

RESEARCH ARTICLE

First evidence of *Halomicronema metazoicum* (Cyanobacteria) free-living on *Posidonia oceanica* leaves

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Abstract

Cyanobacteria contribute to the ecology of various marine environments, also for their symbioses, since some of them are common hosts of sponges and ascidians. They are also emerging as an important source of novel bioactive secondary metabolites in pharmacological (as anticancer drugs) and biotechnological applications. In the present work we isolated a cyanobacteria in a free-living state from leaves of the seagrass *Posidonia oceanica* leaves. This newly collected strain was then cultivated under two laboratory conditions, and then characterized by combining morphological observation and molecular studies based on 16S rRNA gene sequences analysis. The strain showed 99% pairwise sequence identity with *Halomicronema metazoicum* ITAC101, never isolated before as a free-living organisms, but firstly described as an endosymbiont of the Mediterranean marine sponges *Petrosia ficiformis*, under the form of a filamentous strain. Further studies will investigate the actual role of this cyanobacterium in the leaf stratum of *P. oceanica* leaves, given its demonstrated ability to influence the vitality and the life cycle of other organisms. In fact, its newly demonstrated free-living stage, described in this study, indicate that *Phormidium*-like cyanobacteria could play important roles in the ecology of benthic and planktonic communities.

Introduction

Cyanobacteria (*Cyanoprokaryota/Cyanophyta*) are the most ancient and dominant groups of photoautotrophic/photosynthetic and Gram-negative organisms, which played a major role in the evolution of the plant kingdom and Earth's atmosphere. These organisms (blue-green algae) are ubiquitous in nearly all ecosystems and found as unicellular or colonial species. They resemble both bacteria and algae, exhibiting features linking them to both groups [1]. Cyanobacteria are characterized by widespread distribution in both aquatic and terrestrial ecosystems, and they are disseminated in areas ranging from hot springs to the Arctic and