

2009年春季长江口及其邻近水域浮游植物——物种组成与粒级叶绿素a

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Phytoplankton in Yangtze River estuary and its adjacent waters in spring in 2009: Species composition and size-fractionated chlorophyll a.

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摘要

于2009年4月在长江口及其邻近水域采集浮游植物水样,用Utermöhl方法进行初步分析,同时进行叶绿素a粒级分离研究,并采用典范对应分析讨论了浮游植物优势物种与各环境因子的关系.本次调查共鉴定浮游植物3门46属64种(不包括未定名种),其中硅藻33属45种(不包括未定名种),甲藻12属18种(不包括未定名种),定鞭藻1属1种,硅藻在细胞丰度和物种丰富度上占有优势.浮游植物的生态类型主要以温带近岸种为主,优势物种为多尼骨条藻(*Skeletonema dohrnii*)、具槽帕拉藻(*Paralia sulcata*)、菱形海线藻(*Thalassionema nitzschioides*)、尖刺伪菱形藻(*Pseudo-nitzschia pungens*)、颗粒直链藻狭型变种(*Melosira granulata* var. *angustissima*)、柔弱伪菱形藻(*Pseudo-nitzschia delicatissima*)和柔弱几内亚藻(*Guinardia delicatula*),同时调查区也出现少数的半咸水种和大洋种.调查区浮游植物细胞丰度介于0.3~13447.7 cells·ml⁻¹,平均为1142.385 cells·ml⁻¹,硅藻的细胞丰度显著高于甲藻.细胞丰度高值区位于调查区的中部偏北区域,以多尼骨条藻为主.垂向上在表层出现最大值,随着深度的增加丰度降低.调查区的Shannon多样性指数和Pielou均匀度指数的平面分布基本一致,并且与细胞丰度呈镶嵌分布,即在细胞丰度高的调查区中北部较低.表层叶绿素a浓度介于0.34~29 g·L⁻¹,平均为3.30 g·L⁻¹.叶绿素a的高值区主要位于调查区的中部偏北区域,其分布趋势与浮游植物和硅藻细胞丰度的分布基本一致.主要粒级组分为小型浮游植物(microphytoplankton),而其他靠近外海一侧的站位则以微型浮游植物(2~20 μm, nanophytoplankton)和超微型浮游植物(<2 μm, picophytoplankton)为主.与环境因子的典范对应分析(CCA)表明,春季长江口影响最优势物种多尼骨条藻分布的主要因素为硝酸盐、pH和微型浮游动物,而包括甲藻在内的其他各物种则主要受盐度、磷酸盐和硅酸盐影响.本次调查浮游植物定量研究方法与以往不同,在长江口今后需要加强骨条藻的个体生态学研究.

关键词: 浮游植物 群集结构 粒级叶绿素a 长江口 典范对应分析 春季

Abstract:

Based on the multidisciplinary cruise investigation in the Yangtze River estuary and its adjacent waters in April 2009, the phytoplankton species and their abundance were analyzed by the Utermöhl method, and the size-fractionated chlorophyll a concentrations were determined. In the meantime, the relationships between the dominant phytoplankton species and environmental physicochemical factors were explored by Canonical Correspondence Analysis (CCA). A total of 3 phyla, 46 genera, and 64 species (not including uncertain species) were found, mostly diatoms and dinoflagellates, with diatoms dominant. Most of these species were temperate and coastal, but a few brackish and oceanic species also presented. There were 33 diatom genera including 45 species. The dominant species were *Skeletonema dohrnii*, *Paralia sulcata*, *Thalassionema nitzschioides*, *Pseudo-nitzschia pungens*, *Melosira granulata* var. *angustissima*, *Pseudo-nitzschia delicatissima*, and *Guinardia delicatula*. The phytoplankton cell abundance ranged from 0.3 to 13447.7 cells·ml⁻¹, with an average of 1142.385 cells·ml⁻¹. Concerning the horizontal distribution, cell abundance was the highest in the middle-northern part of the survey area, with *S. dohrnii* dominant. The phytoplankton cell abundance was high in the surface layer water, and decreased with increasing depth. The Shannon diversity index and Pielou evenness index were consistently low in the middle-northern part of the survey area, in contrast to the trend of phytoplankton cell abundance. The chlorophyll a concentrations ranged from 0.34 to 29 g·L⁻¹, with an average of 3.3 g·L⁻¹, consistent with the cell abundance distribution. Size-fractionated chlorophyll a results showed that the biomass in the middle-northern part of the survey area was mainly composed of microphytoplankton (>20 μm), while that in offshore waters was mainly composed of nanophytoplankton (2-20 μm) and picophytoplankton (<2 μm). The CCA showed that the distribution of predominant species *S. dohrnii* was mainly affected by the water nitrate content, pH value, and microzooplankton grazing. On the contrary, the distribution of other common species including dinoflagellates was mainly associated with water salinity, and phosphate and silicate contents. The paper also compared the

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differences in the methods of phytoplankton quantification used by the present study and by the previous studies based on net samples. It was suggested that in future work, the autecological study of genus *Skeletonema* in the Yangtze River estuary and its adjacent waters should be strengthened.

Key words: phytoplankton assemblage structure size-fractionated chlorophyll a Yangtze River estuary canonical correspondence analysis spring

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[1] 陈立婧,吴竹臣,胡忠军,彭自然,刘其根. 上海崇明岛明珠湖浮游植物群落结构[J]. 应用生态学报, 2011, 22(06): 1599-1605.