Cyanobacterial Diversity and Nitrogen Fixation in Coastal Areas around Zanzibar, Tanzania

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Abstract

Cyanobacterial diversity and nitrogen fixation were examined in coastal areas around Zanzibar, Tanzania. Samplings were performed intermittently from June 1997 to October, 1999 from plankton, intertidal and subtidal microbial mats as well as from epiphytes on seagrasses and seaweeds. A total of 21 cyanobacterial genera comprising 50 species are described, out of which 64% were filamentous non-heterocystous forms, 24% heterocystous forms and 12% unicellular forms. Non-heterocystous Oscillatoria spp. dominated the microbial mats and epiphytic habitats, and the like-wise non-heterocystous Trichodesmium spp. were the most abundant cyanobacteria in net samples. Fourteen of the species identified were analyzed for the ability to fix dinitrogen using the acetylene reduction assay and eleven species showed nitrogenase activity. Six of these species were also subjected to immuno-blotting. The presence of a nitrogenase (Fe-protein) protein with an average molecular weight of 36 kDa was detected. The results suggest higher cyanobacterial diversity in the area investigated than previously reported and indicate that the capacity to fix molecular nitrogen is present in a number of species that are often prominent in these habitats. It is therefore concluded that cyanobacteria may have an important role and may contribute to new N-production in coastal areas of Tanzania.

Keywords

Enzymatic activity
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