

<Microbial Distribution and Community Composition of the Bohai Sea in the North of China>

by

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SUMMARY

Microorganism has been considered to be the most abundant community in the marine ecosystem, they mainly conduct their roles by acting as decomposers, consumers and producers. They are main drivers in the biogeochemical cycle, they can control the marine biomass and play a paramount role in microbial food web. So the role of marine microbial in the marine ecosystem has gained increasing attention in recent years. With the characteristics of high abundance and wide distribution, heterotrophic bacteria has been considered to be one of the most important factor in deciding the development of basic aquatic food web. It will be vital for marine resources protection to study the relationships between microbial distribution and environmental factors. Virioplankton mainly include bacteriophage and cyanophage which have been confirmed to be the most abundant marine plankton in the world. At present, the widely observed abundance of virioplankton range from 10^4 ml^{-1} (oligotrophic sea area) to 10^8 ml^{-1} (eutrophic sea area), which is nearly one order of magnitude higher than the abundance of heterotrophic bacteria. Virioplankton can modulate the conversion between particle organic matters and dissolved organic matters by the process of host cell lysis. So the virioplankton play a pivotal role in the process of biogeochemical cycles. Furthermore, virioplankton can also have an impact on the microbial diversity and community structure through the process of dynamic succession and genetic transformation. Bohai Sea is an important continental sea which located in the north of China with an average depth of 18m. It is an important fishing and spawning area which have taken great benefit to people nearby. So it will be of great importance to protect the ecology environment in this area. In this study, we used the flow cytometry to enumerate the number of virioplankton and bacterioplankton for evaluating the biomass of Bohai Sea. The results demonstrated that the macroscale distribution of virioplankton and heterotrophic bacteria had a close connection to salinity and concentrations of $\text{PO}_4\text{-P}$ and $\text{NO}_3\text{-N}$. This thesis illustrated that the distribution of virioplankton and heterotrophic bacteria in the Bohai Sea were impacted by the seasonal

variation and nutrient availability. Also this thesis provides the first insight into the community structure of microbial in the Bohai Strait which is influenced by the open sea input such as the Yellow Sea Warm Current (YSWC). It was concluded that the YSWC flushes the microbial community in the Bohai Sea, and suggested that the YSWC entered the Bohai Sea with poor biomass and exited with rich biomass, converting the Bohai Sea nutrients to microbial biomass, which is flushed into the Yellow Sea and that enriches the Yellow Sea microbial loop.