4th European Large Lakes Symposium

Ecosystem Services and Management in a Changing World

August 24-28, 2015, Joensuu, Finland

Dolichospermum lemmermannii (Cyanobacteria) in European waters: distribution patterns and toxic potential

Camilla Capelli[1], Andreas Ballot[2], Leonardo Cerasino[1] & Nico Salmaso[1]

[1]Research and Innovation Centre, Fondazione E. Mach, S. Michele all'Adige, Trento, Italy; [2]Norwegian Institute for Water Research (NIVA), Oslo, Norway

Populations of *Dolichospermum lemmermannii* (Nostocales) have been widely identified in Central and Northern Europe. In Southern Europe, extended surface blooms of this species were recorded for the first time in Lake Garda in 1990/91. Since then, blooms of *D. lemmermannii* were documented in lakes Iseo (1990s), Maggiore (2005), and Como (2006). Recent studies have shown that populations collected in different water bodies are characterised by high variability to temperature adaptation. Actually, although this species is typical of cold environments, specific strains of *D. lemmermannii* show high temperature optima (i.e. between 19°C and 26°C). Further, in the large lakes south of the Alps, populations of *Dolichospermum* have the ability to form huge water blooms in summer stratified conditions and during calm weather. These results could suggest the existence of different ecotypes adapted to different European climatic regions. In this work, we report the preliminary results of a wide research carried out on populations isolated from different European waterbodies. The analyses are based on taxonomical, genetic and metabolomic determinations carried out on isolated strain cultures. A phylogenetic study on 16s rRNA and housekeeping genes (e.g. rpoB,) was integrated by the assessment of potential toxicity, evaluating the presence of cyanotoxins (i.e. Microcystins, Anatoxins, Saxitoxins) encoding genes. Further studies will allow gaining insight about the phylogeography of this fast spreading species at a continental level, along climatic gradients.

Modelling phytoplankton and periphyton primary production in hemiboreal lakes

Fabien Cremona[1], Alo Laas[1], Lauri Arvola[2], Don Pierson[3], Peeter Nõges[1] & Tiina Nõges[1]

[1]Agricultural and Environmental Sciences, Estonian University of Life Sciences, Tartumaa, Estonia; [2]University of Helsinki, Helsinki, Finland; [3]Uppsala University, Uppsala, Sweden

The distribution of whole-lake primary production between planktonic and benthic habitat, also called autotrophic structure, carries critical information about lake food web layout and organic matter fluxes. Although planktonic primary production has been intensively studied since the onset of limnology, the paucity of estimates for benthic production is still blatant, meaning that autotrophic structure of lakes remains poorly known to date. In this study we have modelled both planktonic and benthic production and autotrophic structure of thirteen hemiboreal lakes from Estonia, Finland and Sweden including large lakes Peipsi, Võrtsjärv and Vanajanselkä. We employed an empirical model based on a limited set of variables easily available from basic limnological databases, with a high precision in time (10 min) and depth (every 10 cm). Our results showed that although the studied lakes ranged from periphyton- to phytoplankton-dominated, phytoplankton represented on average 85% of their primary production. Shallow and/or clear lakes with low chlorophyll *a* (chla) were generally more favourable to benthic production than deep and/or turbid lakes. An increase of chla and turbidity in hemiboreal lakes caused by climate warming is expected to skew the pelagic to benthic production ratio even more towards dominance of phytoplankton, with dramatic consequences on lake carbon fluxes.

ORGANIZING COMMITTEE OF THE 4TH ELLS

Paula Kankaala (chair, University of Eastern Finland, Joensuu Campus, Finland)

Orlane Anneville (French National Institute for Agricultural Research, France)

Lauri Arvola (University of Helsinki, Finland)

Heikki Hämäläinen (University of Jyväskylä, Finland)

Marko Järvinen (Finnish Environment Institute, Finland)

Tiina Nõges (Estonian University of Life Sciences, Estonia)

Kurt Pettersson (Uppsala University, Sweden)

Martti Rask (Game and Fisheries Research Institute, Finland)

Nico Salmaso (Fondazione Mach-Instituto Agrario di S. Michele all'Adige, Italy)

Dietmar Straile (University of Konstanz, Germany)

Arkady Terzhevik (Northern Water Problems Institute, Russia)

Anne-Mari Ventelä (Pyhäjärvi Institute, Finland)

Tuula Toivanen (secretary, University of Eastern Finland, Joensuu Campus, Finland)

Merja Lyytikäinen (web master, University of Eastern Finland, Joensuu Campus, Finland)

SPONSORS OF THE 4TH ELLS

University of Eastern Finland

Maj and Tor Nessling Foundation

Federation of Finnish Learned Societies

Joensuun yliopiston tukisäätiö

City of Joensuu