



Morphological diversity of benthic Nostocales (Cyanoprokaryota/Cyanobacteria) from the tropical rocky shores of Huatulco region, Oaxaca, México

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Abstract

The supratidal and intertidal zones are extreme biotopes. Recent surveys of the supratidal and intertidal fringe of the state of Oaxaca, Mexico, have shown that the cyanoprokaryotes are frequently the dominant forms and the heterocytous species form abundant and conspicuous epilithic growths. Five of the eight special morphotypes (*Brasilonema* sp., *Myochrotes* sp., *Ophiothrix* sp., *Petalonema* sp. and *Calothrix* sp.) from six localities described and discussed in this paper, are new reports for the tropical Mexican coast and the other three (*Kyrtuthrix* cf. *maculans*, *Scytonematopsis* cf. *crustacea* and *Hassallia littoralis*) extend their known distribution.

Key words: Marine environment, stressful environment, Scytonemataceae, Rivulariaceae

Introduction

The rocky shore is a highly stressful habitat, due to the lack of nutrients, elevated temperatures and high desiccation related to tidal fluctuation (Nagarkar 2002). Previous works on this habitat report epilithic heterocytous species that are often dominant especially in the supratidal and intertidal fringes (Whitton & Potts 1979, Potts 1980; Nagarkar & Williams 1999, Nagarkar 2002, Diez *et al.* 2007). On tropical rocky shores, primary producers such as cyanoprokaryotes, are able to fix atmospheric nitrogen (Nagarkar 2002, Diez *et al.* 2007); they are often the main epilithic components, and are distributed from the subtidal to the supratidal zone (Whitton & Potts 1979, Potts 1980; Nagarkar & Williams 1999, Nagarkar 2002), forming the base of the benthic food web and contributing greatly to the productivity and organization of the marine community in tropical coastal shores (Williams *et al.* 2000, Nagarkar *et al.* 2004).

Despite their ecological and physiological significance, little is known about the diversity of marine cyanoprokaryotes along the Mexican littoral (León-Tejera *et al.* 2009). There are a few reports for this group (León-Tejera *et al.* 2005, González-Resendiz *et al.* 2013) from the Oaxaca coast. The aim of this study is to describe the main morphotypes of supra- and intertidal epilithic heterocytous cyanoprokaryotes for the Tropical Mexican Pacific rocky shore.

Materials and Methods

Study site and sample collection:—Sampling was conducted between April 2004 and August 2014 in the supratidal and intertidal zones of five bays of the Huatulco region, and one site, Panteones beach, in Puerto Angel, located north of Huatulco. San Agustín and Cacaluta are within the Huatulco National Park (PNH); La Entrega, El Arrocito and Tangolunda are situated in Bahías de Huatulco south of PNH (Figs. 1A–1C), all in the tropical Mexican Pacific. Each site was collected between one and six times for a total of 56 samples. The tides of the coast of Oaxaca are mixed, with semidiurnal dominance. Conspicuous cyanoprokaryotic growths (Figs. 1B, 1D–1G) were collected with hammer and chisel along the supra and intertidal fringes, between 0–7 meters above sea level. Each sample was fixed with 4% formaldehyde in seawater and semi-permanent slides in glycerin gel were made.