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淀山湖浮游植物群落特征及其演替规律

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Phytoplankton community structure and its succession in Dianshan Lake

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摘要 为探明淀山湖浮游植物群落结构演变与富营养化之间的关系, 于2004–2006年对上海市最大天然淡水湖泊淀山湖的浮游植物进行逐月采样调查, 分析其群落结构特征。共采集到淀山湖浮游植物84属205种, 主要由绿藻(种类数占50%)、硅藻(20%)、蓝藻(13%)、裸藻(13%)等组成。相邻两月之间种类相似性系数呈现冬春季高、夏秋季低的趋势; 优势种为银灰平裂藻(*Merismopedia glauca*)、小席藻(*Phormidium tenus*)、铜绿微囊藻(*Microcystis aeruginosa*)、具缘微囊藻(*M. marginata*)、湖泊鞘丝藻(*Lyngbya limnetica*)、微小色球藻(*Chroococcus minutus*)、颗粒直链藻最窄变种(*Melosira granulata* var. *angustissima*)、啮蚀隐藻(*Cryptomonas erosa*)、小球藻(*Chlorella vulgaris*)和四尾栅藻(*Scenedesmus quadricauda*)等。浮游植物群落细胞数量主要由蓝藻(42.73%)、绿藻(37.75%)、硅藻(12.67%)和隐藻(6.06%)组成; 生物量主要由硅藻(36.75%)、蓝藻(16.78%)、绿藻(16.36%)和隐藻(13.53%)等组成。淀山湖浮游植物群落结构季节演替模式不同于PEG (Plankton Ecology Group)模型, 其中蓝藻从春末开始大量出现, 夏季大量繁殖, 一直延续到秋初。综合文献资料看出, 淀山湖浮游植物群落已从1959年的硅藻–金藻型、1987–1988年的隐藻–硅藻型演变为2004–2006年的蓝藻–绿藻型; 数量由1959年的10^3 ind./L上升至2004–2006年的1.11×10^7cells/L。演替的总体趋势表现为: 贫中营养型的金藻、甲藻比例下降, 富营养型的蓝藻、隐藻和微型绿藻增加。浮游植物数量和群落结构的演变指示了淀山湖水体的富营养化进程。

关键词: 浮游植物 优势种 群落结构 演替 富营养化

Abstract: Phytoplankon samples were collected monthly in Dianshan Lake, the largest natural freshwater lake in Shanghai during 2004–2006, to assay the phytoplankton community structure and ascertain the rela-tionship between its succession and the eutrophication for the lake. Two hundred and five species from 84 genera were identified in Dianshan Lake, with Chlorophyta (50%), Bacillariophyta (20%), Cyanophyta (13%) and Euglenophyta (13%) being the main phyla. The monthly similarity index of species was high in winter and spring, while low in summer and autumn. The dominant species were *Merismopedia glauca*,*Phormidium tenus*, *Microcystis aeruginosa*, *M. marginata*, *Lyngbya limnetica*, *Chroococcus minutus*, *Melosira granulata* var. *an-gustissima*, *Cryptomonas erosa*, *Chlorella vulgaris* and *Scenedesmus quadricauda*. The total phytoplankton abundance was mainly composed of Cyanophyta (36.75%), Chlorophyta (16.78%), Bacillariophyta (16.36%) and Cryptophyta (13.53%). The total phytoplankton biomass was dominantly made up of Bacillariophyta (36.75%), Cyanophyta (16.78%), Chlorophyta (16.36%) and Cryptophyta (13.53%). The seasonal succession of phytoplankton community structure in Dianshan Lake was different from the PEG Model, with Cyanophyta of great abundance occurring at the end of spring, then dominating in summer and the early autumn. In the past five decades, the succession pattern of phytoplankton community in the Dianshan Lake showed a decrease in the proportion of such oligotrophic species as Chrysophyta and Dinophyta and an increase in such eutrophic species as Cyanophyta, Cryptophyta and Chlorophyta. The abundance increased from 10^3 ind./L in 1959 to 1.11×10^7cells/L during 2004–2006. The phytoplankton community structure changed from Bacillariophyta-Chrysophyta type in 1959, Bacillariophyta-Cryptophyta type during 1987–1988 to Cyano-phyta-Chlorophyta type during 2004–2006. The changes in the abundance and structure of phytoplankton community and its seasonal succession indicated the evolving eutrophication of Dianshan Lake.

Keywords: phytoplankton dominant phytoplankton species community structure community succession eutrophication Dianshan Lake

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