

Seasonal Variation of Bacterioplankton Community Structure and the Dominant Groups in the Ariake Sea and Tachibana Bay

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The Ariake Sea and Tachibana Bay are one of the most productive estuarine-coastal environments around northern Kyushu, Japan. In recent years, growing concerns on the marine environmental degradation have led to numerous studies on physical, chemical and biological characteristics of the marine ecosystem. However, little is known about the microbial community that drives biogeochemical processes in this area. We therefore initiated a preliminary survey in order to reveal dynamics of the bacterioplankton community structure in the Ariake Sea and Tachibana Bay in March through October 2011.

Based on the community fingerprinting with Automated Ribosomal Intergenic Spacer Analysis (ARISA), we found (1) a distinctive shift in the bacterial community structure between spring (March and June) and summer/autumn months (July to October), (2) a clustering pattern of the bacterial community along a spatial gradient from the Ariake Sea to Tachibana Bay, and (3) a sharp drop in similarity between the surface and bottom bacterial community of Tachibana Bay in summer (August).

Furthermore, we found predominance of two types of bacterial ribosomal ITS (rITS) fragments, 215 and 234 bp in size, together which represented up to 90 % of the integrated signal from all the rITS fragments in each sample of Tachibana Bay. Interestingly, the first and the second major rITS fragment were switched to each other between spring and summer/autumn samples. It was further demonstrated that water temperature was positively correlated with relative dominance of the 215 bp fragment, while negatively correlated with the 234 bp fragment.

The present results suggest that water temperature is a major environmental driver of changes in bacterioplankton community structure in the Ariake Sea and Tachibana Bay.