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

ORAL ONSITE

ON164

Individual trait and fitness variation in a phytoplankton population across eutrophic and re-oligotrophic periods

Richard Lambrecht[1], *Lutz Becks*[1]
[1]University of Konstanz / Limnological Institute, Department of Biology, Konstanz, Germany

Aquatic ecosystems underwent major changes in the last decades. Cultural eutrophication followed by periods of attempts to revere this are probably the most significant and prominent examples. The phytoplankton species composition tends to follow these changes with losses and gains of taxa as well as changes in the dominance of species depending on the environmental conditions. However, some species persist at similar frequencies independent of the environmental conditions. We hypothesize that the persistence of some species is mediated by evolutionary adaptation to different environments. To test for this, we resurrected and isolated multiple clonal lines of *Chlamydomonas* sp. from Lake Constance sediment, associated with either eutrophic or re-oligotrophic conditions in the lake. We characterized and compared competitiveness and defense as two major trophic traits of these isolates and linked these to fitness under controlled laboratory conditions. Specifically, we followed the growth and yield of 14 isolates from each period in low and high phosphate conditions in the presence and absence of predation by *Brachionus calyciflorus*. We found significant differences in traits between isolates and that the trait ranges differed when isolates from the different time periods were compared. In addition, isolates with similar trait combinations for defense and competitiveness differed in fitness when tested in the different environments (phosphate and predator). The observation of differences in heritable trait variation and differential translation into fitness responses suggests that adaptive evolution may play a role in the resilience of *Chlamydomonas* sp. to major environmental changes.

ON437

Cluster analysis reveals hidden community interests to inform a collaborative management plan for Blueskin Bay estuary in Aotearoa New Zealand

Simone Daniela Langhans[1,2], *Alice Neilson*[2], *Marc Schallenberg*[2]
[1]Aalborg University, Chemistry and Bioscience, Aalborg, Denmark, [2]University of Otago, Department of Zoology, Dunedin, New Zealand

Community participation has been increasingly embedded into environmental policy with the aim to accelerate transformative change towards sustainable management. When performed effectively, participatory processes integrate local preferences and knowledge with scientific evidence, which leads to more effective management powered by community buy-in. A common way of engaging the community is the collaboration with local stakeholders; a relatively cost-/time-efficient approach based on the often vaguely-met assumption that each stakeholder represents a shared interest of the respective key community group. The selection of representatives, despite well planned, also often ends up being done ad-hoc due to availability constraints of participation favorites. We tested a more analytical approach based on cluster analysis to identify community interests to feed into the development of a collaborative management plan for the Blueskin estuary in Otago, New Zealand. We interviewed a total of 36 community members to elicit their preferences of management objectives, which we had co-designed in previous workshops. We found distinct preference clusters comprising stakeholders with different backgrounds for the main and the more specific sub-objectives, with the defining objectives being catchment/estuary health and sustainable economic activities (main objectives) and recreational activities, and sustainable agriculture and forestry (sub-objectives). Our results indicate that the assumption that participants with certain economic interests are primarily concerned with objectives directly relating to their industry may not hold. Consequently, cluster analysis helps map community preferences more accurately, while likely facilitating collaborative decision making as stakeholders from diverging backgrounds could view themselves clustered with stakeholders previously assumed to have differing preferences.

ON422

Land use drives detritivore size structure and decomposition through changes in resource quality and quantity

Aitor Larrañaga[1], *Daniel Perkins*[2], *Ana Basaguren*[1], *Santiago Larrañaga*[3], *Jesús Pozo*[1], *Jose Montoya*[4]
[1]University of the Basque Country, Plant Biology and Ecology, Leioa, Spain, [2]University of Roehampton, Department of Life Sciences, London, United Kingdom, [3]Escuela Universitaria de Magisterio Begoñako Andra Mari - BAM, Derio, Spain, [4]CNRS-UPS, Theoretical and Experimental Ecology Station, Moulis, France

Land use change and nutrient pollution are two pervasive global changes that can modify detritus dynamics and carbon cycling. The availability and type of detritus can be greatly modified by land use conversion, whereas nutrient pollution typically stimulates the rate at which detritus can be consumed. Here we study the implications of changes in land use from deciduous forest to *Eucalyptus*plantations, and nutrient enrichment, on the size distribution (size spectrum) of stream detritivores. We also test how size spectra parameters (slopes and intercepts) are related to the decomposition rates of detritus. As expected, the quantity of detritus was positively related to size spectra intercepts, i.e. the carrying capacity of detritivores. Increases of the intercept were caused by an interspecific response based on a larger relative abundance of Amphipoda and Trichoptera, which added individuals in all size categories. In contrast, detritus quality modified size spectra slopes, i.e. the energy transfer efficiency, with shallow slopes (proportionately more large individuals) associated with mesotrophic sites and steeper slopes (proportionately fewer large individuals) associated with sites draining eucalypt plantations. Decomposition rates increased with increasing (shallower) size spectra slopes, highlighting the importance of large sized individuals for driving this ecosystem function. We demonstrate the link between detritus quantity and quality, and the transfer of energy through the 'brown' food web, by means of intra- and interspecific mechanisms. Our study reveals that global change projections that include further land use changes and nutrient pollution could greatly impair detrital dynamics and ecosystem functioning in headwater streams.

ON206

Insight into long-term ecological dynamics from the Lynn Brianne Observatory

Stefano Larsen[1], *Isabelle Durance*[2], *Steve Ormerod*[2]
[1]Fondazione Edmund Mach, San Michele all'Adige, Italy, [2]Cardiff University, Cardiff, United Kingdom

Understanding the erosion of freshwater biodiversity has become a global imperative, but consistent series of long-term data from which to appraise changes are rare. In central Wales (UK), the Lynn Brianne Stream Observatory has provided unique insight into the complexity of biodiversity dynamics over four decades, revealing how apparent stasis in alpha- and beta-diversity might mask non-random functional changes in macroinvertebrate assemblages.
Assessments of synchrony and stability at population and community levels reveal the effect of climatic variations in which warmer, wetter phases of the North Atlantic Oscillation (NAO) have been associated with large interannual changes in community composition. Moreover, these positive NAO periods have brought greater synchrony in species abundances within streams (community synchrony) and across streams (spatial population synchrony). Increasing synchrony can destabilise ecosystems with consequences for the persistence of populations. Preliminary analyses at Lynn Brianne suggest that species with greater spatial synchrony tend to decline in abundance over time. For instance, the abundance of cold-adapted species has declined by 40% since the 1980s reflecting the general increase in temperatures. Moreover, populations of these species displayed significantly higher spatial synchrony than warm-adapted species, which increased by 30% over the same time period. We suggest that both directional climate warming and the NAO contribute to the long-term reorganisation of benthic communities in temperate headwaters.