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Scytolyngbya timoleontis, *gen*. *et sp*. *nov*. (Leptolyngbyaceae, Cyanobacteria): a novel false branching Cyanobacteria from China

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Abstract

A novel genus within Leptolyngbyaceae related to *Leptolyngbya* morphotypes, *Scytolyngbya*, *gen*. *nov*., is described based on a polyphasic approach in the present study. From a freshwater sample with filaments of oscillatorean cyanobacteria from a well in Hubei Province, China, *Scytolyngbya* (type species: *Scytolyngbya timoleontis*, *sp*. *nov*.) was found to possess richly and repeatedly false branches and thick sheaths, which distinguishs this genus from *Leptolyngbya sensu stricto*. Phylogenetic analysis based on 16S rRNA sequences showed that this species was clustered into the Leptolyngbyaceae and separated from the type species *Leptolyngbya boryana*. The secondary structures of 16S-23S rRNA intergenic spacer of *Scytolyngbya timoleontis* did not correspond to any previously described species in cyanobacteria.

Key words: Cyanobacteria, *Leptolyngbya*, New genus, Polyphasic, *Scytolyngbya*, *Scytolyngbya timoleontis*

Introduction

Cyanobacteria are the most diverse group of prokaryotes, with morphologies ranging from simple unicells, colonies of coccid cells and filaments without differentiated cells to filaments with differentiated cells and branches (Waterbury 2006). They are widely distributed in rivers, lakes, reservoirs, streams, oceans and some extreme habitats such as hot springs, alkaline lakes, deserts soils and polar glaciers (Cohen & Gurevitz 2006). Traditionally, cyanobacterial taxa are classified based on morphological and ecological characters, but morphological variation under varying environmental factors and the culture conditions could be a major problem for cyanobacterial taxonomy (Stanier *et al*. 1971). The polyphasic approach, mainly using DNA sequences in addition to morphology and habitat preference, has brought resolution to the cyanobacterial taxonomic problem described above. 16S rRNA gene sequences and the 16S-23S rRNA internal transcribed spacer (ITS) have been widely applied in phylogenetic studies and generic determination of cyanobacteria (Nelissen *et al*. 1996, Casamatta *et al*. 2006, Johansen *et al*. 2011).

Oscillatoriales, characterized by filaments without differentiation of heterocytes and akinetes, is a particularly understudied order of cyanobacteria. Komárek and Anagnostidis (2005) classified Oscillatoriales, based on morphological and ecological features, into six families as Pseudanabaenaceae, Schizotrichceae, Borziaceae, Phormdiaceae, Gomontiellaceae and Oscillatoriaceae. Through continuous revisions in the past decade, the taxonomic system of cyanobacteria has been radically changed by several researchers such as Hoffmann *et al*. (2005) and Komárek *et al*. (2014), and the Oscillatoriales *sensu auct*. were separated into two orders, as Oscillatoriales (Osillatoriophycidae) and Synechococcales (Synechococcophycidae) which contains the genus *Leptolyngbya*, providing a strikingly novel image into the taxonomy of nonheterocystous filamentous cyanobacteria.

Leptolyngbya Anagnostidis et Komárek (1988: 327) was created as a new genus containing species all having very thin trichomes (generally 0.5–3.5 µm wide), with one trichome per sheath, and peripherally arranged thylakoids. The filaments are rarely or very rarely pseudobranched, and their sheaths are firm, thin, and hyaline. The genus includes species which traditionally were recognized as genera such as *Lyngbya* C.Agardh ex Gomont (1892: 118), *Phromidium* Kützing ex Gomont (1892: 156) and *Plectonema* Thuret ex Gomont (1892: 11) (Anagnostidis & Komárek 1988). This

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