Olfactory Orientation to Salt Marsh Odors by Atlantic silverside in Coastal Long Island Sound

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Abstract

Menidia menidia, Atlantic silverside, are a migratory fish that use salt marsh habitats as breeding and feeding grounds in the spring and summer months, over-wintering in the open estuary. While this migration pattern is well documented, it is not known how the species detects and navigates to salt marshes. Atlantic silverside are known to eat *Spartina alterniflora*, cordgrass, a major plant species of salt marshes in New England (Cadigan and Fell 1985). Decomposing cordgrass produces many organic compounds and chemicals during the break-down process, including the amino acids Alanine and Leucine, and it has been shown that Atlantic silversides can detect Alanine (Jonsson 1979). The objective of this study was to determine if Atlantic silverside use olfactory detection of cordgrass or cordgrass break-down products to orient to salt marshes. Using a Y-maze, fish were exposed to one of five treatments: artificial seawater, seawater with cordgrass, Alanine, Leucine, and morpholine. The locations of fish in the maze, when given a choice between control seawater and one of the treatments, were recorded over 5-minute periods. The results did not support the hypothesis that silverside use these amino acids to orient. Possible aversion to high concentrations of Alanine noted in one trial suggests that the fish may be able to detect the chemical but may not orient to it as a salt marsh, perhaps because the amino acids are products of decomposition and may not be perceived as indicating the presence of healthy marsh habitat.

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References

Cadigan K. Fell P. 1985. Reproduction, Growth and Feeding Habits of *Menidia menidia.* (Atherinidae) in a Tidal Marsh-Estuary System in Southern New England. *Copeia.* 1985(1): 21-26.

Jonsson L. Ali M. 1979. Environmental Physiology of Fishes. A Division of Plenum Publishing Corporation: Plenum Press, New York. 731

Biography

Valeriay is a senior in the marine biology program with an interest in fish behavioral ecology, including the sensory modalities that allow fish to orient. This was her first major research experience, through it she gained knowledge and experience on how to run her own experiment and will use it to continue with her senior thesis. She hopes to further her education in the field of sensory biology.