Undergraduate Internship Project #5 of 7 for FY12

Intern Julia Hagemeyer's project, co-sponsored by the DWRC and UD’s College of Earth, Ocean, and Environment, was titled “Characterization of Viral Density within the Mantel Fluid of the Eastern Oyster, Crassostrea virginica.” She was advised by Dr. K. Eric Wommack the UD’s Department of Plant and Soil Sciences.

Abstract

The eastern oyster is a vital proponent of the estuarine environments along the Atlantic coast. It is considered a keystone species and is what keeps the water clean and provides shelter. This study looked into the microbial and viral communities that reside within these oysters’ mantle fluids. In this study we looked at three different methods of oyster concentration: ultracentrifugation, direct flow filtration, and iron chloride flocculation. The method of ultracentrifugation proved to recover only 2.4% of the viruses in the sample and was not considered useful. We then optimized the direct flow filtration and were able to get recoveries as high as 185.2% (although we believe the samples may have been contaminated with bacterial DNA). Unfortunately this method did not amplify well with PCR so it also proved to be unhelpful. The last method that we optimized was the iron chloride flocculation. This method recovered up to 92% of the viruses and also amplified the best of any sample (but only once a dialysis step was included into the procedure). Overall we found that the best method at this time is that of iron chloride flocculation with a dialysis step (in order to remove PCR inhibition) to concentrate viruses and extract viral DNA from oyster mantle fluid. Unfortunately we also found that one oyster is not enough to provide sufficient DNA to sample, but a compilation of 15 oysters would be adequate. Ultimately this research may lead to an increased understanding of interactions between oysters and their microbial and viral communities, thus impacting efforts to restore this keystone species.