SIL 100
BERLIN | GERMANY

36th Congress of the
International Society of Limnology

7 – 10 August 2022 | www.sil2022.org

ABSTRACT BOOK

IGB
Leibniz Institute of Freshwater Ecology and Inland Fisheries

SIL

THE NEXT 100 YEARS:
SENSING AND SAFEGUARDING INLAND WATERS

ON395

Predator mediated feedback effects in natural plankton communities

Maria Stockenreiter[1], *Rosalie Krause*[1], *Patrick Fink*[2], *Herwig Stibor*[1]
[1]Ludwig-Maximilians-Universität München, Biology, Planegg-Martinsried, Germany, [2]Helmholtz Centre for Environmental Research, Department River Ecology and Department Aquatic Ecosystem Analysis, Magdeburg, Germany

Biodiversity loss due to climate change is unquestionable and, in some areas, irreversible. While some species cope less well with higher water temperatures, others benefit. A well-known predator in plankton systems is *Chaoborus* sp.. While this predator normally occurs in cycles, its presence is more and more constant throughout all seasons. As a very efficient but also selective predator in zooplankton, increased abundance can lead to shifts in the composition and diversity of the zooplankton community. These changes in the zooplankton can have lasting effects on nutrient recycling in the food web. For example, resources such as nitrogen and phosphorus are used differently by the respective zooplankton genera and are thus less or more available to the primary producers. This in turn can lead to changes in the composition of the primary producer communities, resulting in a shift in traits of the primary producers. The presence or absence of a predator can thus have a major impact on feedback mechanisms in plankton communities. While direct predator-prey effects are well known, there is a lack of knowledge about the above-mentioned feedback effects in natural plankton communities. Here, we present experimental data from eight different lakes that mainly show the changes in nutrient availability for phytoplankton caused by predator-mediated shifts in zooplankton communities. We discuss the resulting community compositions as well as phytoplankton biodiversity and possible implications for the food web.

ON228

Can space-for-time-substitution surveys represent zooplankton biodiversity patterns and their relationship to environmental drivers?

Jason Stockwell[1], *Lia Ivanick*[1], *Ariana Chiapella*[1], *Cecilia Vichi*[1], *Hans-Peter Grossart*[2], *Horacio Zagarese*[3,4], *Nadia Diovisalvi*[3,4], *Mariana Odriozola*[3,4], *Gideon Gal*[5], *Ana M. Antão-Geraldes*[6], *Kirsten S. Christoffersen*[7], *Jouko Sarvala*[8], *Kätlin Blank*[9], *Meryem Beklioğlu*[10], *Martin J. Kainz*[11], *Rosalie Bruel*[12,13], *Kemal Ali Ger*[14], *Shin-ichiro S. Matsuzaki*[15], *Samiullah Khan*[16], *Jens C. Nejstgaard*[2], *Petr Znachor*[17], *Jaromír Seďa*[17], *Ulrike Obertegger*[18], *Nico Salmaso*[18], *Jorge García-Girón*[19,20], *Barbara Leoni*[21], *Erik Jeppesen*[22], *Ülkü Nihan Tavşanoğlu*[23], *Olga O. Rusanovskaya*[24], *Barbara Tartarotti*[25], *Gaël Dur*[26], *Natalia Kuczyńska-Kippen*[27], *Renata Dondajewska-Pielka*[27], *Elvira de Eyto*[28], *Stephen J. Thackeray*[29], *Javier R. Garcia de Souza*[30], *James A. Rusak*[31], *Jannicke Moe*[32], *Stephanie Figary*[33], *Linda May*[34], *Iain Gunn*[34], *Jonathan P. Doubek*[35], *Celia C. Symons*[36], *Sarah H. Burnet*[37], *Fabio Lepori*[38], *Javier Alcocer*[39], *Rocío Fernández*[39], *Luis A. Oseguera*[39], *Piet Verburg*[40], *María Soledad Fontanarrosa*[41]
[1]University of Vermont, Burlington, United States, [2]Leibniz Institute for Freshwater Ecology and Inland Fisheries, Neuglobsow, Germany, [3]CONICET-UNSAM, Chascomús, Argentina, [4]Escuela de Bio y Nanotecnologías, Chascomús, Argentina, [5]Kinneret Limnological Laboratory, Migdal, Israel, [6]Instituto Politécnico de Bragança, Centro de Investigação de Montanha (CIMO), Bragança, Portugal, [7]University of Copenhagen, Copenhagen, Denmark, [8]University of Turku, Turku, Finland, [9]Estonian University of Life Sciences, Tartu, Estonia, [10]Middle East Technical University, Biological Sciences Dept. Limnology Lab. & EKOSAM, Ankara, Turkey, [11]WasserCluster - Biological Station Lunz, Lunz am See, Austria, [12]iEES, Paris, France, [13]Sorbonne Universite, Paris, France, [14]Universidade Federal do Rio Grande do Norte, Natal, Brazil, [15]National Institute for Environmental Studies, Tsukuba, Japan, [16]Otago Regional Council, Dunedin, New Zealand, [17]Institute of Hydrobiology, Biology Centre CAS, České Budějovice,, Czech Republic, [18]Fondazione Edmund Mach (FEM-CRI), SanMichele all`Adige, Italy, [19]Finnish Environment Institute, Freshwater Centre, Oulu, Finland, [20]University of León, León, Spain, [21]University of Milan-Bicocca, Department of Earth and Environmental Sciences, Milano, Italy, [22]Aarhus University, Aarhus, Denmark, [23]Çankırı Karatekin University, Biology Department, Çankırı, Turkey, [24]Irkutsk State University, Scientific Research Institute of Biology, Irkutsk, Russian Federation, [25]University of Innsbruck, Innsbruck, Austria, [26]Shizuoka University, Shizuoka City, Japan, [27]Adam Mickiewicz University in Poznań, Poznań, Poland, [28]Marine Institute, Newport, Ireland, [29]UK Centre for Ecology & Hydrology, Lancaster, United Kingdom, [30]ILPLA-CONICET-UNLP, Instituto de Limnología "Dr. Raúl A. Ringuelet", La Plata, Argentina, [31]Dorset Environmental Science Centre, Dorset, Canada, [32]Norwegian Institute for Water Research, Oslo, Norway, [33]Cornell University, Ithaca, United States, [34]UK Centre for Ecology & Hydrology, Edinburgh, United Kingdom, [35]Lake Superior State University, Sault Ste. Marie, United States, [36]University of California, Irvine, Irvine, United States, [37]University of Idaho, Moscow, United States, [38]University of Applied Sciences and Arts of Southern Switzerland, Manno, Switzerland, [39]Universidad Nacional Autónoma de México, Mexico City, Mexico, [40]National Institute of Water and Atmospheric Research, Hamilton, New Zealand, [41]Ecosistemas (UNCPBA-CICPBA) - CONICET, Tandil, Argentina

Space-for-Time-Substitution surveys (SFTS) are commonly used to describe zooplankton community dynamics and to determine lake ecosystem health. SFTS surveys typically combine single point observations from many lakes to evaluate the response of zooplankton community structure and dynamics (e.g., species abundance and biomass, diversity, demographics and modeled rate processes) to spatial gradients in hypothesized environmental drivers (e.g., temperature, nutrients, predation), in lieu of tracking such responses over long time scales. However, the reliability and reproducibility of SFTS zooplankton surveys have not yet been comprehensively tested against empirically-based community dynamics from long-term monitoring efforts distributed worldwide. We use a recently compiled global data set of more than 100 lake zooplankton time series to test whether SFTS surveys can accurately capture zooplankton diversity, and the hypothesized relationship with temperature, using simulated SFTS surveys of the time series data. Specifically, we asked: (1) to what degree can SFTS surveys capture observed biodiversity dynamics; (2) how does timing and duration of sampling affect detected biodiversity patterns; (3) does biodiversity ubiquitously increase with temperature across lakes, or vary by climate zone or lake type; and (4) do results from SFTS surveys produce comparable biodiversity-temperature relationship(s) to empirical data within and among lakes? Testing biodiversity-ecosystem function (BEF) relationships, and the drivers of such relationships, requires a solid data basis. Our work provides a global perspective on the design and usefulness of (long-term) zooplankton monitoring programs and how much confidence we can place in the zooplankton biodiversity patterns observed from SFTS surveys.

ON353

What nutrient enrichment experiments (don't) tell us about underlying co-limitation mechanisms

Jordyn Stoll[1], *David Costello*[1]
[1]Kent State University, Biological Sciences, Kent, United States

Harmful algal blooms (HABs) are increasing in frequency and extent globally, in part due to cultural eutrophication supplying algae with ample nutrients. Nutrient enrichment experiments (NEEs) are widely used to characterize nutrient limitation in aquatic ecosystems. While NEEs provide information about what nutrient(s) are limiting a system from further growth, the underlying mechanisms of co-limitation are not thoroughly explored in most NEEs. Theoretical underlying mechanisms of co-limitation include community composition shifts, heterotrophic-autotrophic mutualistic relationships and metabolic efficiency associated with multiple nutrients in replete supply. We hypothesize that NEEs that measure additional endpoints alongside growth are more capable of discerning what underlying metabolic or community level pathways are leading to two nutrients stimulating a community additively, and that these experiments have the power to advance co-limitation theory. To assess this hypothesis, we conducted a literature review of all ~2500 papers that cite the landmark co-limitation paper, Elser et al. 2007, to determine what proportion of aquatic NEE papers are investigating underlying mechanisms of co-limitation. We also analyzed these citing papers for consistent co-limitation language use based on Harpole et al., 2011 and Morris and Lewis, 1988. While most aquatic ecology researchers are using consistent co-limitation language, preliminary results indicate that <20% of NEE papers report on the underlying mechanism of co-limitation, or measure endpoints other than growth. To more holistically understand and protect our aquatic resources from HABs, researchers conducting NEEs should consider investigating the specific metabolic or community pathways resulting in co-limitation of algal growth.