Effects of Varying Environmental Conditions on Marine Viral Community Composition in Mount Hope Bay, Green Hill Salt Pond, and Quonochontaug Salt Pond

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Cyanobacteria are photosynthetic bacteria found in the oceans and they are one of the most important primary producers in the marine environment. Cyanophages are viruses that infect these cyanobacteria. There are many different types of cyanobacteria and cyanophage with different phages infecting different bacterial cell types. It is known that the cyanophage community composition changes seasonally, with an increase in viral abundance and diversity in the summer months. However, less is known about how environmental conditions during a given season affect the cyanophage community composition. The objective of this research was to examine how different environmental conditions such as temperature and salinity in Green Hill Pond, Quonochontaug Pond, and Mount Hope Bay influence the community composition of cyanophages. These different sites were sampled and the community compositions of *Synechococcus*-infecting cyanophages were analyzed. Viral abundance was estimated through most probable number assays and viruses were isolated using extinction dilution assays with *Synechococcus* strain WH7803. The DNA polymerase gene from the viral isolates was amplified via PCR and then sequenced. These sequenced viral isolates from Mount Hope Bay, Green Hill Pond and Quonochontaug pond were grouped into OTUs based on a 99% sequence similarity. It was estimated that there were 2.9x105 viruses per milliliter of water in Green Hill Pond, 210 viruses per milliliter in Mount Hope Bay, and 39 viruses per milliliter in Quonochontaug Pond. The sites had some variation in terms of environmental conditions which may have led to the differences in viral abundance and diversity of OTUs. A higher temperature correlated with a higher abundance of cyanophages as seen at the Green Hill Pond site. Preliminary results also show that among all three sites there are at least 26 OTUs with some overlap of OTUs between sites, however many of the OTUs in Green Hill Pond were unique to that location. Since viruses are the most abundant entities in the ocean, having a significant impact of nutrient cycling when they infect and kill their hosts, it is important that we understand them and how environmental changes due to global warming may affect microbial communities in the marine environment.

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