Protistan Diversity of Benthic Habitats in Narragansett Bay

Erin Frates[1], Dr. Roxanne Beinart[2]

[1]Cell and Molecular Biology, [2]Graduate School of Oceanography

For my Honors Project, I analyzed 18S rRNA sequencing data in order to understand the biodiversity of protists (unicellular, eukaryotic microbes) inhabiting Narragansett Bay's seafloor. To generate this data, sediment cores from three locations across Narragansett Bay (Fig. 1) were collected over three seasons, and the top six centimeters of the cores were subsampled (Fig. 2). The DNA from microbes living in these sediment subsamples was extracted, amplified, and sequenced. The resulting "fingerprint" amplicon sequences were used to assess the distribution and diversity of benthic protists.

The taxonomic composition of each sample was assessed, and the taxa present in each sample were compared according to location. Although all sites were dominated by Dinoflagellata, variations were evident according to site. Samples collected at Providence River and Wickford Harbor appeared to show similar diversity trends; these sites are host to a higher abundance of Apicomplexa. Mid Bay samples host relatively few Apicomplexa, but had a notably high abundance of Ciliophora (Fig. 3). The Shannon Diversity Index was used to examine the degree of diversity and evenness according to season and sampling location. Diversity and evenness appear relatively similar at most sites, but appear to increase during the spring (Fig. 4). Samples collected from each location showed a phylogenetic similarity to those from the same location. All three sampling sites formed distinctly separate clusters, which demonstrate the phylogenetic disparity between different locations. No clustering was apparent according to season (Fig. 5).

The distribution pattern of benthic protists in Narragansett Bay correlate closely with sampling location. Therefore, future work will be directed at identifying the differing environmental conditions at all three sites. The geochemical characteristics of each location will be compared in order to understand the abiotic factors that influence the benthic protistan communities of Narragansett Bay.