

Lakes: The Mirrors of the Earth

BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

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Book of Abstracts of the 15th World Lake Conferences

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TOXIC CYANOBACTERIA IN LAKE GARDA: A MOLECULAR ASSESSMENT ON CYANOTOXIN PRODUCING GENOTYPES

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Harmful cyanobacteria blooms are increasing worldwide. The health hazard for humans and animals is due to the ability of these organisms to produce a wide range of toxins, including hepatotoxins (e.g., microcystins, MCs), and neurotoxins (e.g., anatoxin-a, ATX). The gene clusters encoding the synthesis of the broad group of MCs have been analyzed in detail 15 years ago, while the genes responsible of the synthesis of ATX were discovered only recently. The dominant cyanobacterium in Lake Garda is *Planktothrix rubescens*, a filamentous species which synthesizes different MCs congeners. In the last two decades a new species forming huge blooms appeared, *Dolichospermum lemmermannii*, which can produce both MCs and ATX. Nevertheless, metabolomic data and phytoplankton biomass quantification, showed that most of the time the abundance of *D. lemmermannii* was not sufficient to explain the high concentrations of ATX, raising important questions about the correct identification of ATX-producers in Lake Garda. In this contribution we will report the first results obtained from a wide survey carried out in Lake Garda with the aim to characterize the cyanobacterial genotypes carrying the MCs and ATX encoding genes. The analyses are based on taxonomical, genetic (PCR and Real-Time PCR, qPCR) and metabolomic determinations carried out on both environmental samples and numerous isolated strain cultures. The information will contribute to better define specific lake-tailored risk-assessment models aimed at minimizing the health risks connected with the presence of toxic cyanobacteria in bathing waters and in waters used as drinking water supply.

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