



***Calochaete gen. nov.* (Cyanobacteria, Nostocales), a new cyanobacterial type from the “páramo” zone in Costa Rica**

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Abstract

A new tapered and false branched morphotype of filamentous heterocytous cyanobacterium was isolated from soil material collected on a massif of Chirripó Mountain, Costa Rica. The strain was analyzed morphologically and a sequence of its 16S rRNA gene was compared with available 16S rDNA sequences of organisms with similar morphology, especially those with heteropolar tapering filaments. Phylogenetic analyses revealed that the strain was significantly different from Rivulariaceae, but was closely related to several strains designated as *Tolypothrix*. However, according to the original descriptions in the literature, members of the genus *Tolypothrix* possess only very slightly tapering filaments. With regard to all these differences, we decided to describe a new genus—*Calochaete gen. nov.* with type species *C. cimrmanii*.

Key words: 16S-23S ITS, 16S rRNA gene, Central America, Cyanoprokaryota, Microchaetaceae, morphology, new genus, taxonomy

Introduction

Mesoamerica and the Caribbean region are listed among the world's biodiversity hotspots and are known for their large number of endemic vertebrates and plant species (Myers *et al.* 2000). However, there is no reason to not extend this biodiversity to organisms much smaller and not so easily visible such as algae and Cyanobacteria. In this sense, the monograph by Gardner (1927), or more recent studies (e.g. Komárek & Komárková-Legnerová 2007, Kaštovský *et al.* 2011) that described previously unrecognized cyanobacterial diversity in the tropical regions of Central and South America, are very valuable.

Within the group of filamentous cyanobacteria with heterocytes (order Nostocales *sensu* Hoffmann *et al.* 2005), there are three groups of false branched types. The family Scytonemataceae has isopolar filaments and tapering can be found in two of the five genera belonging to this group. The families Rivulariaceae and Microchaetaceae are both characterized by heteropolar filaments; tapered types are included in the family Rivulariaceae, as tapering was traditionally considered the fundamental difference between these two families (Komárek & Anagnostidis 1989). The only known exception to date is *Godleya alpina* Novis et Visnovsky (2011: 14), which is distinctly tapered, but was classed to Microchaetaceae based on molecular markers.

In the course of a broader study on the floristics of aerophytic cyanobacteria of the San Gerardo de Rivas region, San José, Costa Rica (Mühlsteinová 2011), a new morphotype of a heterocytous cyanobacterium was found and isolated into a unicyanobacterial strain. The aim of this study was to characterize this unusual type using a combination of morphological and molecular data (referred to as the polyphasic approach). By recognizing and describing our isolate as a species new to science, our study contributes to knowledge about the species richness of one of the planet's biodiversity hotspots. Concurrently, we discuss the heterogeneity of the family Microchaetaceae in the current concept.