

# Larval Fish Pelagic Settlement and Benthic Colonization in Charleston Harbor

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## ABSTRACT

The purpose of this experiment was to determine if estuarine larval settlement was influenced by the lunar cycle. It was theorized, due to the significant increase in settlement rate in coral reef ecosystems during the new moon, that the estuarine larval would follow this same pattern. The new moon would increase settlement rates due to the negative correlation of light intensity. Four fish traps were placed in the Grice Cove in Charleston Harbor. Samples were collected daily for 12 days, beginning after the first day of the new moon until the full moon. Pelagic settlement occurred only in *Leiostomus xanthurus* while benthic colonization was observed in all of the other collected species. The estuarine lunar cycle hypothesis proved to be inconclusive.

## MATERIALS AND METHODS

Four fish traps were made using bread trays (1m. x .5m.) covered with a thin mesh. Oyster shells were placed on top of the mesh. This was covered with a large anti-predatory mesh, which also kept the oyster shells and fish in place. The bread trays were latched together with the large mesh using 6 plastic cable ties. The traps were imbedded into the sand using metal stakes. The traps were placed during low tide in Grice Cove in the Charleston Harbor. The traps were recovered once a day for 12 days during low tide. The specimens recovered were placed in plastic jars and preserved in ethanol. The specimens were identified and weighed at the end of each week.

Trap Location



Fish Trap



Trap Location



Placement of Fish Trap



Figure 1

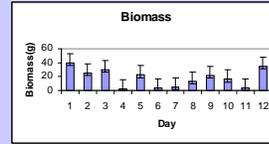


Figure 2

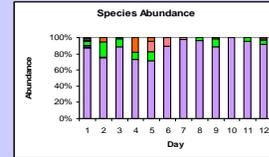
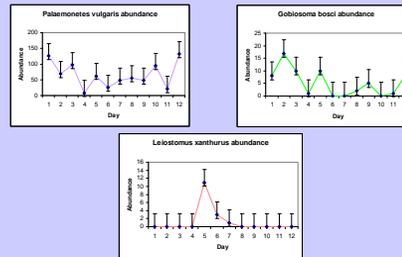


Figure 3



## Legend

	<i>Palaemonetes vulgaris</i>	
	<i>Gobiosoma boscii</i>	
	<i>Chasmodes bosquianus</i>	
	<i>Palaemonetes pugio</i>	
	<i>Gobiesox strumosus</i>	
	<i>Opsanus tau</i>	
	<i>Fundulus heteroclitus</i>	
	<i>Leiostomus xanthurus</i>	

## RESULTS

Figure 1

•Biomass was fairly consistent throughout the study

Figure 2

- The majority of the biomass consisted of *Palaemonetes vulgaris*
- The traps were relatively consistent in species composition and abundance

Figure 3

- P. vulgaris* abundance significantly fluctuated throughout the study
- Gobiosoma boscii* represented the benthic colonization
- Leiostomus xanthurus* represented the pelagic settlement
- L. xanthurus* showed the highest settlement on Day 5

## DISCUSSION

During the course of our experiment, pelagic settlement was observed in the *Leiostomus xanthurus*. Settlement specifically occurred during day 5 in the first quarter waxing in the lunar cycle. Due to the post-flexion stage of the larvae, it is hypothesized that settlement, rather than colonization, occurred.

Colonization occurred in all of the other remaining species:

*Palaemonetes vulgaris*, *Gobiosoma boscii*, *Chasmodes bosquianus*, *Palaemonetes pugio*, *Gobiesox strumosus*, and *Opsanus tau*. Colonization, rather than settlement, occurred due to the size, development, and the ability to swim against the currents. Previous studies have shown that fish larvae in coral reef ecosystems have significantly higher rates of settlement during the new moon (Lozano & Zapata, 2003). However, our study has not shown these same conclusive results in an estuarine location.

## Works Cited

Lozano, S., Zapata, F.A. (2003). Short-term temporal patterns of early recruitment of coral reef fishes in the tropical eastern Pacific. *Mar. Biol.* 142: 399-409.

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