

Studies on the bacterioplankton community and its relationship to phytoplankton in the Three-Gorge reservoir

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After the impoundment of the Three-Gorges Reservoir, the eutrophication and algae blooms of tributary had become a subject extensively concerned. The scientific understanding about the endogenous cycle of nutrient which was driven by the bacteria in the lake paludification process of reservoir is still scarce. Bacterioplankton play a key role in planktonic ecosystems. There has been a lot of results pertaining to bacterioplankton diversity in freshwater, but the studies in the Three-Gorge reservoir is very limited.

A total of 4467 clones were obtained from 48 water samples, and most of clones belonged to the clusters *α-Proteobacteria*、*β-Proteobacteria*、*γ-Proteobacteria*、*Firmicutes*、*Bacteroidetes*、*Verrucomicrobia*、*Planctomycetes bacterium*、*Novosphingobium sp. α-*、*β-Proteobacteria*, and *Firmicute* were the main dominant groups of in River Zhuyi, River Meixi, River Caotang, and adjacent main stream.. Each gene group all showed various seasonal changes. The abundance of phytoplankton ranged from 0.22×10^5 to 866.775×10^5 cells/L.

Correlation analysis showed that influence on bacterioplankton of factors associated with phosphorus were more obvious in the upper water column, otherwise factors related nitrogen in the middle and deeper water column were more evident. The abundance and community diversity of bacterioplankton were significantly correlated with the abundance of phytoplankton. The group of *Actinobacteria* and *Bacteroidetes* had obvious negative correlation with *Pandorina morum*, the group of *β-proteobacteria* had positive correlation with *Cosmarium*, *Chlamydomonas* and *Closterium ehrenbergii*. The group of *β-Proteobacteria* and *Bacteroidetes* was significantly positive related to *Chlorophyll a*. These result indicated that the bacterioplankton play an important role in the process of algae bloom in the Three-Gorge reservoir, and it will contribute to enrich the scientific data of Lake Paludification research in the Three Gorges Reservoir and form novel knowledge accumulation on the mechanism of reservoir eutrophication.