

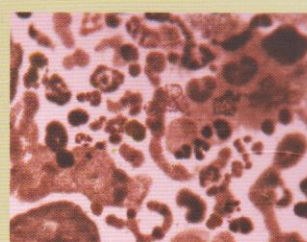


ICTC8

The 8th International Conference on
Toxic Cyanobacteria | Istanbul, TÜRKİYE
August 29th - September 4th, 2010



OFFICIAL PROGRAM AND ABSTRACT BOOK



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(ID 078)

Nutrient availability and climatic fluctuations control the distribution and temporal variability of cyanobacteria in the large and deep lakes south of the Alps

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This contribution reports the results of a synoptic study carried out on the ecology of cyanobacteria and phytoplankton in the large and deep lakes south of the Alps (lakes Garda, Iseo, Como, Lugano and Maggiore). The more eutrophic basins (Lugano and Iseo) showed a larger presence of Cyanobacteria, green algae (Chlorophyta and Charophyta) and Dinophyta. The development of Oscillatoriales and green algae during the growing season showed a strong dependence from the surface spring availability of TP, which, in turn, was related to winter climatic oscillations, deep mixing dynamics, and trophic status. A specific analysis carried out by applying additive mixed modelling and generalized least squares allowed investigating the direct, seasonal effects of water temperature variations on different algal groups. Chroococcales and Nostocales showed a positive and significant dependence from temperature. Oscillatoriales – mostly *Planktothrix rubescens* – showed only a partial relationship with temperature. Positive relationships were found for a few other algal groups (e.g., Chlorophyta and Dinophyta). Overall, the results obtained in this work showed a positive relationship between the development of cyanobacteria and the interactions between nutrients and water temperature. Nevertheless, it was stressed that specific differences could be interpreted taking into account the different autoecological characteristics of different species and functional groups. The results will also be discussed in relation to their implications for the evaluation of risk assessment and appearance of toxic blooms.

Keywords: cyanobacteria, phytoplankton, deep lakes, eutrophication, climatic fluctuations