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研究论文

基于个体大小的后生浮游动物群落结构分析——以广东星湖为例

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摘要 星湖是一个位于热带北缘的浅水湖泊。于2002年和2003年对该湖的后生浮游动物进行了采样，并以体重作为个体大小变量研究了浮游动物的个体大小组成结构。星湖后生浮游动物的体长范围为50～1300μm，所有优势种的体长均小于1mm。轮虫优势种中，体长最小的是剪形臂尾轮虫、角突臂尾轮虫和广布多肢轮虫等，它们的平均体长均小于100μm。前节晶囊轮虫是个体最长的轮虫。枝角类的优势种及次优势种为长额象鼻、颈沟基合、短尾秀体和微型裸腹等中小型种类，平均体长介于220～430μm之间。桡足类优势种为台湾温剑水蚤和温中剑水蚤，平均体长介于680～730μm之间，此外，无节幼体和剑水蚤幼体在数量和生物量上也比较高。后生浮游动物的个体体重范围为0.034～70.24μg，绝大部分种类都分布在3个体重等级以上，其中前节晶囊轮虫的分布范围最宽，为0.548～70.24μg。后生浮游动物的种类和数量均是以小个体为主，并且随着体重增大逐渐减少，而生物量则在4.39～8.78μg这一中等个体体重的位置上出现峰值。根据对两个子湖——波海湖和青莲湖2002年和2003年生物量分布的分析与比较，2003年生物量均有所下降，在生物量分布的每个体重等级上轮虫基本上都是第一优势类群，其次是桡足类。星湖后生浮游动物的个体大小范围和出现生物量峰值的位置均小于温带湖泊，其个体大小结构特征与位于赤道附近的热带湖泊相似。除了与营养水平较高有关外，鱼类的下行效应和水温可能是影响该湖后生浮游动物的大小结构而产生与温带湖泊差异的重要因素。因此，进一步研究该湖中浮游动物和鱼类的关系将有助于在热带湖泊中利用生物操纵来改善水质。

关键词 后生浮游动物；个体体重；大小结构；热带湖泊

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Size structure of the metazoan zooplankton community in a tropical lake: Xinghu Lake, South China

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Abstract Xinghu Lake, a shallow tropical lake consisting of five basins was examined for its metazoan zooplankton in 2002 and 2003. The size structure of the metazoan zooplankton was analyzed by taking body mass as the size variable. Body length varied from 50μm and 1300μm, with all dominant species less than 1mm long. The smallest dominant species were the Rotifera Brachionus forficula, Brachionus angularis and Polyarthra vulgaris, with an average length less than 100μm. Asplanchna priodonta was the largest rotifer. The main cladocerans, Diaphanosoma brachyurum, Moina micrura, Bosminopsis deitersi and Bosmina longirostris, had an average size between 220 and 430μm. In copepod, Thermocyclops taihokuensis and Mesocyclops thermocyclopoides were dominant, and their average lengths were 730μm and 680μm, respectively. Nauplii and cyclopoid copepodites also had high abundance and biomass.

The body mass of the metazoan zooplankton ranged from 0.034μg to 70.24μg, and included more than two size classes for almost every species examined. Asplanchna priodonta had the largest range of body mass, 0.548～70.24μg. Both species number and abundance of the metazoan zooplankton were dominated by the small-sized species, and decreased with body mass, while biomass distribution had a peak in the medium size class, 4.39μg to 8.78μg. In two basins, Bohai and Qinglian, Rotifera contributed most to biomass in almost each size class, followed by copepod. Both the size range of the zooplankton and the body size at which peak biomass occurred were lower than in temperature lakes. Although Xinghu Lake is located far from the Equator, the size structure of its zooplankton is that of a typical equatorial lake. Besides the eutrophic status， pre

dation by planktivorous fish and temperature appear to be the main factors controlling this size structure. The fact that the zooplankton community was dominated by small-sized animals suggests that predation effects need to taken into account in the application of biomanipulation to the lake.

Key words metazoan zooplankton _ body mass _ size structure _ tropical lake

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