

Effect of probiotic use on larval survival, growth, and settlement success of the eastern oyster

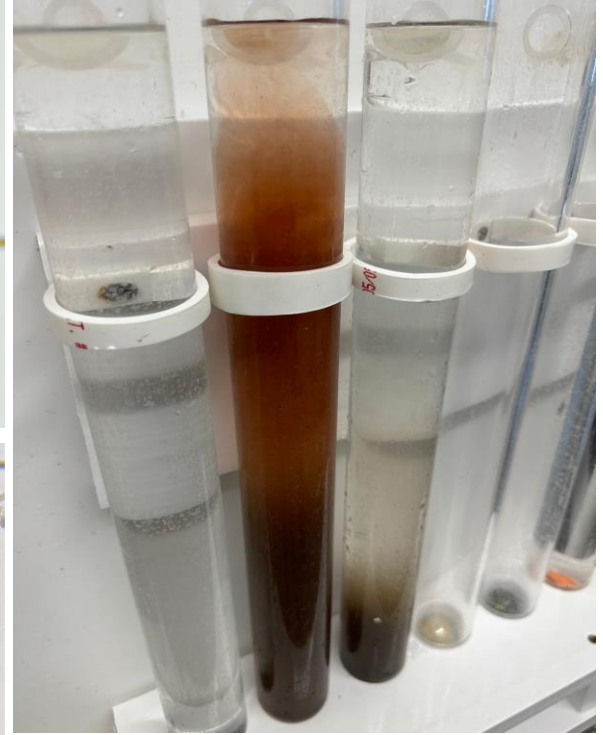
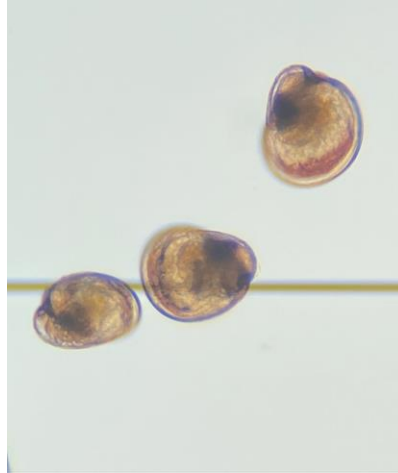
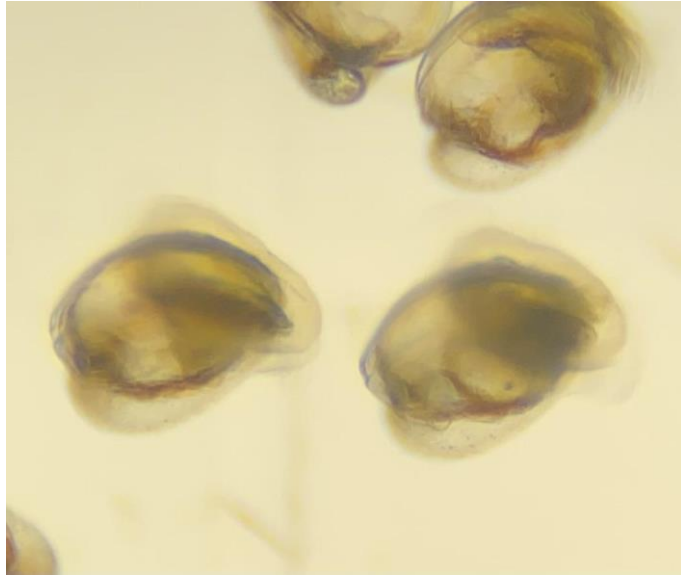
Morgan Hawkins, Dr. Sandra Brooke

Florida Aquaculture Project– FY 2023-24

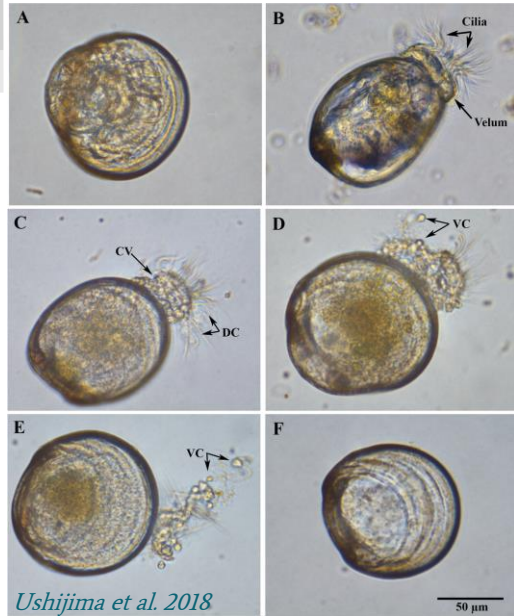
FSUCML Shellfish Restoration and Research Hatchery



Importance



An example of a common pathogenic bacteria: *Vibrio*

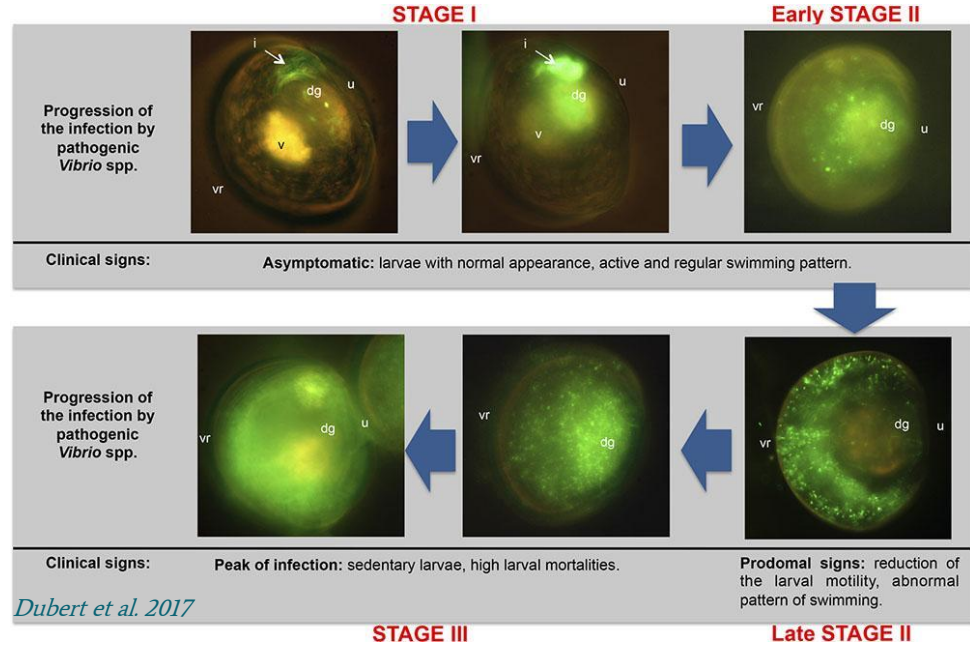


CV: Clumped vellum

DC: Disorganized cilia

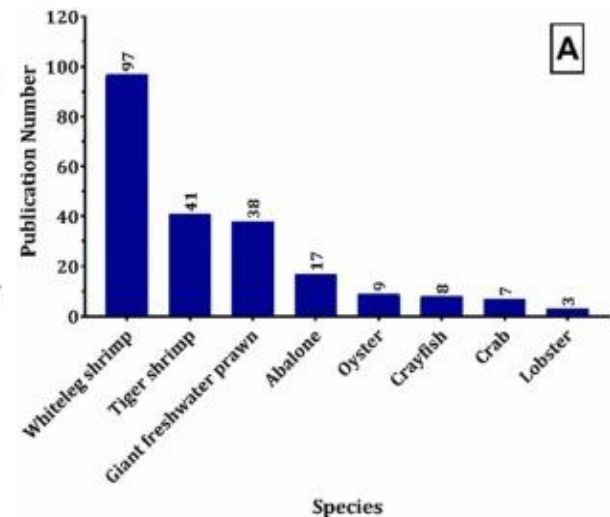
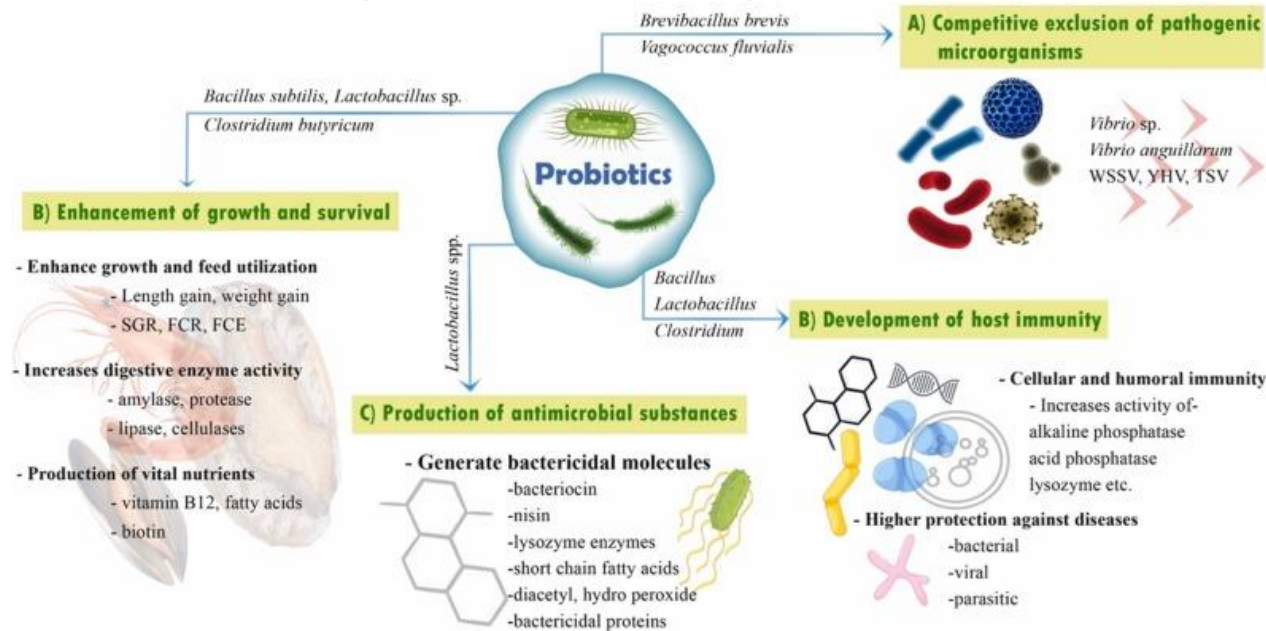
VC: Velar cells

Ushijima et al. 2018



- Has a rapid division rate
- Effects many hatcheries world wide
- *V. coralliilyticus* was shown to cause 76-100% mortality of the eastern oyster (*C. virginia*)

Prevention: Probiotics



- Alternative to antibiotics and phage therapy,
- uncommon in bivalve culture,
- commercially available

Objectives



Hatchery

- *Objective 1:* Determine if Sanolife MIC alters larval survival and growth compared to controls during fall and spring
- *Objective 2:* Determine if Sanolife MIC alters settlement success compared to controls.
- *Objective 3:* Determine at what concentration Sanolife MIC (high or low) should be used.

Illumina Sequencing

- *Objective 3:* Verify the *Bacillus* species in SanoLife MIC.
- *Objective 4:* Determine if SanoLife MIC changes microbial composition.
- *Objective 5:* Determine how the microbial composition changes seasonally in a Florida hatchery.

Methods



- Implemented commercial stocking densities
- Live algal rations
- Daily water changes
- Fall and spring

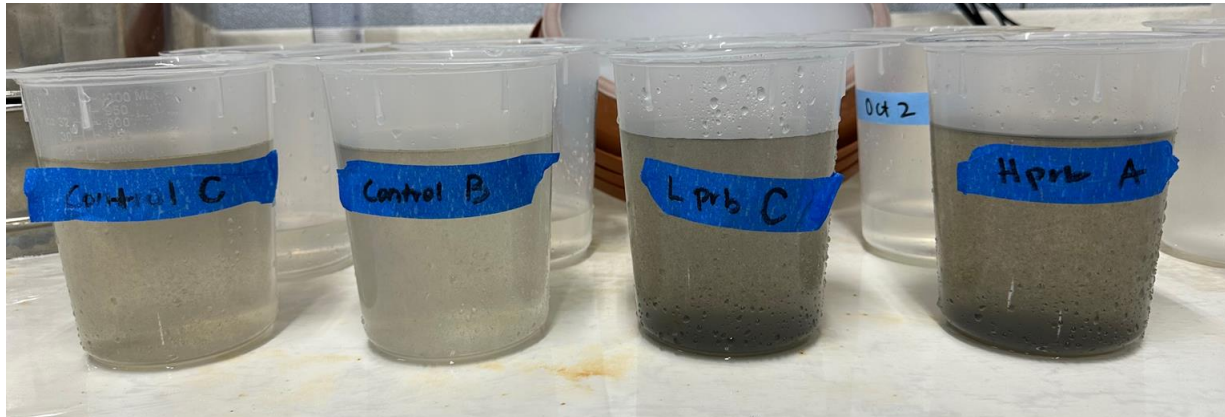
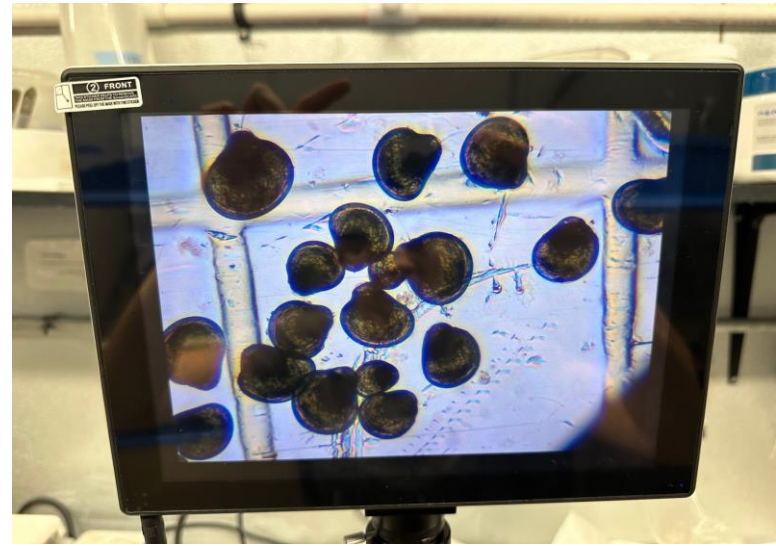
Illumina Sequencing



- 16S RNA Sequencing
- EOAS Dr. Olivia Mason
- UCONN MARS for library preparation and sequencing
- Full sweep of bacterial composition compared to other methods



Results



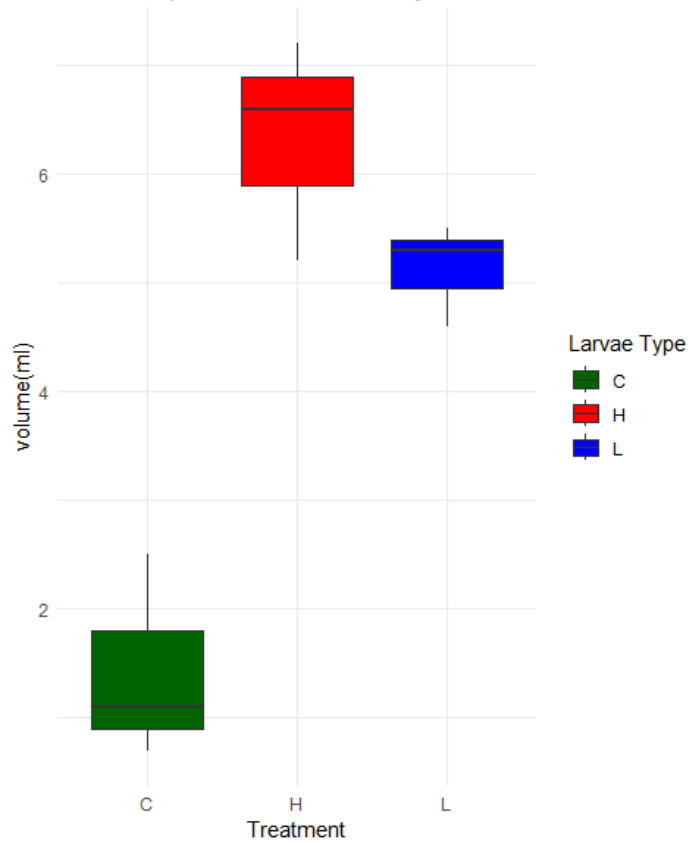


Fall

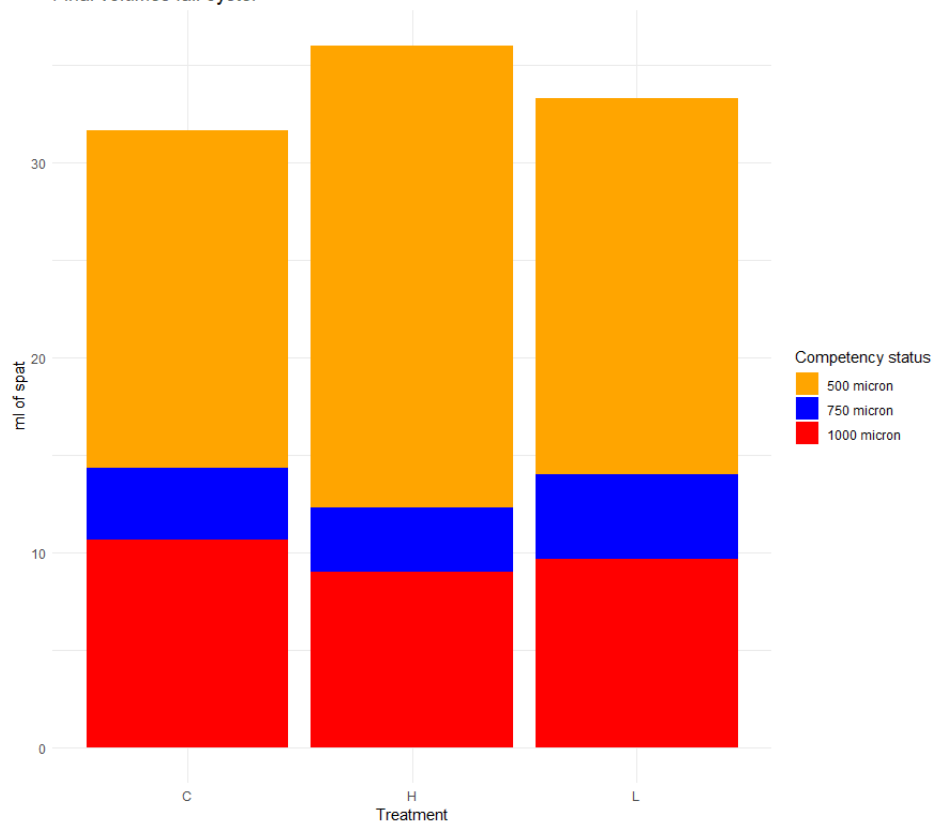
	% Larval survival	% Competent	% Metamorphosis success
Control	30%	66%	80%
High probiotic	68%	68%	73%
Low probiotic	67%	75%	71%

Average of all 3 replicates

ml of competent larvae to set system



Final volumes fall oyster





Spring (still in progress)

	% Larval survival	% Competent	% Metamorphosis success
Control	14%	50%	32%
High probiotic	35%	70%	24%
Low probiotic	30%	54%	27%

Average of all 3 replicates

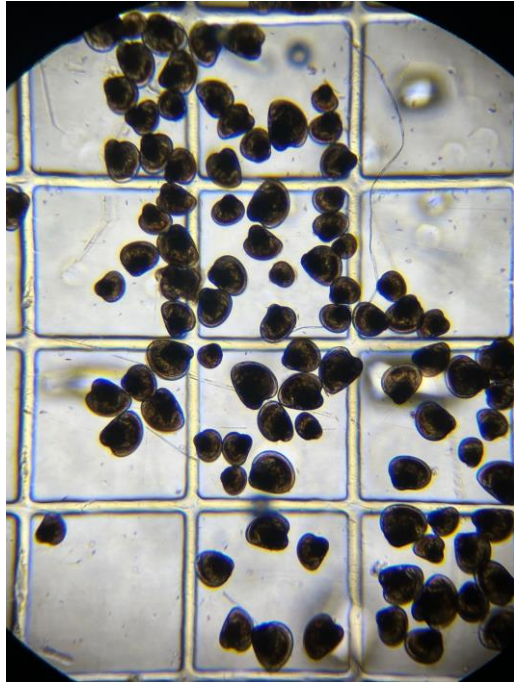
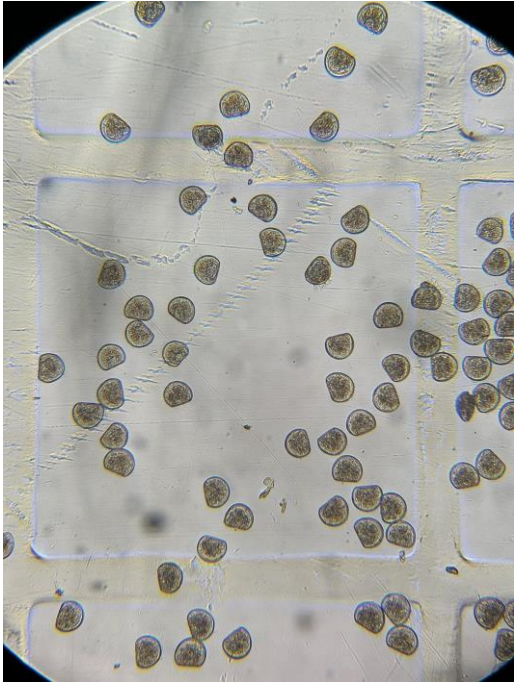


Take home messages

- Probiotics have a promising beneficial relationship with larval oysters, increasing seed yield
 - Enhancement of growth (in progress), survival, and competency
- Seasonality plays an important role for the overall effect of the probiotic
- High probiotic concentrations seem to be necessary during the spring, and low concentrations in the fall



Questions?



Thank you!