初秋南沙群岛海域网采浮游植物群落特征及其与环境因子的关系

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Characteristics of net phytoplankton community and their relationships to environmental factors in the waters around Nansha Islands

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摘要

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摘要

根据2011年8—9月南沙群岛海域的生物和环境调查资料,对网采浮游植物的群落特征及其与环境因子的关系进行分析.结果表明: 在鉴定的3门34属113种网采浮游植物中,甲藻门和硅藻门种类各占57.5%和40.7%,其中硅藻门的角藻属种类最多,占30.1%.网采浮游植物平均丰度为2.12×10^4 cell·m^{-3},丰度高值区出现在北部礼乐滩多涡区域和南部万安气旋涡附近海域.蓝藻门束毛藻属是网采浮游植物的主要功能群,占海域平均丰度的77.0%.主要优势种为铁氏束毛藻、红海束毛藻和夜光梨甲藻.优势种(类)存在较明显的空间差异,蓝藻门在S_3、S_5、S_6和$S_{10} \sim S_{14}$站占优势;甲藻门在中部S_4、$S_7 \sim S_9$站占优势,硅藻门在南部S_1和S_2站占优势.网采浮游植物多样性和均匀度指数分别为3.10和0.62.影响浮游植物群落特征的重要环境因子有盐度、水温、铵氮、亚硝酸盐、磷酸盐和硅酸盐,以及南沙中尺度气旋涡和南沙西部沿岸流.典范对应分析排序图较好地显示了浮游植物和环境因子之间的关系.

关键词： 浮游植物   环境因子   典范对应分析   南沙群岛

Abstract：

Based on samples collected in the waters around Nansha Islands from August 25 to September 28, 2011, the characteristics of net phytoplankton community and their relationships to environmental factors were investigated. A total of 113 species, belonging to 34 genera of 3 phyla were identified, among which 57.5% belonged to Pyrrophyta and 40.7% belonged to Bacillariophyta.   Ceratium   in Pyrrophyta had the most species accounting for 30.1% of the 113 species. The average abundance of net phytoplankton was 2.12×10^4 cell·m^{-3} and high abundances were encountered in the complex gyre adjacent to Reed Tablemount and in the Cyclonic Gyre adjacent to Wan' an Tan.   Trichodesmium   in Cyanophyta was the dominant functional group, taking up 77.0% of the total net phytoplankton abundance. *Trichodesmium thiebautii*, *T. erythraeum* and *Pyrocystis noctiluca*   were the major dominant species. The dominant species varied with locations. Cyanophyta widely dominated at stations 3, 5, 6 and 10-14, Pyrrophyta were the dominant phytoplankton in the central locations at stations 4 and 7-9, while Bacillariophyta dominated only at the southernmost stations 1 and 2. The values of Shannon index and Pielou evenness index of net phytoplankton community were 3.10 and 0.62, respectively. The salinity, water temperature, contents of ammonium, nitrite, phosphate and silicate, as well as mesoscale gyres and the west Nansha coastal current were the important environmental factors affecting the characteristics of net phytoplankton community. The ordination plots by canonical correspondence analysis could well display the characteristics of net phytoplankton community and their relationships to environmental factors.

Key words： phytoplankton   environmental factor   canonical correspondence analysis   Nansha Islands.

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