

African Journal of Aquatic Science

First report of an *Anabaena* Bory strain containing microcystin-LR in a freshwater body in Africa

PJ Oberholster^{1,2}, S Jappie³, PH Cheng^{1,3}, AM Botha^{3*} and MW Matthews⁴

¹ CSIR Natural Resources and the Environment, Stellenbosch, South Africa

² Department of Paraclinical Sciences, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa

³ Department of Genetics, Stellenbosch University, Stellenbosch, South Africa

⁴ Marine Remote Sensing Unit, University of Cape Town, Cape Town, South Africa

* Corresponding author, e-mail: ambo@sun.ac.za

Abstract

In South Africa, little is known about the production of microcystin by the genus *Anabaena* Bory. In April 2012, during a cyanobacterial bloom event in Theewaterskloof Dam, Western Cape Province, the plankton was sampled on 10 occasions. The dominant algae belonged to the genus *Anabaena*, a family of filamentous cyanobacteria known to produce cyanotoxins such as anatoxin-*a*, harmful to humans and the aquatic foodweb. The specimens isolated lacked the characteristic akinetes and/or heterocysts associated with this genus. Therefore the 16S rRNA gene was Sanger sequenced and a maximum parsimony tree was constructed, confirming its identity as *Anabaena ucrainica* (Schkorbatow) M. Watanabe. Enzyme-linked immunosorbent assay (ELISA) confirmed the presence of microcystin-LR in the isolated *A. ucrainica* field sample, while PCR analysis and sequencing further confirmed the presence of *mcy* genes in this species. It was speculated from the data that prevailing low water-column temperatures and strong gusty winds may have resulted in the lack of akinete or heterocyst production. The *Anabaena* strain isolated from Theewaterskloof Dam is the first report of a strain containing microcystin-LR belonging to this genus in a freshwater body in Africa.