

**NOAA  
FISHERIES**

# Sea Scallop Research at the NOAA Fisheries Lab in Milford, CT: An Update and a Look Forward

New England Fishery Management Council  
Scallop RSA Share Day, May 5<sup>th</sup> 2022

NOAA Fisheries/NEFSC/Milford, CT  
Mark S. Dixon

# Shellfish Aquaculture

Shellfish farming and restoration is critical to get more oysters, clams, and mussels in the water for food, jobs, and ecosystem services. We are working with partners to address environmental research, spatial planning, permitting, restoration, and farming techniques for shellfish aquaculture.

NOAA Office of Aquaculture

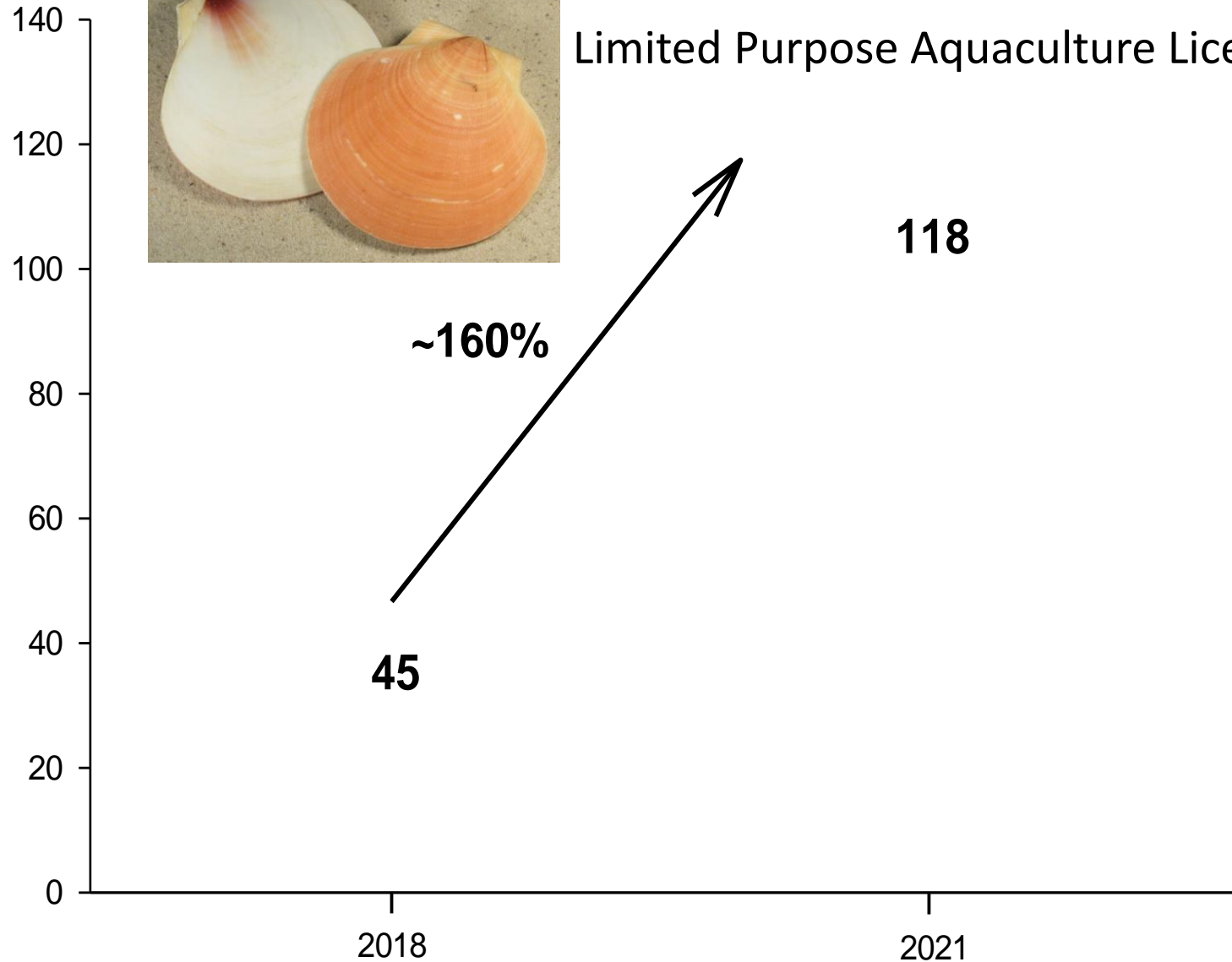


# Maine

## Limited Purpose Aquaculture Licenses



LPA Licenses



20% of current  
experimental and  
standard leases  
list sea scallops as  
an approved species

# Current Status

- Relatively small industry
- Roe-On, whole animal product
- Expected expansion of products offered
- Industry driven growth expected
- Relies 100% on spat collection from the wild
- May not be sustainable/reliable to support industry expansion

# Challenges to Sea Scallop Aquaculture in Coastal Maine

- Spat collection
- **Transitioning from spat collection to hatchery seed production**
- Long larval phase
- Summer temperatures
- Harmful algal blooms
- Permitting
- **Site Selection**
- Protected species interactions
- **Changing oceanic pH**

“To date, we are one of the largest farms in Maine and **exclusively farm sea scallops**, reaching markets across the country with our whole and shucked product. Given our aggressive growth strategy **in order to reach a sustainable business state we are relying on a steady and dependable source of seed, lots of seed**. It is for this reason we are incredibly supportive of this project and we are **looking forward to the security that will be provided by having a hatchery seed source.**”

Andrew Peters  
Deep Blue Aquaculture, LLC, Belfast Maine



A collaborative approach to investigate hatchery culture methods to produce commercial quantities of sea scallop, *Placopecten magellanicus*, spat for farmers in Maine.



# Hatchery Implementation Team HIT

## Research Collaborators

University of Maine Darling Marine Center

Maine Aquaculture Innovation Center

Mook Sea Farm

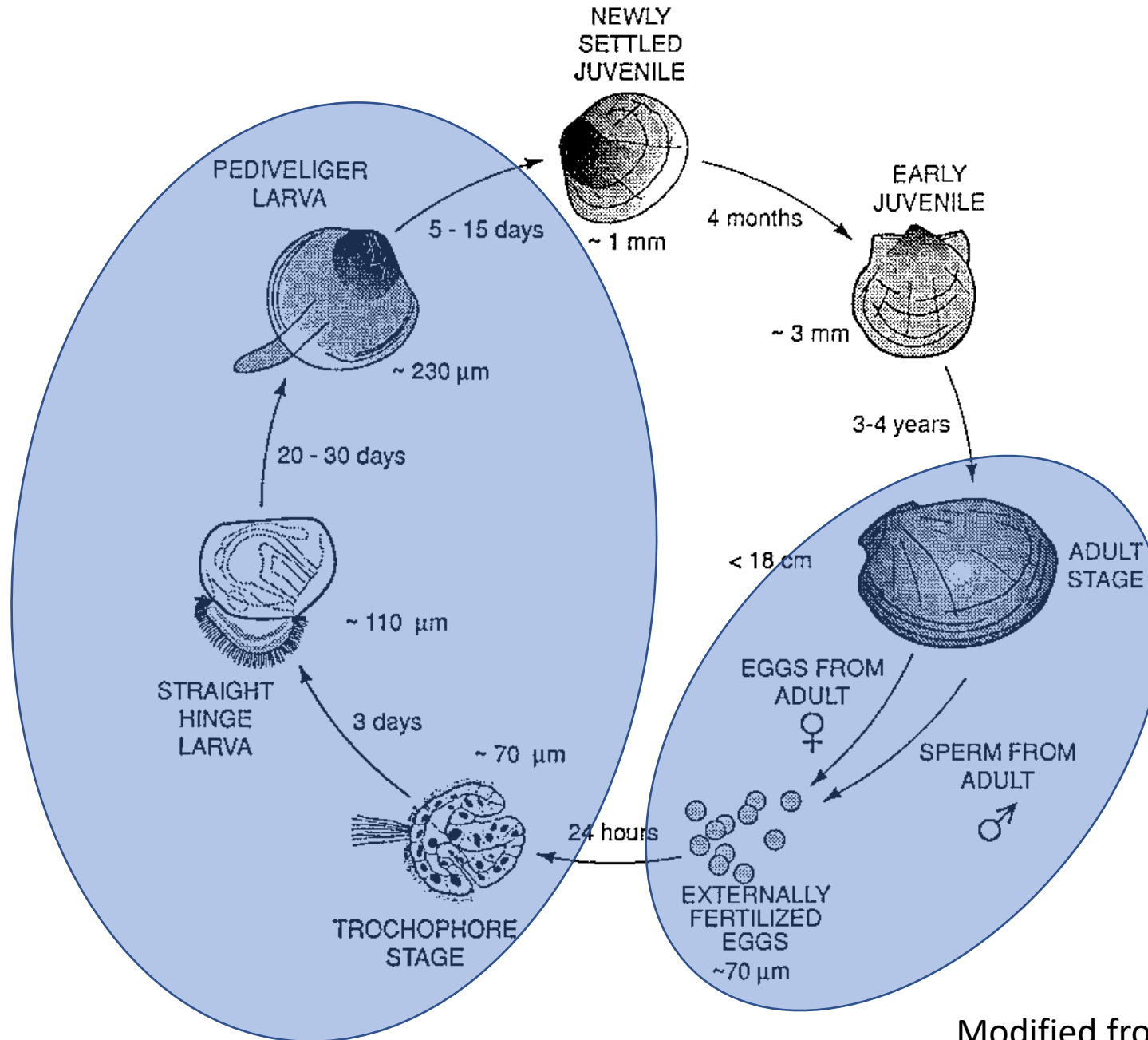
Downeast Institute

NOAA Fisheries, Milford, CT



Larval  
Stages

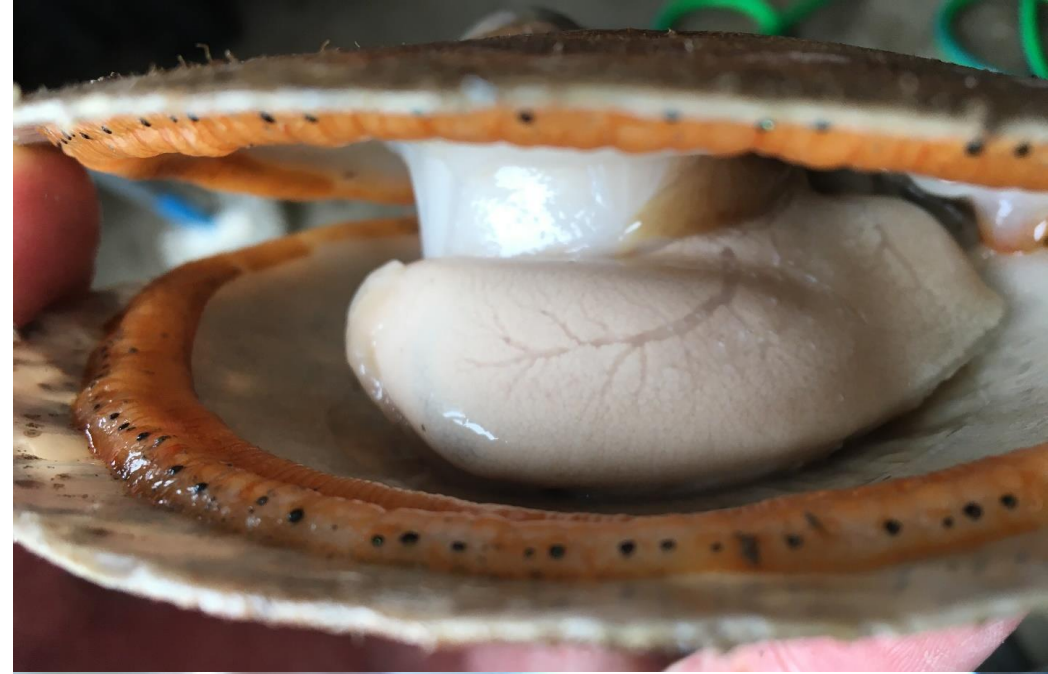
40-50  
Days



Conditioning  
and Spawning

# 2021

- 3 Hatcheries
- Collected broodstock
- Induced Spawning
- Static larval system
- Flow-through larval system
- Stocking density (low v. high)
- Sampled for bacteria
- Monitored water quality





Spawning:

Brood Stock sources:

Cobscook bay (wild)

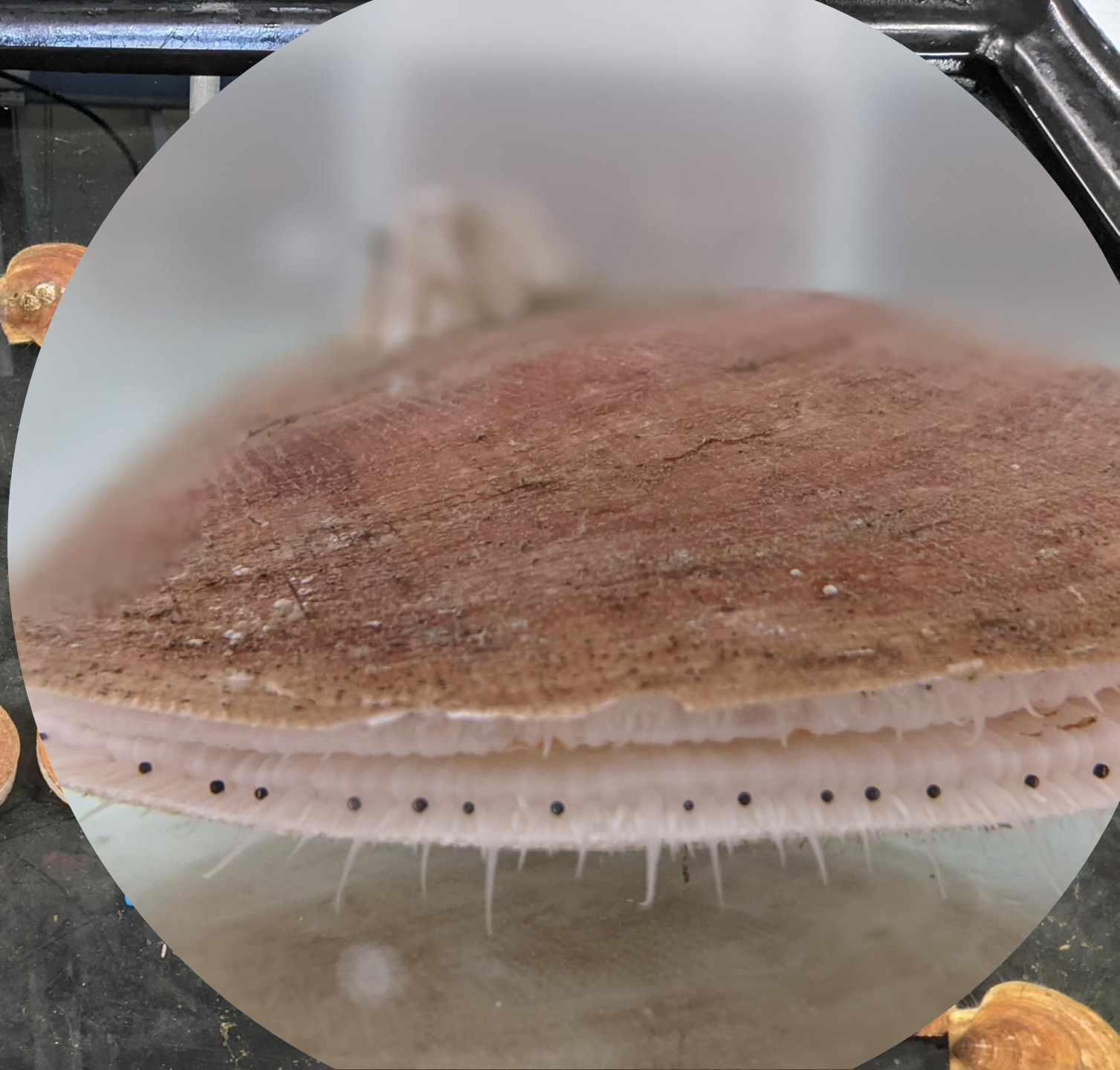
Hurricane Island (farmed)

Darling Marine Center (farmed)

Temperature cycling

Agitation

Desiccation



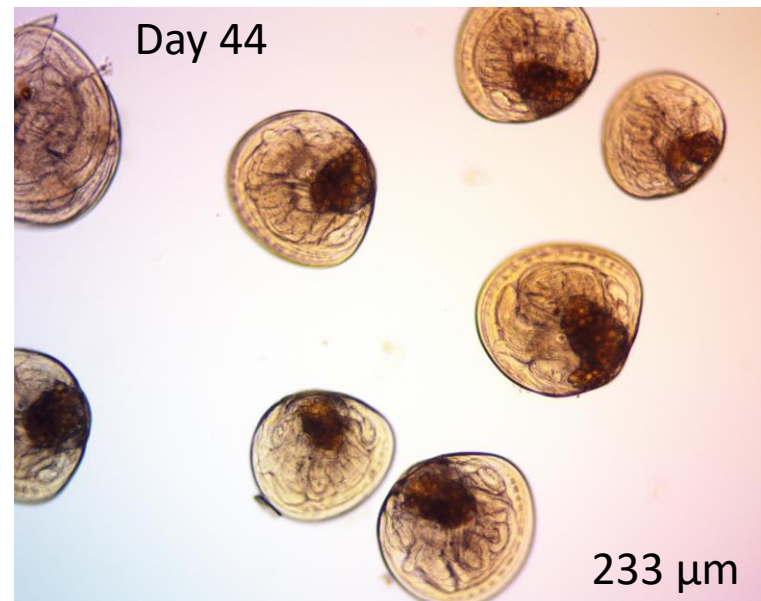
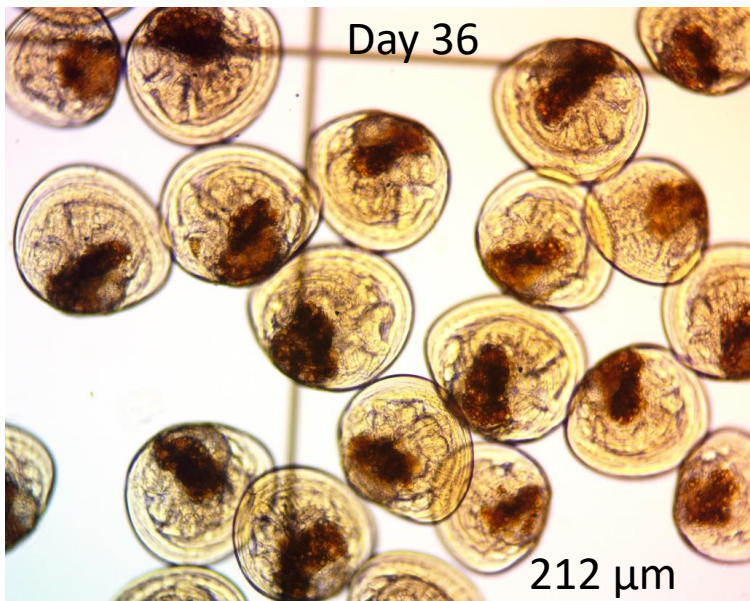
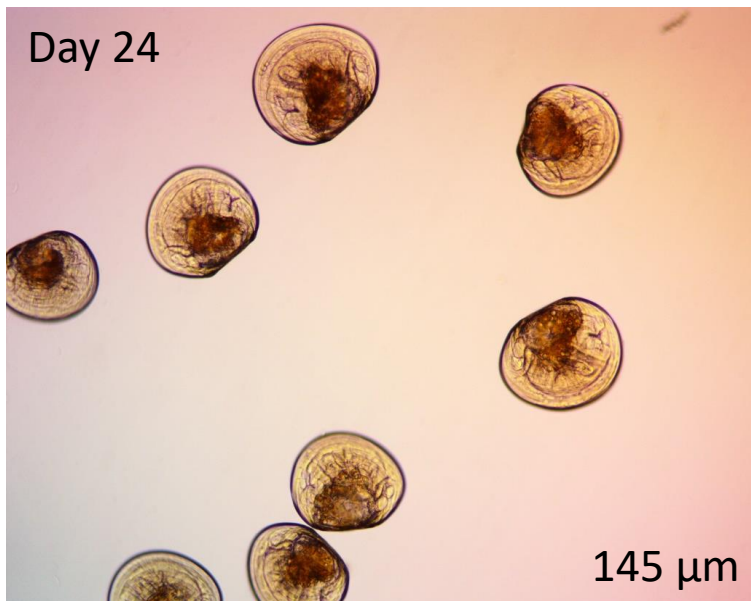
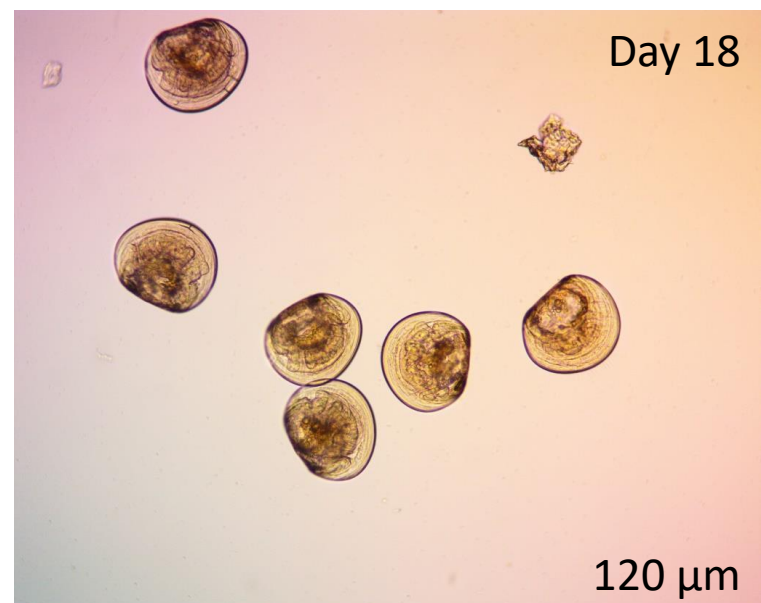
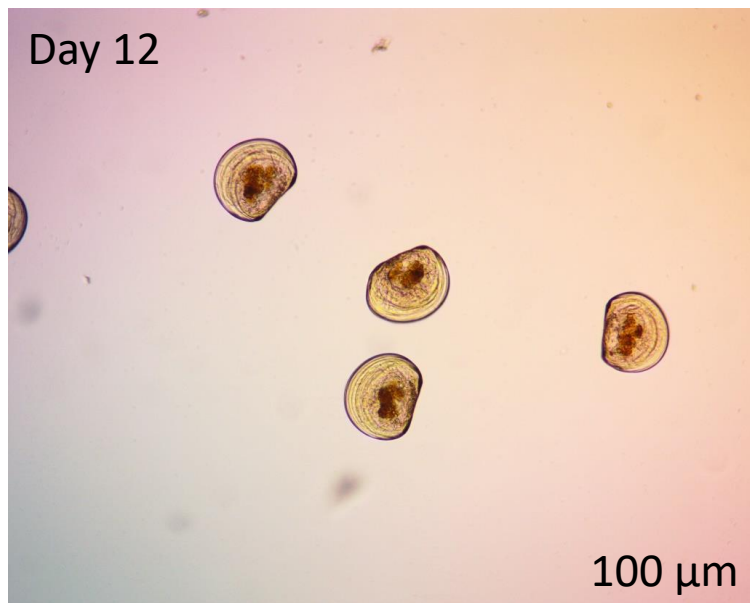
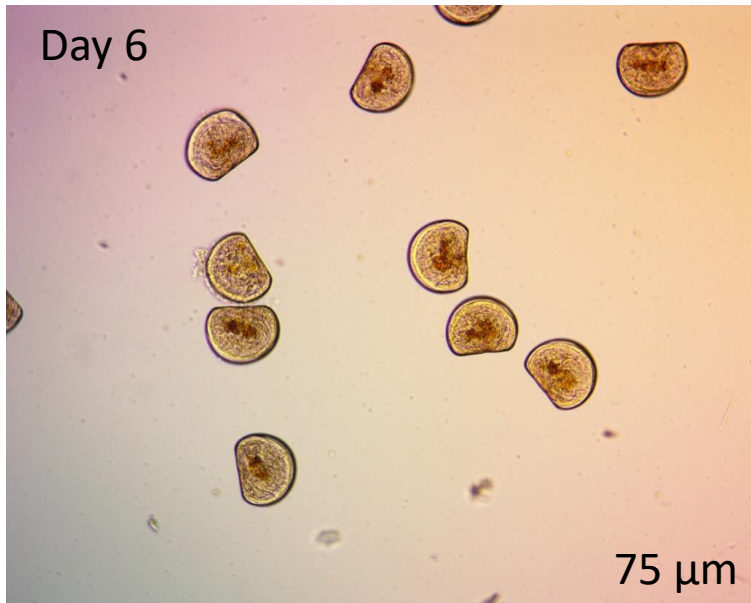
# Phase One

- Static
- 10/ml
- 5/ml
- Until retained on 75 micron mesh
- Approximately 10 days
- T-ISO and Mono (Pavlova) mixed diet

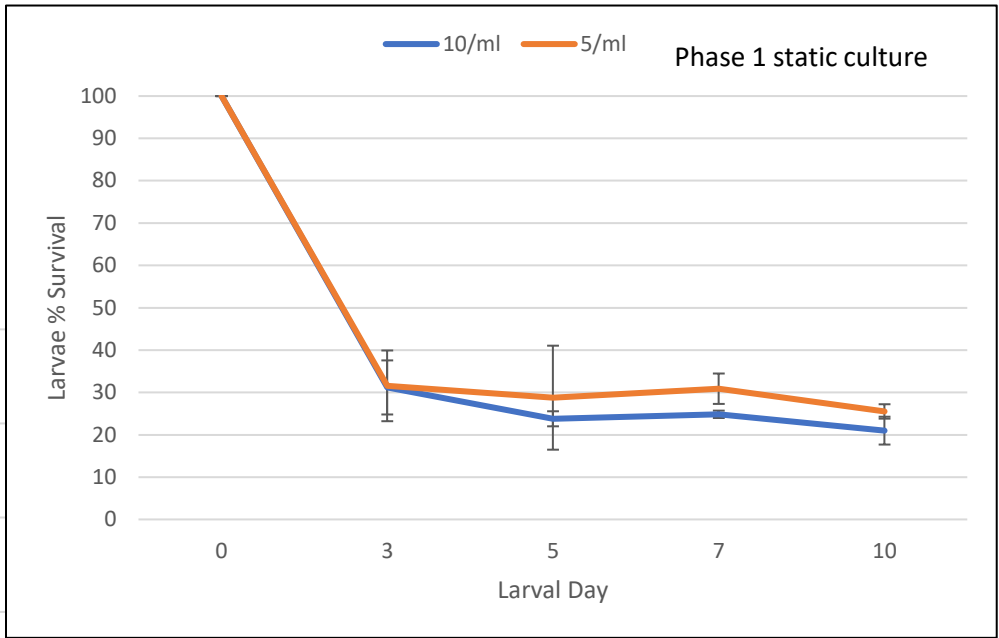
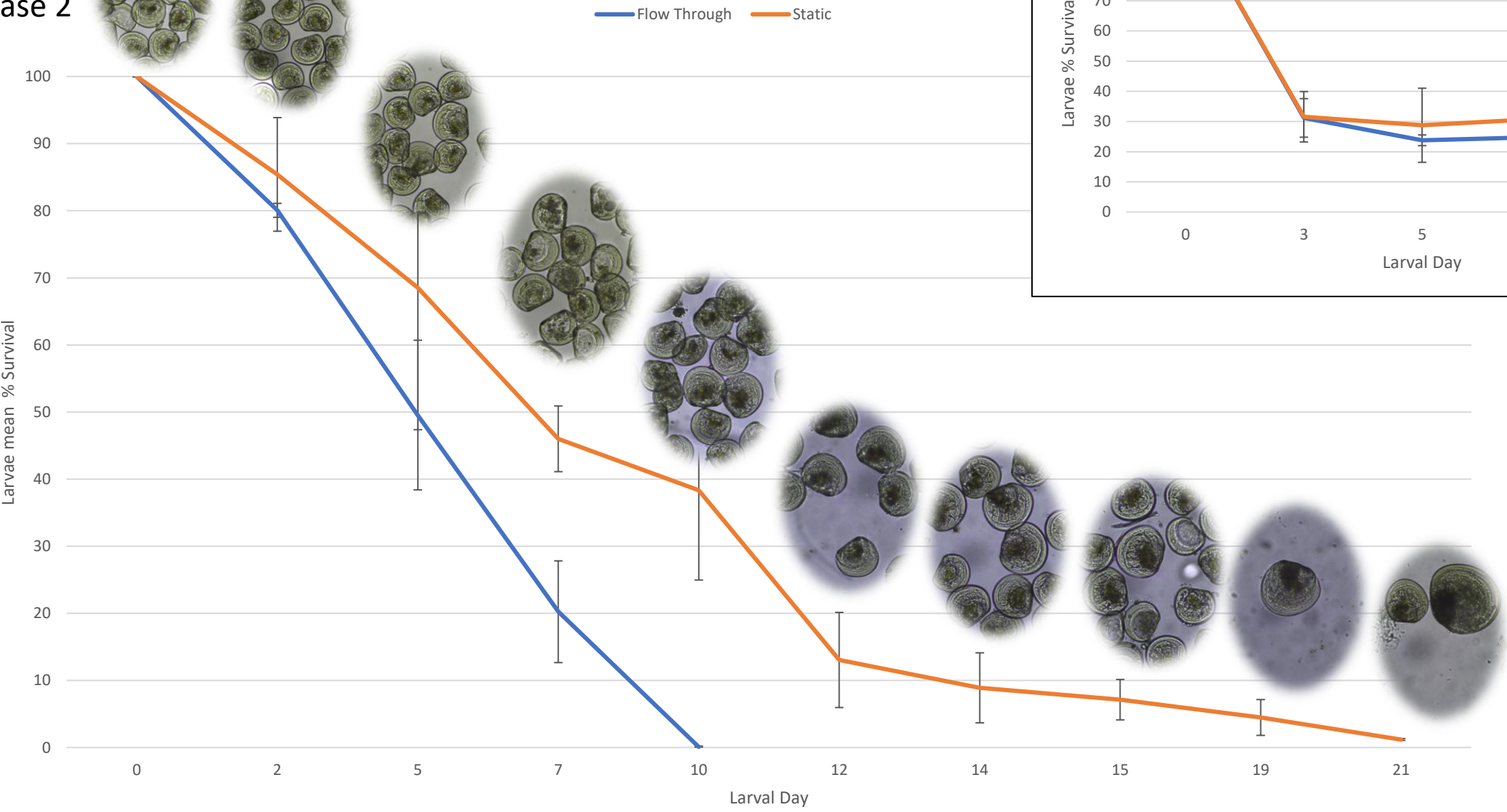
# Phase Two

- Static 5/ml
- Flow Through 5/ml
- Flow Through 20/ml
- Until setting
- T-ISO, Mono, Chaetoceros mixed diet



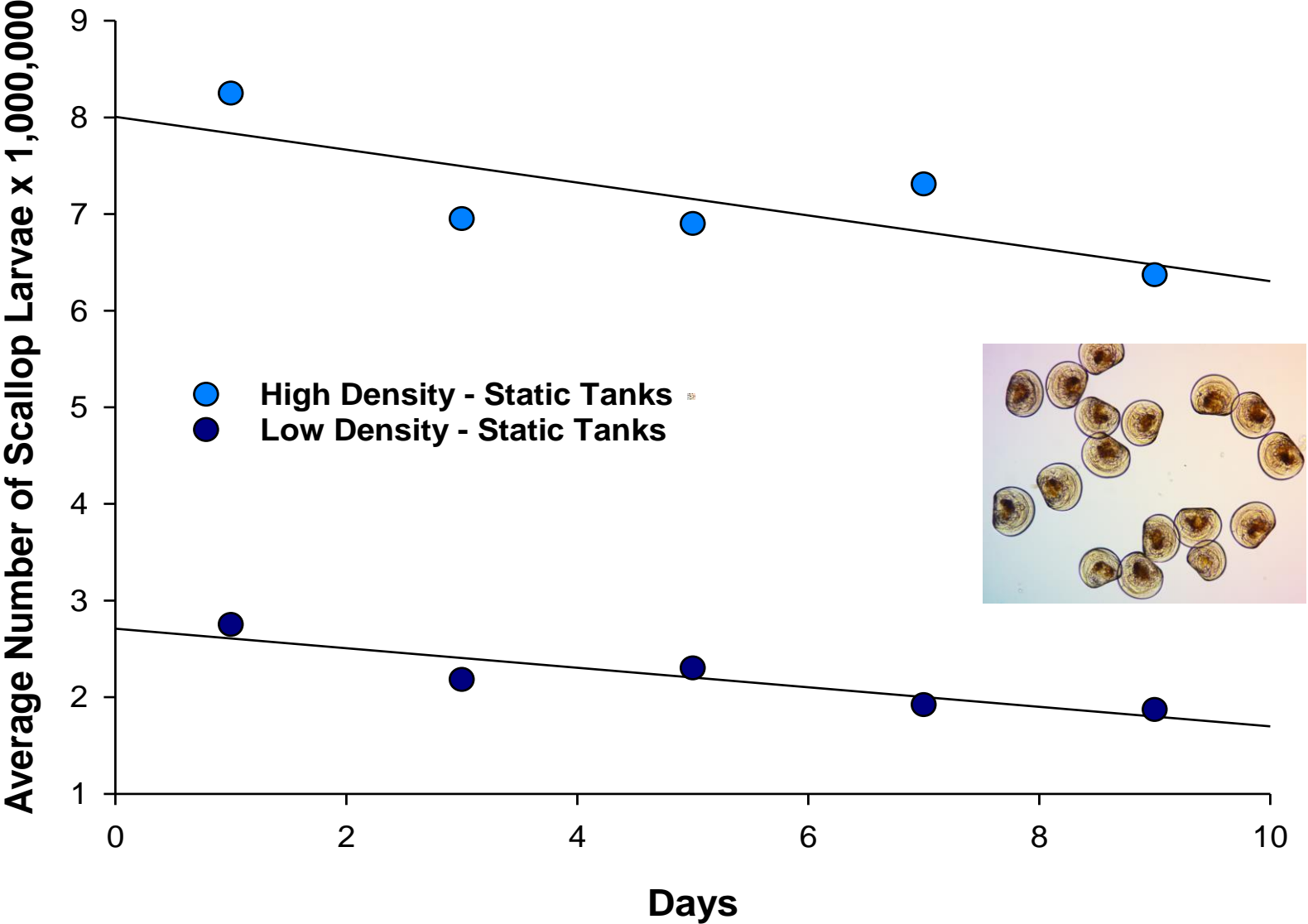


Phase 2



# Downeast Institute

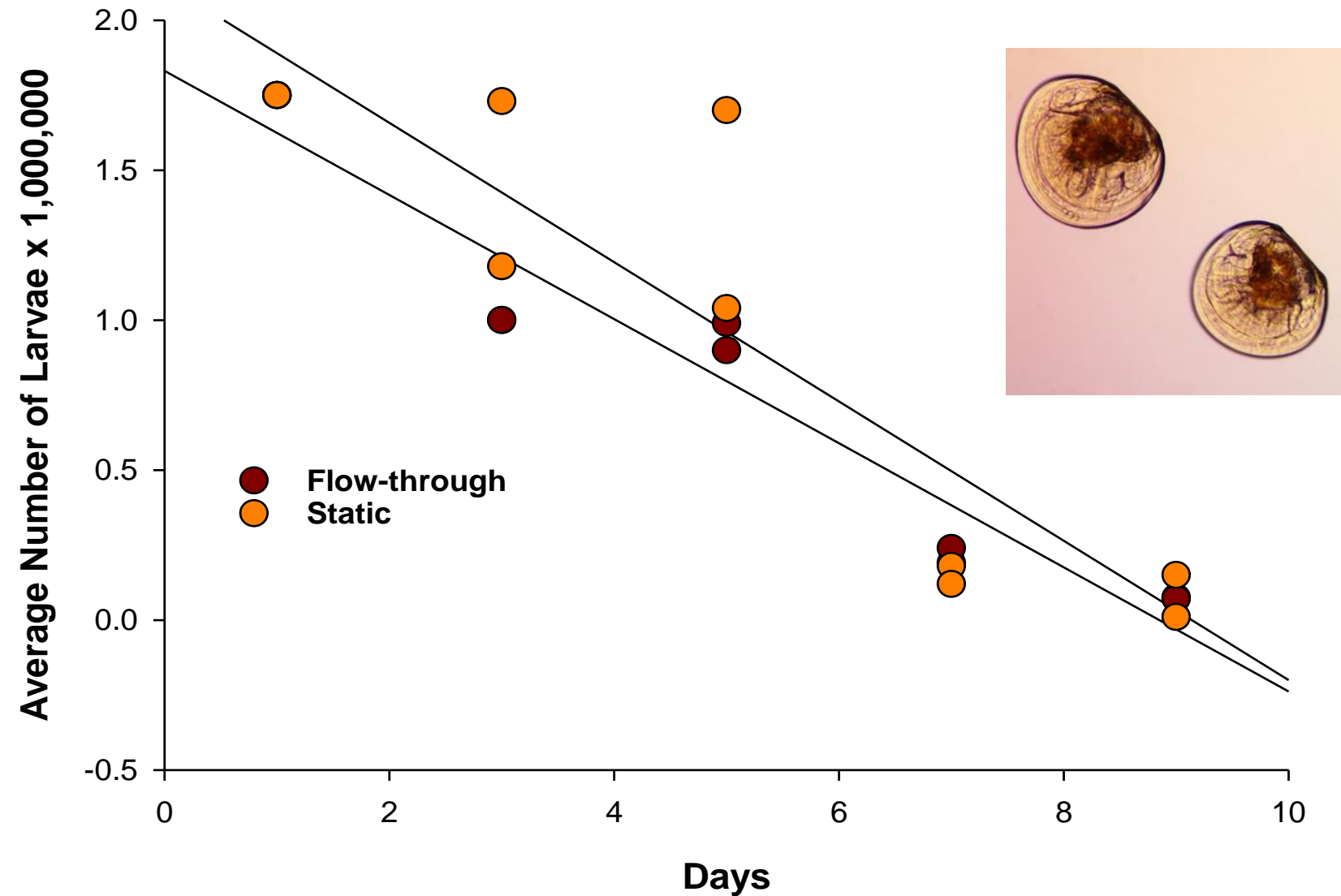
## Larval Scallop Survival in 400-liter static tanks to 90 $\mu\text{m}$



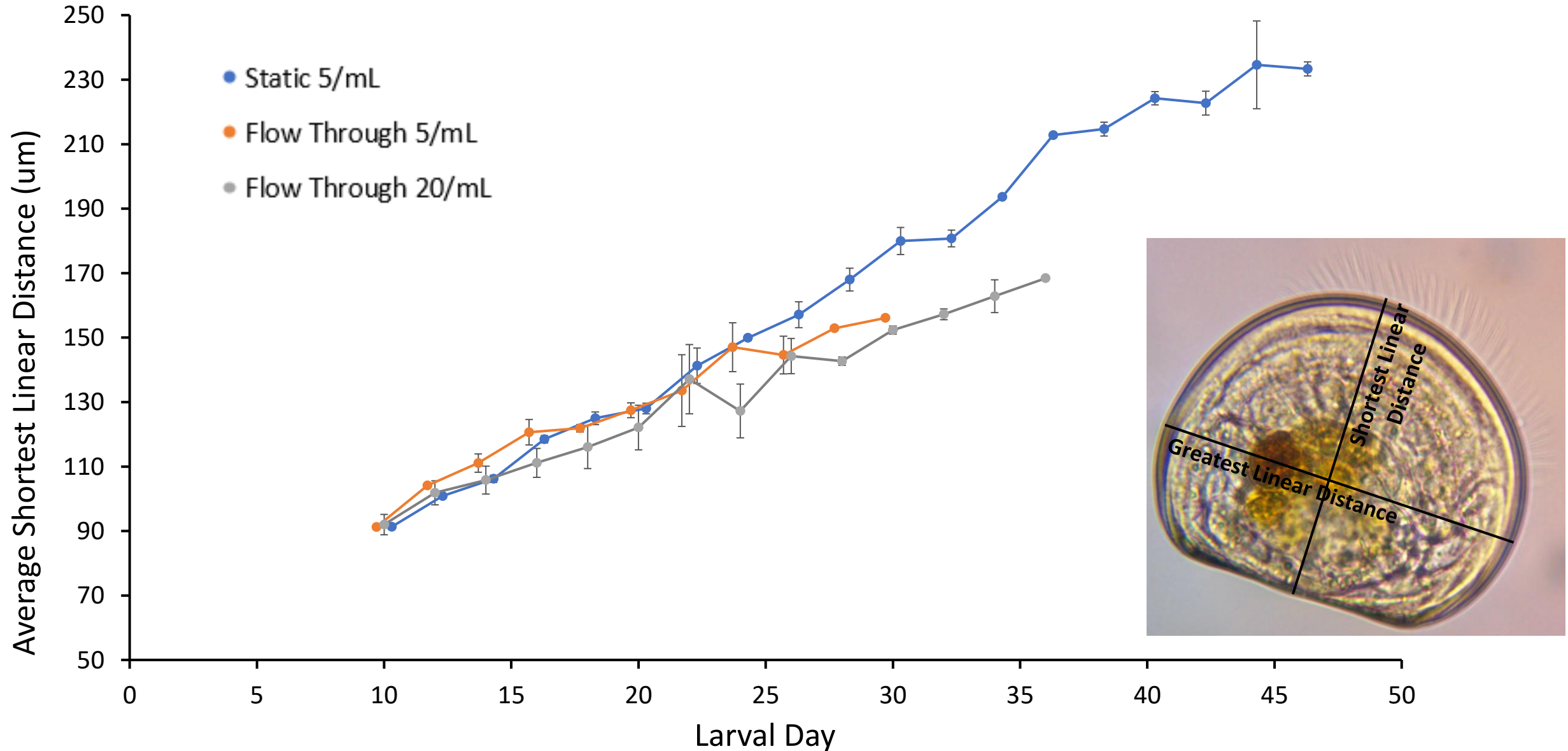


# Downeast Institute

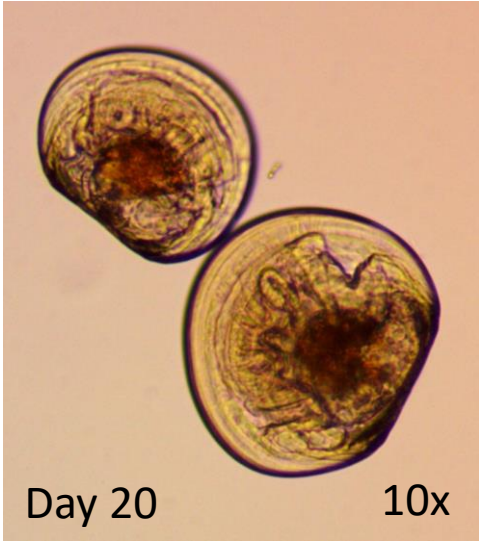
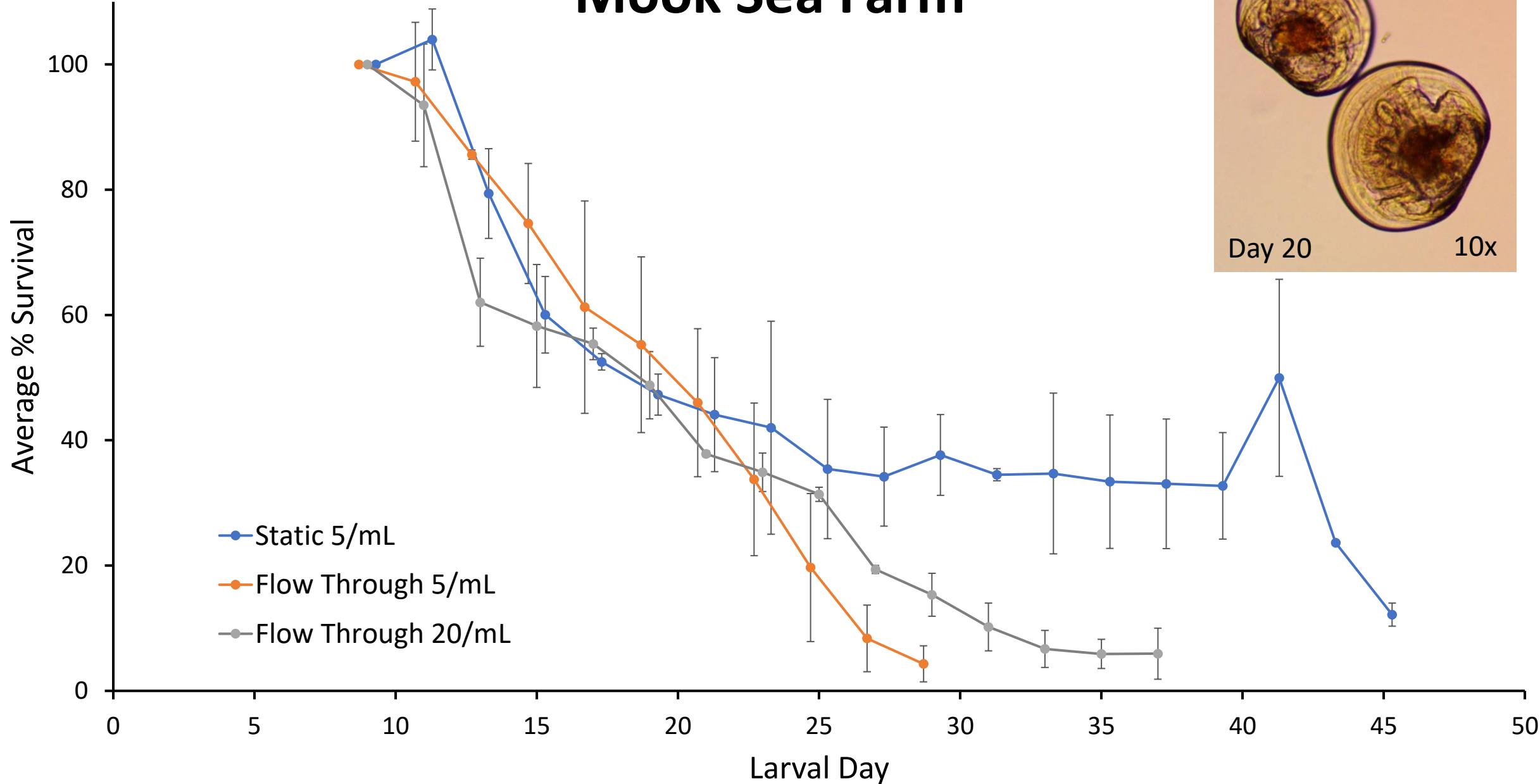
## Larval Scallop Survival in 400 liter static and flow-through tanks



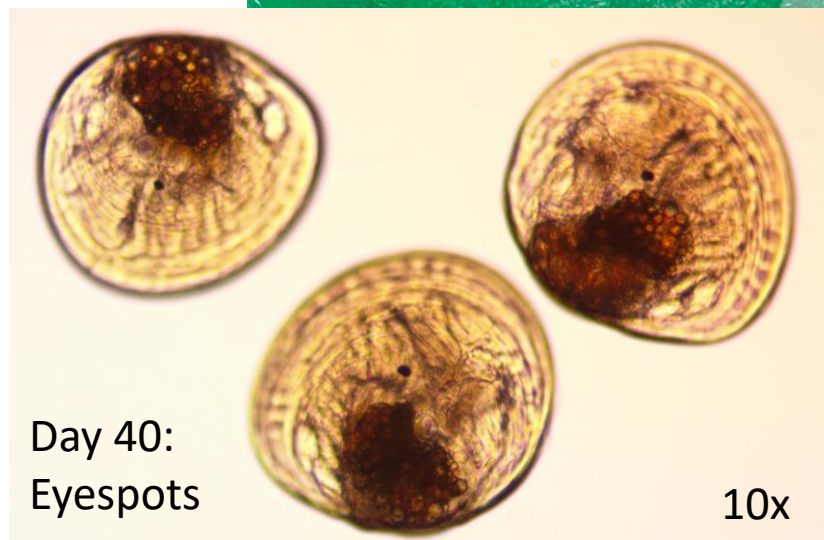
# Mook Sea Farm



# Mook Sea Farm







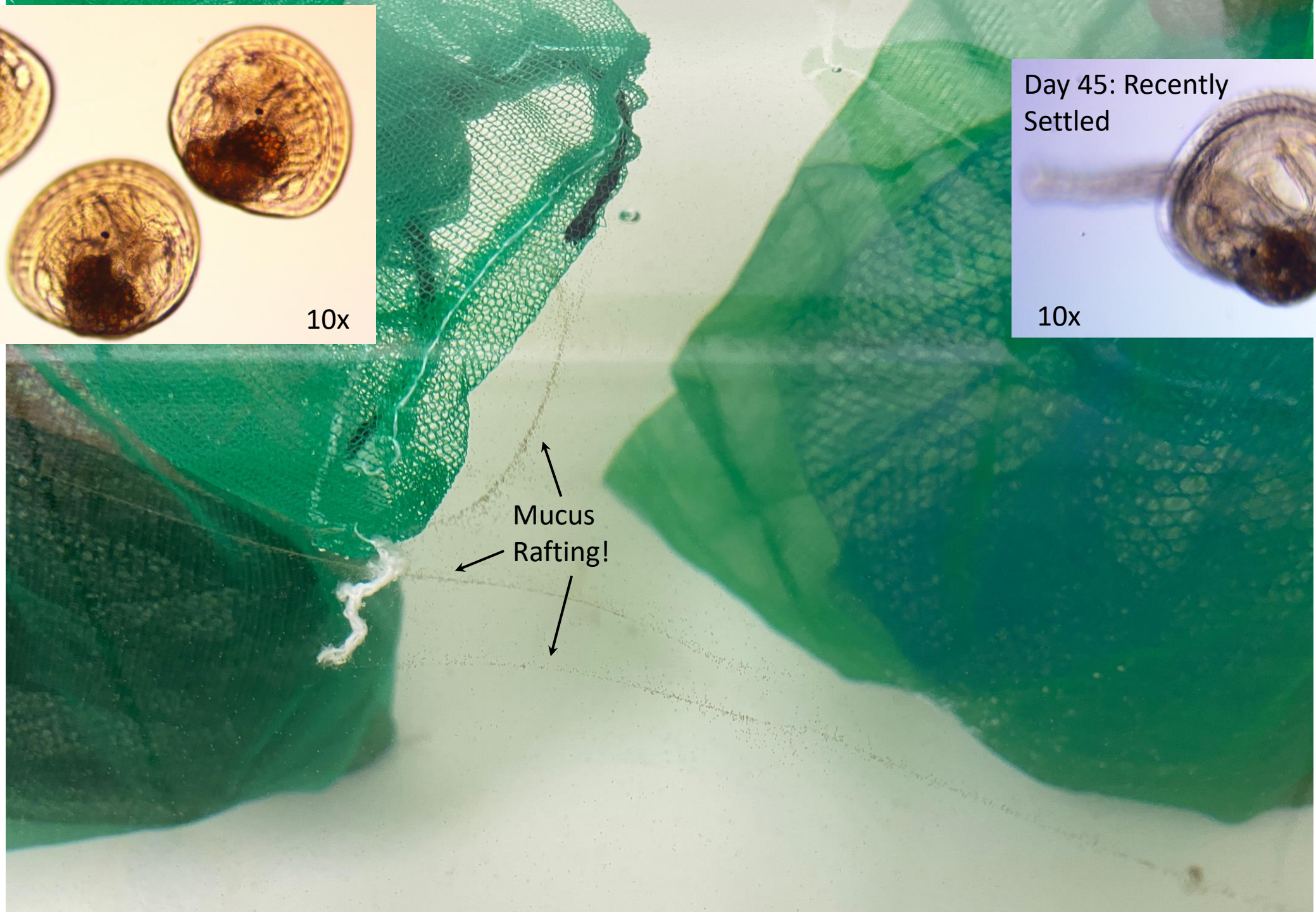
Day 40:  
Eyespots

10x

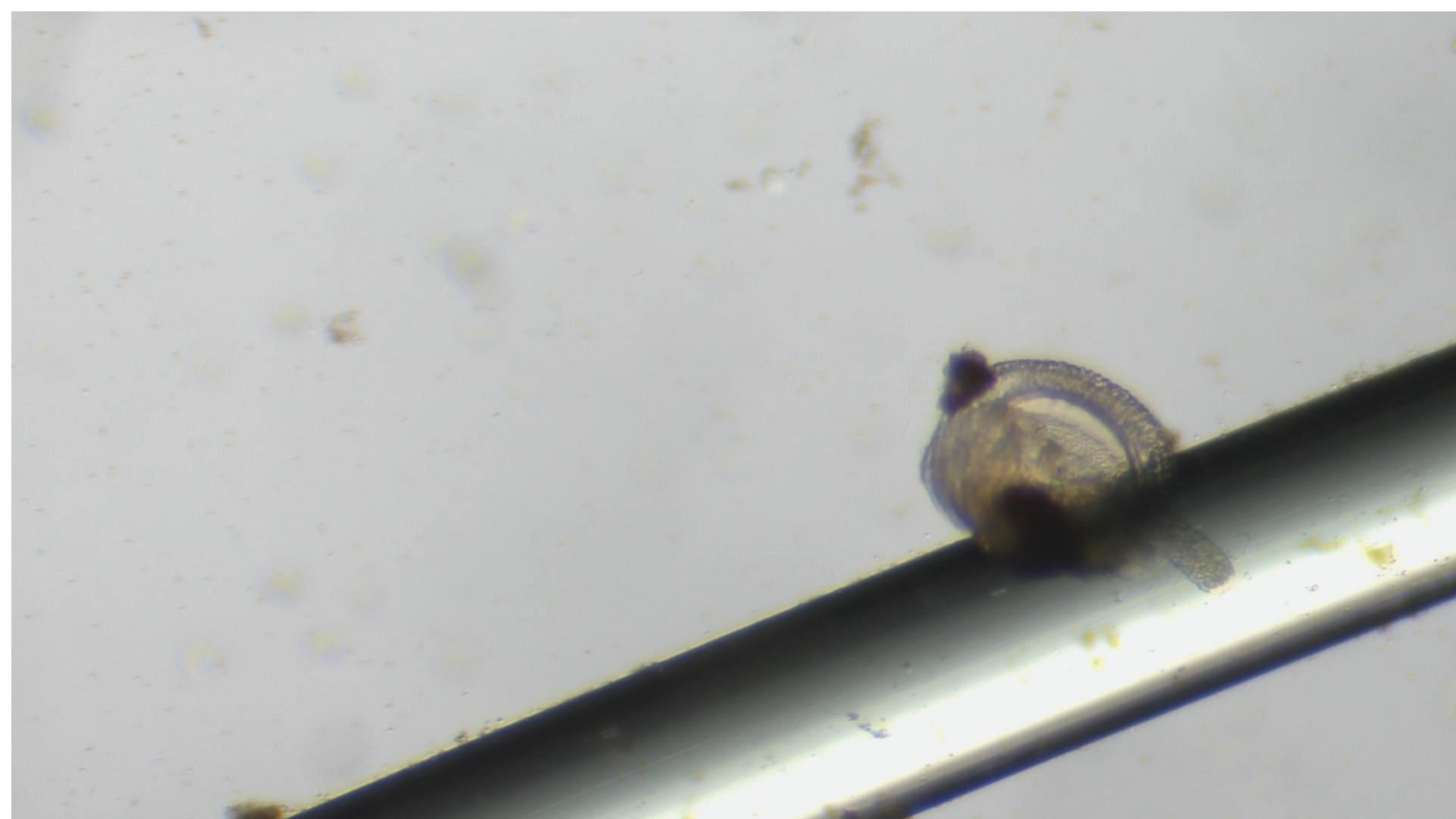


Day 45: Recently  
Settled

10x

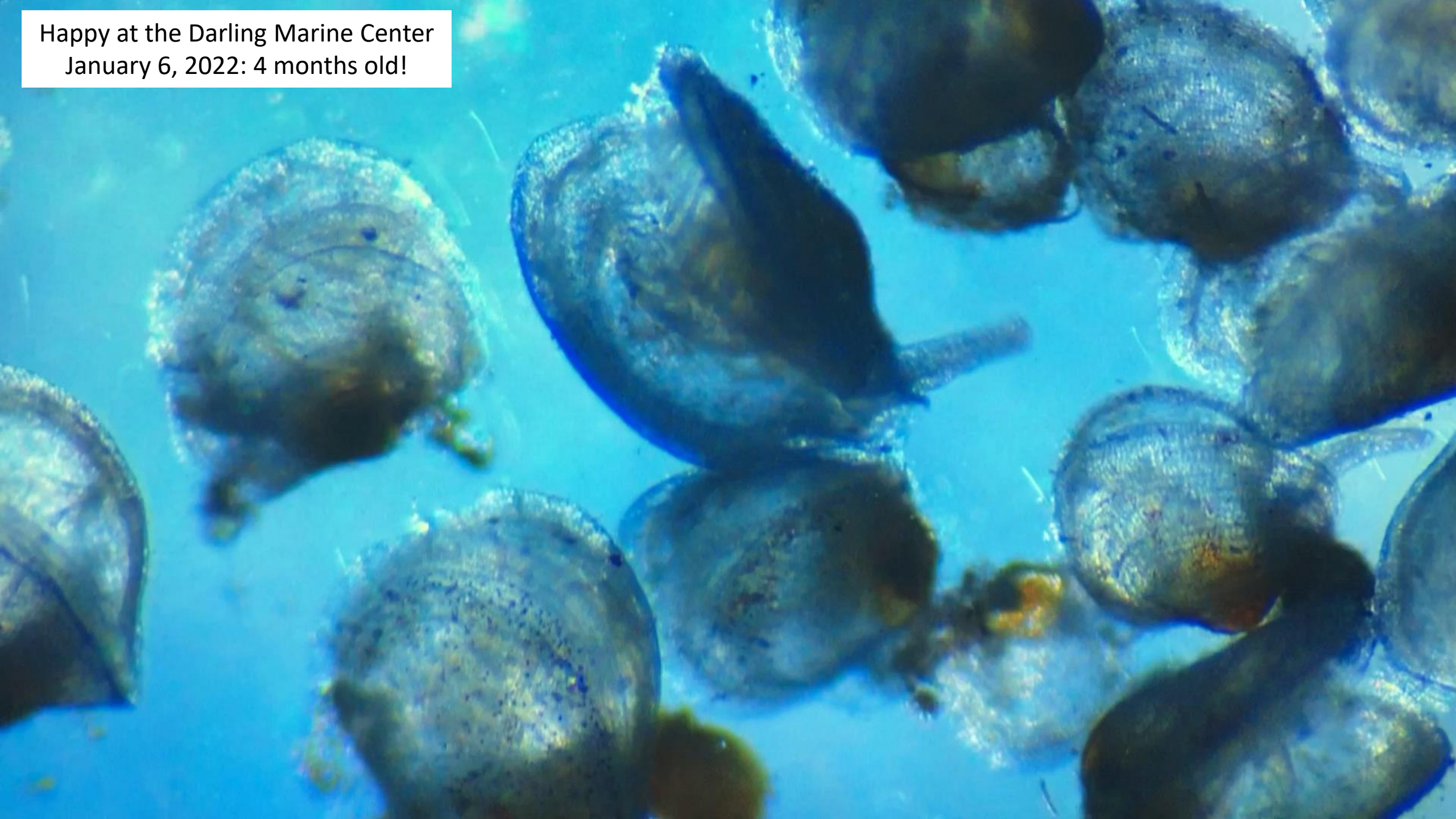


Mucus  
Rafting!





Happy at the Darling Marine Center  
January 6, 2022: 4 months old!





At the Darling Marine Center



April 1, 2022: 7 months old!

# Lessons Learned

- Spawning was more difficult than expected, late start
- High demand on microalgae
- Flow Through was more difficult to implement than anticipated
- Difficult to replicate efforts and results at 3 different hatcheries
- Buffering shows promise
- Monitoring water, systems, and larvae is essential
- Monitor water and larvae microbiome
- Collaborative model was successful



# What's Next

- Feedback from other researchers with experience
- Expand team to include microbiologist and immunologist
- Submitted proposal to National Sea Grant for 3 years of funding to continue/expand research

# Important Variables to Examine

- Broodstock collection/conditioning
- Spawning methods
- Diet: broodstock and larvae
- Seasonality
- Buffering hatchery water
- Larval settlement
- Bacteriology
- Economic feasibility
- Growout, in partnership with growers
- Outreach/Education

# Acknowledgments

- Michael Bonney, generous financial support
- Funding support through National Oceanic and Atmospheric Administration, Department of Commerce, award number NA18NMF4720321
- Des FitzGerald, effective leadership
- Meredith White, Kyle Pepperman, Adam St. Gelais

# Questions?

[mark.dixon@noaa.gov](mailto:mark.dixon@noaa.gov)

203-882-6564



