



## XXVI Congresso AIOL

**San Michele all'Adige, 27 giugno - 1 luglio 2022**

Esperienze e approcci innovativi per la conoscenza e la salvaguardia degli  
ecosistemi acquatici



#### Comitato Scientifico

Caterina Bergami, *CNR-ISMAR, Bologna*

Silvia Bianchelli, *Università Politecnica delle Marche, Ancona*

Mauro Celussi, *Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Trieste*

Diego Copetti, *CNR-IRSA, Brugherio (Monza-Brianza)*

Domenico D'Alelio, *Stazione Zoologica Anton Dohrn, Napoli*

Alessandra Pugnetti, *CNR-ISMAR, Venezia*

Michela Rogora, *CNR-IRSA, Verbania*

Nico Salmaso, *Fondazione E. Mach, Istituto Agrario di S. Michele all'Adige, S. Michele all'Adige (Trento)*

Cecilia Teodora Satta, *Università degli Studi di Sassari*

Monica Tolotti, *Fondazione E. Mach, Istituto Agrario di S. Michele all'Adige, S. Michele all'Adige (Trento)*

#### Comitato Organizzatore

*Fondazione E. Mach, Istituto Agrario di S. Michele all'Adige, Unità Idrobiologia*

Adriano Boscaini

Maria Cristina Bruno

Leonardo Cerasino

Ulrike Obertegger

Nico Salmaso

Monica Tolotti

# Indice

## Sommario

<b>Indice</b> .....	3
<b>Programma</b> .....	8
<b>INVITED SPEAKERS</b> .....	20
<b>Cristiana Callieri</b> .....	21
<b>Rita Giuffredi</b> .....	23
<b>Michael W. Lomas</b> .....	25
<b>Federico Marrone</b> .....	27
Dipartimento di Scienze e Tecnologie biologiche, chimiche e farmaceutiche, Università di Palermo .....	27
<b>Mariangela Ravaioli</b> .....	29
<b>Mario Sprovieri</b> .....	31
<b>COMUNICAZIONI ORALI</b> .....	33
<b>SESSIONE SPECIALE - Effetti della pandemia da SARS-CoV2 sugli ecosistemi acquatici – Chair: Jacopo Chiggiato, Giuseppe Scarcella, Michela Rogora</b> .....	34
Using machine learning to predict the effect of the 2020 COVID-19 lockdown on the biogeochemical properties of the Venice lagoon at selected sites .....	34
Evidence of Covid-19 lockdown effects on riverine dissolved organic matter dynamics provides a proof-of-concept for needed regulations of anthropogenic emissions. ....	34
Effects of the lockdown during Covid-19 Pandemic on the distribution of trace metals and PAH in the Venice Lagoon .....	35
Response of the Taranto Gulf (Ionian Sea, Italy) to the COVID-19 lockdown .....	36
COVID-19 lockdowns reveal the resilience of Adriatic Sea fisheries to forced fishing effort reduction. ....	36
Knowledge co-construction by citizens and researchers to create a SNAPSHOT of the marine environment during and after the Covid-19 lockdown .....	37
Underwater noise levels in the Northern Adriatic Sea during the COVID-19 pandemic period .....	37
COVID-19 lockdown affected atmospheric deposition and surface water chemistry over an Alpine area .....	38
The potential effects of COVID-19 lockdown and the following restrictions on the status of eight target stocks in the Adriatic Sea.....	39
<b>SESSIONE SPECIALE - Gli studi ecologici di lungo termine per la comprensione delle risposte degli ecosistemi acquatici agli impatti antropici e climatici – Chair: Giuseppe Denti, Silvia Pulina</b> .....	40
High altitude freshwaters: macroinvertebrates to the rescue.....	40
From metabarcoding time-series to plankton food webs.....	40
The European double heatwave in 2019: Chlorophyll-a response moderated by lake depth and trophic state .....	41

Do scientific dolphin watching influence cetacean's behaviour? The case study of the Levantine Aegean Sea (Eastern Mediterranean Sea).....	41
Lake oxygen and climate warming: the deep subalpine lakes in a global context.....	42
Long-term water temperature monitoring and the response of amphipod metabolic rate to climate change in Acquatina lagoon .....	42
Light transparency and chlorophyll-a influence the temporal and spatial differences of the under-ice microbiome .....	43
Synchronous trend signals of the water quality of Seveso, Olona and Lambro in half a century.....	43
Are phytoplankton a good indicator of climatic and anthropic impact? Hints from long term observations in the Gulf of Naples .....	44
Is plankton trophic structure a reliable indicator of the overall ecological efficiency? .....	44
Gli antichi strumenti della limnologia: dalla conservazione alla scoperta .....	45
Occurrence of cyanobacterial toxins in freshwaters of the Alpine region .....	46
Preliminary data on the effectiveness of fish passages from Toce River, the second largest tributary to Lago Maggiore .....	46
Gaia Blu, the new multipurpose ocean research vessel of CNR.....	47
Diversity and distribution of dragonflies in Italy, with an updated checklist.....	47
The Italian chapter of the Marine Social Sciences Network: an opportunity to make a difference in the complex and complicated relationship between society and the sea in the Mediterranean basin. ....	48
Genetic differentiation between the wild and hatchery Marble trout ( <i>Salmo marmoratus</i> Cuvier 1829), and limited presence of released hatchery-produced individuals into the wild: a case study from Toce river (Piemonte, Italy).....	48
Plastic debris in freshwater systems worldwide .....	49
Vertical dispersion of microplastics in the marine environment. A modelling approach.....	51
<b>SESSIONE SPECIALE - Processi fisici e biogeochimici in ambienti marini e d'acqua dolce: misure e modelli –</b>	
Chair: Claudia Dresti, Diego Copetti, Andrea Fenocchi.....	52
Effectivity of hypolimnetic withdrawal on the restoration of Lake Varese.....	52
Modelling physical and ecological processes in medium-to-large deep European perialpine lakes: directions of past research and issues to address for the future.....	52
Long-term variability of the coastal ocean stratification in the Gulf of Naples: Two decades of monitoring the marine ecosystem at the LTER-MC site, between land and open Mediterranean Sea .	53
Multiple Stressor Effects on Ecosystem Function: Disentangling Effects of Eutrophication and Clogging on Nitrate Uptake.....	53
A simple model for predicting ice thickness in lakes.....	54
Resilience of plankton food webs to ocean warming .....	54
<b>SESSIONE SPECIALE - Laghi artificiali, stagni e lagune costiere del Mediterraneo: una risorsa a rischio –</b>	
Chair: Cecilia Teodora Satta, Federico Marrone .....	56
Trophic state and algal blooms in a southern Italy strategic multiple-uses reservoir (Lake Occhito) ....	56

The spreading of the global invader <i>Palaemon macrodactylus</i> Rathbun, 1902 and its interaction with congeneric native species in Venice lagoon (Italy).....	56
<b>SESSIONE SPECIALE - Multidisciplinary and trans-ecodomain vision for the management and control of invasive alien species - Visione multidisciplinare e trans-ecodominio per la gestione e il controllo delle specie aliene invasive – Chair: Angela Boggero, Agnese Marchini .....</b>	
How hydrology and topography drive exotic plants in annual vegetation of mid-size lowland rivers...	58
LIFE PREDATOR: a new EU LIFE Nature & Biodiversity Project to PREvent, Detect, combAT the spread of <i>Silurus glanis</i> in south European lakes to protect biodiversity.....	58
The validation case on invasive crustaceans of the LifeWatch ERIC Internal Joint Initiative: state of the art and next steps forward. ....	59
Behavior of the invasive mosquitofish increases top-predator fry mortality: preliminary results.....	60
The initial spread of quagga mussel, <i>Dreissena bugensis</i> Andrusov, 1897, in Italy: molecular and morphological evidence in Lake Garda .....	60
DNA metabarcoding as early warning and monitoring system for non-indigenous zooplankton species .....	61
The effects of the alien aquatic plant <i>Alternanthera philoxeroides</i> on the freshwater communities of the Arno River in Florence .....	61
Bio-pollution assessment of Lake Maggiore and its hydrographic system .....	62
<b>SESSIONE SPECIALE - Il restauro degli ecosistemi: prevenire, arrestare ed invertire il degrado degli ecosistemi - Ecological Restoration: prevent, halt and reverse the degradation of ecosystems – Chair: Silvia Bianchelli, Antonio Pusceddu .....</b>	
Following the roadmap for the restoration of Mediterranean Macroalgal forests: a case study from the Central Adriatic Sea .....	63
Displacement of hatchery trout in a small creek in Southern Switzerland: the role of water discharge	63
Moving waters: mitigating hydrological alterations while increasing hydropower production, a case study from the Italian Alps .....	64
Bioreactor capacity of sea cucumber <i>Holothuria tubulosa</i> (Gmelin, 1788) under different scenarios of climate change.....	65
The challenge of setting restoration targets across the Mediterranean Sea under climate changes: the case study of macroalgal forests .....	65
Restocking with wild caught farmed European eels: an alternative approach.....	66
<b>SESSIONE SPECIALE - Aquatic microbiomes and microbial pathogens across the One Health spectrum – Chair: Grazia M. Quero, Ester M. Eckert .....</b>	
Zooplankton influences extracellular DNA degradation and acquisition through natural transformation in freshwater microcosms .....	67
Host-associated and environmental microbiomes in a Mediterranean gilthead sea bream fish farm ..	67
Improving environmental monitoring of Vibrionaceae in coastal ecosystem through amplicon sequencing.....	68
Popstars in the Adriatic Sea: seasonal dynamics of the most abundant prokaryotes at C1-LTER station, Gulf of Trieste .....	68

Water masses age and origin drive the diversity of pelagic prokaryotes and dissolved organic matter dynamics: the Mediterranean Sea case .....	69
The sweet tooth of marine microbiomes: potential and expression patterns of prokaryotic glycosylhydrolases across the global ocean.....	69
Trends of fecal pollution along the coasts of Marche Region (Adriatic Sea) over a decade (2011-2021) .....	70
The role of intraspecific morpho-functional trait variability in marine phytoplankton responses to changing nutrient scenarios .....	70
<b>POSTER</b> .....	72
<b>SESSIONE SPECIALE - Gli studi ecologici di lungo termine per la comprensione delle risposte degli ecosistemi acquatici agli impatti antropici e climatici – Chair: Giuseppe Denti and Silvia Pulina</b> .....	73
A longitudinal study on bathing waters: bacterial investigation and <i>Ostreopsis cf ovata</i> dynamics combined with environmental variables in a highly touristic area (Sardinia, western Mediterranean) from 2015 to 2021 .....	73
Effects of spring-summer water levels management on littoral macroinvertebrates of Lake Maggiore (NW, Italy).....	73
Multiannual zooplankton carbon and nitrogen stable isotopes for detecting changes in the Lake Maggiore (Italy) pelagic food web.....	74
High frequency monitoring (HFM) through in-situ sensors as a support to lake quality evaluation and management: insights from the INTERREG project SIMILE in Lake Maggiore .....	74
In-situ high resolution turbidity time series to describe storm resuspension events along the North-Western Adriatic shelf .....	75
<b>SESSIONE REGOLARE – Chair: Leonardo Cerasino, Maria Cristina Bruno</b> .....	76
The project “ROCK-ME: Geochemical response of Alpine Rock Glaciers to global warming: hydroecological consequences of trace element Export” .....	76
Environmental DNA as a tracer of the origin of sestonic organic matter in coastal systems .....	76
<b>SESSIONE SPECIALE - Laghi artificiali, stagni e lagune costiere del Mediterraneo: una risorsa a rischio – Chair: Cecilia Teodora Satta, Federico Marrone</b> .....	78
Use of otoliths for estimating age of <i>Mugil cephalus</i> L. destined to “bottarga” production in Tortoli lagoon (central western Sardinia, western Mediterranean).....	78
A metagenetic study on intestinal microbial communities of grey mullets from a Mediterranean coastal lagoon (Santa Giusta, Sardinia, Italy) .....	78
The ancient irrigation system of the Palermo Plain (Sicily, Italy) as a substitute ecosystem: preliminary investigations on its aquatic flora.....	79
<b>SESSIONE SPECIALE – Multidisciplinary and trans-ecodomain vision for the management and control of invasive alien species - Visione multidisciplinare e trans-ecodominio per la gestione e il controllo delle specie aliene invasive – Chair: Angela Boggero, Agnese Marchini</b> .....	81
Potential impact of dreissenids species in relation to the first report of quagga mussel ( <i>Dreissena bugensis</i> ) at the end of winter 2022 in Lake Garda (Northern Italy). .....	81
Invasive hell: potential distributions of invasive gammarids overlap in central Europe but not in South European coastal regions .....	81

eDNA detection of autochthonous and invasive freshwater crayfish in Trentino .....	82
Distribution and impacts of the invasive amphipod <i>Dikerogammarus villosus</i> (Sowinsky, 1894) in the river Adda (South Adda Regional Park, Northern Italy).....	82
<b>SESSIONE SPECIALE - Il restauro degli ecosistemi: prevenire, arrestare ed invertire il degrado degli ecosistemi - Ecological Restoration: prevent, halt and reverse the degradation of ecosystems – Chair:</b>	
Silvia Bianchelli, Antonio Pusceddu .....	84
REST-ART: RESToration of Marine Forests on ARTificial Reefs.....	84
<b>SESSIONE SPECIALE - Aquatic microbiomes and microbial pathogens across the One Health spectrum –</b>	
Chair: Grazia Marina Quero, Ester Eckert .....	85
Insights into salinity tolerance from a <i>Chlamydomonas</i> strain .....	85
EVER-LAKE: Formation, evolution and fate of new proglacial lakes in the deglaciating Alps .....	85
Does the biodiversity of high-altitude aquatic prokaryotes reflect the expected “Windows of opportunity” in deglaciating Alpine catchments? .....	86
Microbial pathogen detection in freshwater biomonitoring by amplicon sequencing: range of potential applicability.....	86
<b>INDICE DEGLI AUTORI</b> .....	<b>88</b>



## SESSIONE SPECIALE - Aquatic microbiomes and microbial pathogens across the One Health spectrum – Chair: Grazia Marina Quero, Ester Eckert

### Insights into salinity tolerance from a *Chlamydomonas* strain

**Emma Bazzani** (1)\*, Chiara Lauritano (2), Olga Mangoni (3,4), Francesco Bolinesi (3), Maria Saggiomo (1)

(1) Research Infrastructure for Marine Biological Resources Department, Stazione Zoologica Anton Dohrn, Villa Comunale, 80121 Naples, Italy

(2) Ecosustainable Marine Biotechnology Department, Stazione Zoologica Anton Dohrn, Villa Comunale, 80121 Napoli, Italy

(3) Department of Biology, University of Naples Federico II, 80126 Naples, Italy

(4) Consorzio Nazionale Interuniversitario delle Scienze del Mare (CoNISMa), 00196 Rome, Italy

\* email corresponding author: [emma.bazzani@szn.it](mailto:emma.bazzani@szn.it)

Salinity is among the main drivers affecting the growth and distribution of photosynthetic organisms in their natural environment, especially in coastal areas, where run-off, rivers and land use have greater impact. As a consequence of climate change, the global salinity patterns are expected to vary, with strong implications on the distribution and composition of microalgal communities, which are the base of the food web.

In our project, we performed a comprehensive experiment exposing a microalga from the genus *Chlamydomonas* (*Chlamydomonas* sp CCMP225) to different concentrations of sea salts. The evaluation of the microalgal responses to this stressor will shed light on the morphological and physiological effects of salinity stress on green algae, allowing us to gain some insights on the possible effects of climate change on this group of organisms. Notably, our strain appeared to be exceptionally resistant to this kind of stress. In fact, even though the growth was considerably reduced under high salinity, the photosynthetic parameters were not substantially affected. These results could help to understand why some organisms are more favored than others under stressful conditions, and which characteristics give them extreme resilience and adaptability.

### EVER-LAKE: Formation, evolution and fate of new proglacial lakes in the deglaciating Alps

**Maria Vittoria Tenci** (1), Marco Toffolon (1), Walter Bertoldi (1), Stefano Brighenti (2), Francesco Comiti (2), Luca Carturan (3), Maria Cristina Bruno (4), Leonardo Cerasino (4), Massimo Pindo (4), Monica Tolotti (4)

(1) Università di Trento – Dipartimento di Ingegneria Civile, Ambientale e Meccanica, via Mesiano, 77 38123 Trento

(2) Università di Bolzano, piazza Università, 5 39100 Bolzano

(3) Università di Padova - Department of Land, Environment, Agriculture and Forestry, Viale Dell'Università, 16 - Legnaro (PD)

(4) Fondazione Edmund Mach - Centro Ricerca ed Innovazione, Via E. Mach, 1 38098 S. Michele all'Adige (TN)

\* email corresponding author: [mariavittoria.tenci@unitn.it](mailto:mariavittoria.tenci@unitn.it)

The Alpine deglaciation is one of the most evident effects of the ongoing climate change. Under glacier retreat, proglacial lakes are increasing both in number and in volume, thereby becoming important elements of the mountain landscape. An improved knowledge of the ecological characteristics of the newly forming lakes is crucial for the conservation of the Alpine biodiversity and habitats, to identify ecosystem services provided by these environments and to base coherent management strategies in the future iceless Alpine landscape. The “EVER-LAKE” PhD project will focus on a system of recently formed proglacial lakes in the Ortles-Cevedale Mountain group (Italy), with the aim to: (i) characterize the lake ecosystems from a physical, chemical and biological, point of view; (ii) understand the ecological development of proglacial lake



ecosystems with glacier retreat and build a conceptual model of their future evolution. Given the typically high water turbidity and the low biomass associated with these harsh habitats, biological communities will be characterized based on the metabarcoding of the 16S (prokaryotic) and 18S (eukaryotic) rRNA genes from eDNA samples. This approach will allow to obtain a broad overview of the taxonomical groups living in the lakes, while causing as less disturbance as possible.

### Does the biodiversity of high-altitude aquatic prokaryotes reflect the expected “Windows of opportunity” in deglaciating Alpine catchments?

**Monica Tolotti (1)\***, Stefano Brighenti (2), Maria Cristina Bruno (1), Leonardo Cerasino (1), Massimo Pindo (1), Werner Tirlir (3), Davide Albanese (1)

(1) Research and Innovation Centre, Fondazione Edmund Mach, Via Mach 1, 38098 S. Michele all'Adige, Italy

(2) Faculty of Science and Technology, Free University of Bolzano/Bozen, Piazza Università 1, 39100 Bolzano, Italy

(3) Eco Research, Via Luigi Negrelli 13, 39100 Bolzano, Italy

\* email corresponding author: [monica.tolotti@fmach.it](mailto:monica.tolotti@fmach.it)

Alpine headwaters are threatened by the global warming that is accelerating the glacier melting and increasing the thermal and hydrological seasonal variability. Changing diversity and seasonal dynamics of aquatic communities reflect this variability and may have great implications for future integrity and functionality of Alpine freshwaters. Prokaryotes in Alpine streams have remained largely unexplored until recently, despite the recognition that microbial communities may have a disproportionate role in driving stream biodiversity, hydrochemistry, and metabolism. Organisms dwelling in glacial streams are expected to preferentially develop during Windows of opportunity (WOs), i.e. short periods of less harsh environmental conditions typically occurring in early summer and, especially, in late summer/autumn. While research demonstrated WO as favourable periods for biomass accrual, very little is known about parallel changes in biodiversity in both glacial and non-glacial streams. From June to September of 2017 and 2018 we investigated epilithic and sediment prokaryotic communities of streams fed by glaciers, rock glaciers and groundwater in two deglaciating Alpine catchments. We addressed the following questions: i) do WO drive seasonal changes in microbial diversity? ii) what are the major environmental drivers of prokaryotic diversity in different Alpine water types? iii) are WO changing under the impact of climate warming?

### Microbial pathogen detection in freshwater biomonitoring by amplicon sequencing: range of potential applicability

**Sara Vettorazzo (1,2)\***, Adriano Boscaini (2), Nico Salmaso (2)

(1) Department of Cellular, Computational and Integrative Biology, University of Trento, Via Sommarive 9, 38123, Povo, Italy

(2) Research and Innovation Centre, Fondazione Edmund Mach, via E. Mach 1, 38098, San Michele all'Adige, Italy

\* email corresponding author: [sara.vettorazzo@studenti.unitn.it](mailto:sara.vettorazzo@studenti.unitn.it)

Pathogen detection is a key aspect to evaluate during freshwater biomonitoring. Studies leveraging high-throughput sequencing (HTS) technologies are providing new and cost-effective insights into the ecology of aquatic microbiomes and pathogen spread. In this work, environmental DNA samples collected from different small Alpine waterbodies and from Lake Garda were analysed by amplicon sequencing of 16S and 18S rRNA hypervariable regions. Bioinformatic analysis was based on the DADA2 pipeline and the amplicon sequence variants (ASVs) approach. Taxonomic assignments of potentially pathogenic bacteria and protists were performed by the naïve bayesian RDP classifier. In addition, a BLAST-based comparison was carried out. The analyses highlighted several limitations of metabarcoding, mainly linked to the limited taxonomic resolution that can be reached at the species level, and showed that amplicon sequencing can be suitable