

Association for the Sciences of Limnology and Oceanography





Home

Members

Libraries

Publications

Meetings

Employment

Activities

Search

Effects of inorganic nitrogen on taxa-specific cyanobacterial growth and nifH expression in a subtropical estuary

Moisander, Pia H., Hans W. Paerl, Jonathan P. Zehr

Limnol. Oceanogr., 53(6), 2008, 2519-2532 | DOI: 10.4319/lo.2008.53.6.2519

ABSTRACT: The potentially toxic, diazotrophic filamentous cyanobacterium Cylindrospermopsis raciborskii has recently become a common component in the summer phytoplankton in the St. Johns River (SJR) estuary, Florida, where *Anabaena* spp. historically dominated. Using a microcosm nutrient enrichment experiment, we investigated the ability of C. raciborskii and Anabaena spp. to compete under a range of available NO, and NH, concentrations, to test the hypothesis that C. raciborskii benefits from increased dissolved inorganic nitrogen (DIN) availability. TaqMan quantitative polymerase chain reaction (PCR) probes were designed, tested, and applied to target the nifH gene in one C. raciborskii and two Anabaena spp. strains from the SJR. N limitation prevailed, as shown by increased N,-fixation rates if no N was added, increased chlorophyll a concentrations when DIN was added, and depletion of added DIN. Anabaena spp. and C. raciborskii showed rapid growth with no DIN additions and were the main taxa responsible for N, fixation. Abundances of C. raciborskii increased if NH, was added, but nifH was expressed at low levels, suggesting growth was relying on NH₄. Anabaena spp. and C. raciborskii expressed nifH genes when NO, or NH, were present, but expression was higher with NO,. The *narB* gene sequence was amplified from Anabaena spp. and C. raciborskii from the SJR, suggesting these taxa are capable of assimilating NO,: However, even small NO, additions blocked the growth of Anabaena spp. in the mixed phytoplankton community but not that of C. raciborskii. The results suggest that C. raciborskii in the SJR is a stronger competitor than Anabaena spp. when DIN is

Article Links

Download Full-text PDF

Return to Table of Contents

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.
