

研究论文

南海北部海域 *Synechococcus* 和 *Prochlorococcus* 生长率和被摄食消亡率

——变化范围及其与环境因子的关系

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摘要 2004年首次在南海北部海域使用选择性代谢抑制剂技术进行了 *Synechococcus* 和 *Prochlorococcus* 生长率和被摄食消亡率的研究。研究表明, *Synechococcus* 高丰度值出现在次表层 (15 m或20 m), 位于温跃层之上, 高生长率往往出现在丰度最大值水层上方; *Prochlorococcus* 丰度在夏季出现次表层最大值, 与温跃层深度基本一致, 表层生长率高于真光层底部。 *Synechococcus* 真光层平均生长率为0.11~1.18 d⁻¹, 被摄食消亡率为0.11~0.76 d⁻¹, 分布格局均为从沿岸向外海方向升高。 *Prochlorococcus* 真光层平均生长率为0.23~0.49 d⁻¹, 存在较明显的季节变化, 夏季近岸略高于外海, 而冬季的趋势正好相反; 真光层平均被摄食消亡率为0.12~0.33 d⁻¹, 冬夏两季均是近岸高于外海。温度、营养盐和光是影响 *Synechococcus* 生长率变化的重要因子。 *Synechococcus* 和 *Prochlorococcus* 丰度与群落生长率之间不存在相关关系, 而与摄食消亡率之间则存在显著的指数相关。根据 *Synechococcus* 和 *Prochlorococcus* 的生长率估算了它们的生产力及其对Pico-生产力的贡献

关键词 [*Synechococcus*; *Prochlorococcus*; 丰度; 生长率和被摄食消亡率; 南海](#)

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Synechococcus and *Prochlorococcus* growth and mortality rates in the northern China Sea: range of variations and correlation with environmental factors

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Abstract Studies on *Synechococcus* and *Prochlorococcus* growth and mortality rates using selective inhibitor technique for the first time were conducted in the northern South China Sea in 2004. The results showed that high abundance of *Synechococcus* appeared in the subsurface layer (15 m or 20 m), above the thermochline. The high *Synechococcus* growth rate always occurred above the layer of its maximum abundance. *Prochlorococcus* abundance showed subsurface maximum in the summer according to the thermochline depth. *Prochlorococcus* growth rates in the surface were higher than that in the euphotic bottom. The range of *Synechococcus* euphotic-averaged growth and mortality rates were 0.11~1.18d⁻¹ and 0.11~0.76d⁻¹, respectively. Both distribution patterns increased from the coast to the open ocean. The range of *Prochlorococcus* euphotic-averaged growth rates were 0.23~0.49d⁻¹. The rates showed obviously seasonal variation, i.e., slightly higher in coastal water than offshore in the summer and contrary trends in the winter. The range of *Prochlorococcus* euphotic-averaged mortality rates were 0.12~0.33d⁻¹. The rates were higher in near shore than offshore in both summer and winter. Temperature, nutrients and light were important factors to influence *Synechococcus* growth rates. There were no relationship between abundances and community growth rates of *Synechococcus* and *Prochlorococcus*, b

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ut obvious exponential correlation with the mortality rates. *Synechococcus* and *Prochlorococcus* production and their contributions to Pico-production were estimated based on their growth rates.

Key words *Synechococcus* *Prochlorococcus* abundance growth and mortality rate south China Sea

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