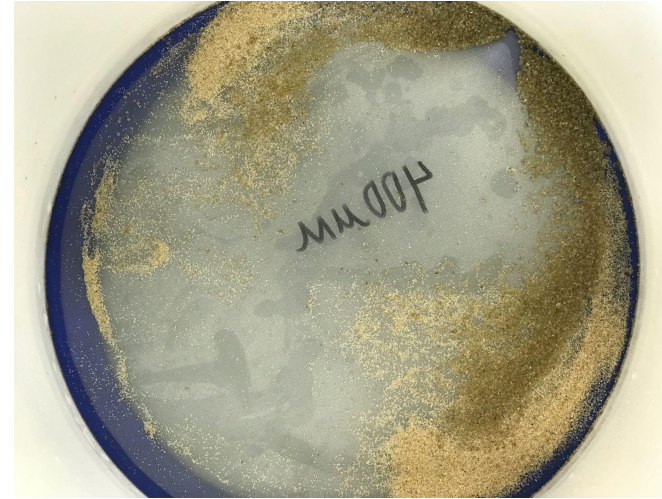
- Purchased 400k eyed larvae from HPL
- 3 groups: Avespa, Shellfish Diet, PEARL algae
- 44k/silo
- Start from July 2

Stage 3: Post-Metamorphosis Larvae Culture

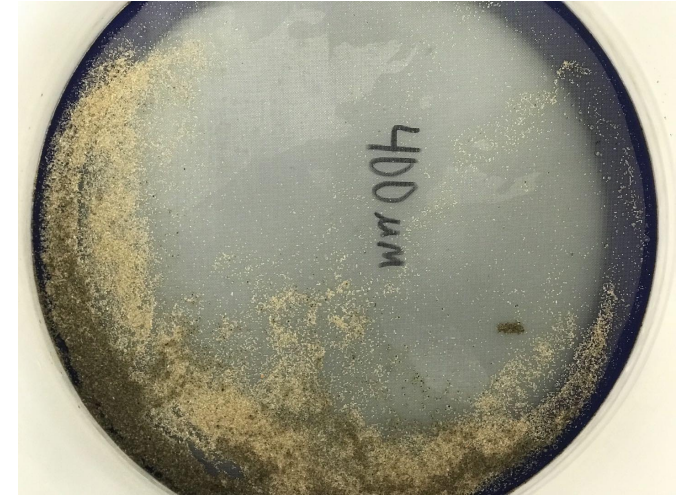
- 7/20 , taking count on oysters per silo
- 18 days of growth
- Took individual samples from each group



Avespa



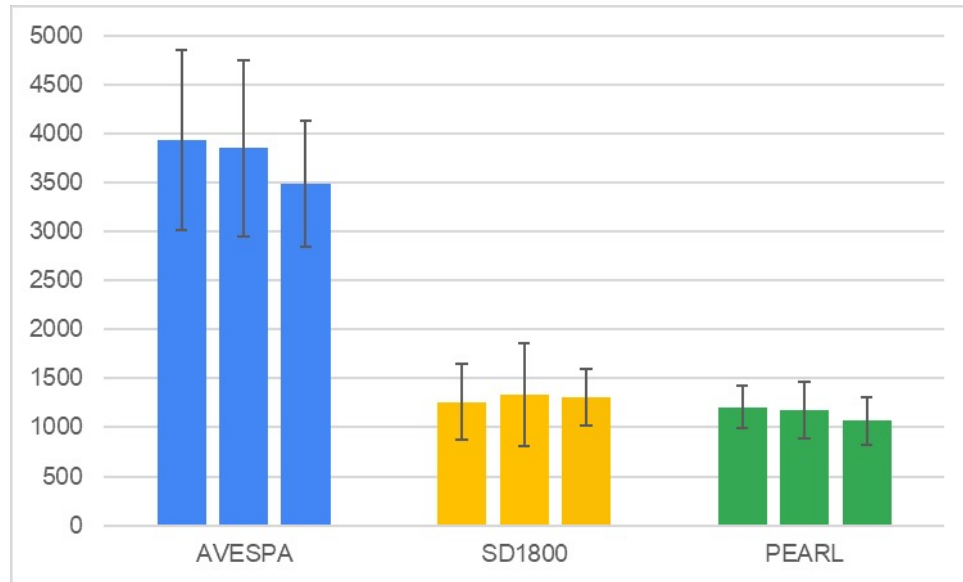
Shellfish Diet



PEARL Algae

Stage 3: Larvae Growth and Survival Data

Growth



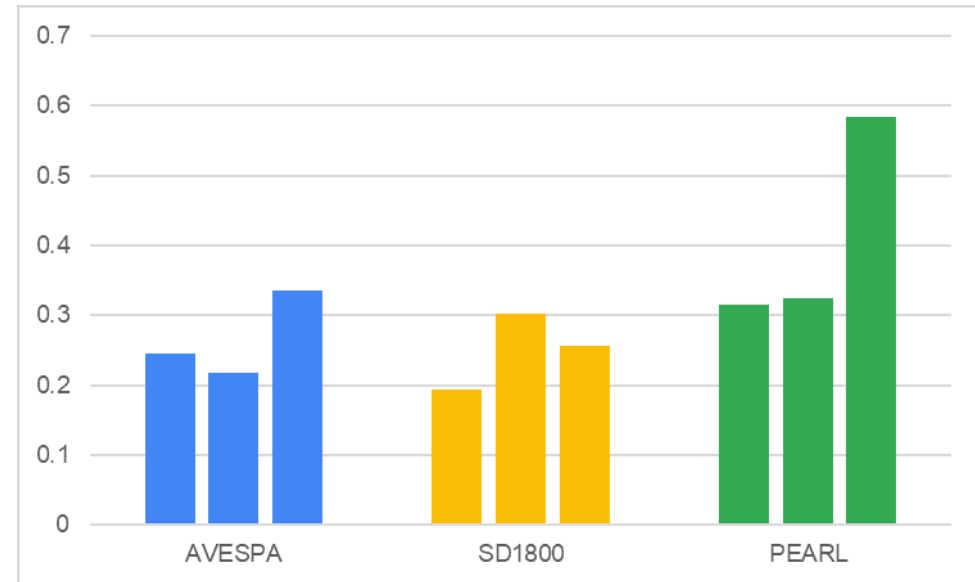
Ave: 3758.3 1300.4 1150.8

T-Test:

Avespa vs SD 1800 $P < 0.001$

Avespa vs PEARL $P < 0.001$

Survival



Ave: 0.27 0.25 0.41

T-Test $P = 0.122$

Conclusion

- Stage 1: Avespa broodstock conditioned faster than the SD1800 oysters
- Stage 2: The results were inconclusive because of the unexpected larvae crash; this stage will be repeated next year.
- Stage 3: Avespa fed larvae has significant faster growth than SD1800 and PEARL

Acknowledgments



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Thank you!