



CYANOCOST – ES 1105 Action

Cyanobacterial blooms and toxins in water resources:
Occurrence, impacts and management.

Short Term Scientific Mission (STSM)

The invasion of *Dolichospermum lemmermannii* in the large lakes south of the Alps: characterization of genotypes and colonization rates in the European context

Introduction

Dolichospermum lemmermannii represents a case of very recent colonisation in the largest lakes south of the Alps (namely, lakes Garda, Iseo, Como and Maggiore). This species appeared for the first time in Lake Garda at the beginning of the 1990s in the form of extended summer blooms and afterward in lakes Iseo (second half of the 1990s), Maggiore (2005), and Como (2006) (Salmaso et al., 2012).

The development of blooms represents a new emerging risk, due to the intensive use of these lakes for recreation and drinking water supply, as well as irrigation and industry, raised essential questions linked also to the potential production of new toxins.



Objectives

Highlight the phylogeography of potentially toxic Nostocales at a continental level, along climatic gradients:

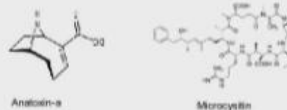
- Compare strains isolated from the large lakes south of the Alps with strains isolated in Central and Northern Europe.
- Evaluate differences between populations recorded in Italy and other European countries.
- Identify different classes of toxins and cyanotoxins encoding genes in strains analyzed.



Methodology

- Isolation of *D.lemmermannii* from summer water samples collected in lakes Garda, Iseo, Como and Maggiore and culturing of strains.
- PCR and Sequencing of 16s rRNA and housekeeping genes (*rpoB*).
- Phylogenetic analysis based on *D.lemmermannii* 16s rRNA and *rpoB* gene sequences obtained from Italian and Central and Northern European strains.

- Toxin analyses (LC-MS)
- PCR to identify cyanotoxin encoding genes (*anaC*, *mcyE*)



Results

D. lemmermannii strains collected in Lake Garda were compared with some of Central and Northern European strains (NIVA) by a phylogenetic analysis using 16s rRNA genes. Results suggest a close relation between these population. Nevertheless, is not possible to make any conclusion yet and further studies are required to complete a phylogeographic evaluation, including strains isolated from others large lakes south of the Alps (Lakes Iseo, Como, Maggiore). Phylogenetic analysis on housekeeping gene and toxicity typing of strains are under progress.

References

Salmaso, N., Buzzi, F., Garibaldi, L., Morabito, G., Simona, M., 2012. Effects of nutrient availability and temperature on phytoplankton development: A case study from large lakes south of the Alps. *Aquatic Sciences*, 74: 555-570.

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