

# An ongoing quest: Understanding the effects of competition between juvenile *Nereocystis luetkeana* and *Sargassum muticum*

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## Introduction and Background

*Nereocystis luetkeana* (bull kelp) beds start over every year

- Annual species (in a "field" of perennials)
- Each year's recruits must survive juvenile stage (which has high mortality)
- Dominant primary producer and 3D habitat forming species



- Beds exhibit annual variability and declining trends in some parts of the Salish Sea

- *Sargassum muticum* (wireweed) is a widespread non-native that may compete with *N. luetkeana* in the shallow subtidal

## KEY QUESTION: Does the presence of established *S. muticum* influence the growth of juvenile *N. luetkeana*?

$H_0$  = No difference in growth between *N. luetkeana* alone or in the presence of *S. muticum*

## Results

- In the first experiment, few *S. muticum* and no *N. luetkeana* survived to be measured
  - Some *N. luetkeana* stipes remained attached to the blocks
  - Transplant method has potential?
- In suspended experiments, SCUBA surveys indicated that juvenile kelp could survive for ~1 week

## Conclusions

- Something** is damaging transplants before we can assess differences in growth
  - Herbivores?
    - Other seaweeds on the FHL dock show evidence of kelp crab (*Pugettia*) damage
  - Water motion?
    - Suspended blocks move with currents/boat wakes
    - Low flow in FHL basin
  - Transplantation stress?



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## Methods



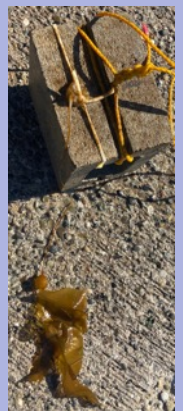
Initial experimental setup: shallow subtidal (~3 m deep) at Friday Harbor Labs (FHL), deployed via wading on a low tide

-used Gorilla Glue to attach juvenile *N. luetkeana* and *S. muticum* (collected subtidally) to half-size concrete blocks

-factorial design: effects of inter- and intraspecific competition

-n=5 per treatment

- One *N. luetkeana* ----->
- One *S. muticum*
- Two *N. luetkeana*
- Two *S. muticum*
- One *N. luetkeana* and one *S. muticum*



-measured stipe length (*N. luetkeana* only) and total length of transplanted seaweeds

-remained in the field for three weeks

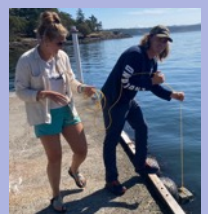
- allow for growth

-enable pickup at same tidal height  
Second and third attempts: suspended half-size concrete blocks using polypropylene line at 3 m depth from FHL floating dock

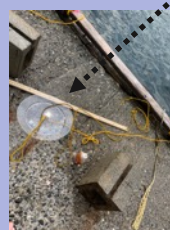
-same transplant method and seaweed measurements

-n=5 per treatment; focus on interspecific only

- One *N. luetkeana*
- One *S. muticum*
- One *N. luetkeana* and one *S. muticum*



-Third experimental setup included clear plastic plates as "crab shields", attached to rope 1 meter above the block



-Monitored by SCUBA after ~1 week and pulled up for data collection after two weeks of growth

## Feedback greatly appreciated!!

How might we refine our methods???

What alternative explanations might exist for our results (or lack thereof)???