

BOOK OF ABSTRACTS

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Monitoring of physico-chemical parameters and their influence on the cyanobacteria occurrence: a case study in Alqueva reservoirs

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Abstract

Alqueva complex is constituted by 17 reservoirs/dams interconnected by waterways, being built to provide water for agricultural irrigation, as well as for human consumption and recreational activities in Alentejo region. Most of these reservoirs are eutrophic and show contamination by cyanobacteria. In this respect, it is important to characterize the quality of the water considering the concentration of cyanobacteria with toxic potential and cyanotoxins and its association with the commonly monitored physico-chemical parameters. Understanding the dynamics of cyanobacteria in water and its causes can help to predict future blooms and then to take measures in order to prevent water contamination and the human exposure to this contaminant. In this work, the relationship between the environmental physico-chemical variables and the abundance of each group of cyanobacteria was performed through the analysis of canonical correspondences (ACC). This analysis was done in two ways with monitoring data acquired periodically between 2012-2018, one with "standard ACC" and the other with "partial ACC", in which the effect of seasonal variation was eliminated. With this technique it was possible to verify that certain physico-chemical parameters, in relation to others, contribute significantly to the density of some genera/species of cyanobacteria, such as *Microcystis* and *Cylindrospermopsis* (among others cyanotoxin producers). Temperature was the most important variable in the gradients that define the abundance of, cyanobacteria, as it is a variable with a strong seasonal character and is strongly correlated with solar radiation, which is determinant in the increase of cyanobacteria production (reflected in chlorophyll a). Furthermore, chlorophyll was then another parameter with a great correlation with cyanobacteria, as well as nutrients such as nitrate, in which the greater the concentration of these parameters the greater the density of cyanobacteria. These results emphasize the potential threats of climate change and agricultural pollution, which favours an overall increase in temperature and the water eutrophication, contributing to an increase in the proliferation of toxic cyanobacteria. In conclusion, the mentioned physico-chemical parameters can serve as a useful tool for predicting the occurrence of toxic cyanobacteria allowing decision

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makers to prioritize reservoirs where it is necessary to maintain recurrent monitoring of cyanobacteria.

Keywords – Cyanobacteria; cyanotoxins; climate change; eutrophication; canonical correspondence analysis; physico-chemical parameters

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