Book of Abstracts

LIMNOLOGIA2018

XIX Conference of the Iberian Association of Limnology
Inland waters and XXI century challenges: from scientific knowledge to environmental management
24 – 29 June 2018, Coimbra, Portugal

Welcome to LIMNOLOGIA 2018

Inland freshwaters represent only a minor fraction of total waters of our planet; however they comprise a large variety of systems, including lakes, lagoons, ground waters, streams and rivers that greatly differ in size, and water chemistry. Inland waters also support a strikingly and disproportionately high level of the world's biodiversity.

Historically, inland waters are linked to the rise of ancient civilizations. Many ancient civilizations grew and flourished along large rivers or other large sources of freshwaters as centers of intensive anthropogenic activities. Some civilizations collapsed due to environmental changes resulting in water scarcity. Some of the worst recent environmental disasters are related to bad water management (e.g. the collapse of the Aral sea). The misuse of water resources is an ongoing process, with large rivers that run dry (e.g. Colorado, Indus, Yellow) and dubious hydrological plans threatening biodiversity and marginalized human societies (e.g. inner Niger Delta). Unsafe water kills more people than all wars; it is estimated that every year 1.7 million people die in the world because of water related problems.

Inland waters provide ecosystem services to humans, including clean water for consumption, irrigation and hydropower, food, cultural and spiritual values. However, humanity's growing water needs, global climatic change, nutrients and pollutants run-off are exacerbating challenges of water scarcity and quality, which will in turn, increase the pressure we place on our inland waters.

These pressures challenge human societies to better understand rivers to properly manage freshwater resources. The Iberian Limnological Association meeting, to be held in Coimbra in June 2018, will be an interactive platform for scientists, policy makers, environmental managers, industry and all those interested in inland waters to discuss and share their ideas and expertise. We welcome all to the 2018 AIL meeting.

PROAQUA MARE U C FCTUC FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE DE COIMBRA imar AIL

CÂMARA MUNICIPAL COIMBRA MUSEU DA CIÊNCIA UNIVERSIDADE DE COIMBRA UNICAM Sistemas Analíticos, Lda Filsat PRAXIS Pure malt beer

Venue

University of Coimbra, Polo II
Rua Silvio Lima
3030-790 COIMBRA

40°11’10.98”N 8°24’41.57”W

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Delineating freshwater monitoring networks using eDNA metabarcoding

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Environmental DNA (eDNA) and metabarcoding are potentially useful tools for assessing water ecological status and for detecting rare freshwater species, including species that are threatened or were recently introduced. While collection of biotic data of good quality is essential to inform managers, the widespread application of eDNA metabarcoding in freshwater monitoring is still hindered by the lack of standardised field, lab and bioinformatic protocols. Here we aim to illustrate the eDNA metabarcoding workflow developed under the FRESHING project for monitoring the ecological status of running waters and detecting rare species. The Douro Basin watercourses (Spain and Portugal) were used as a case study since the region covers a range of environmental conditions and human stressors. We first selected a collection of sampling sites that represent the main gradients of environmental conditions and human stressors in the basin using GIS datasets available online and from ordination techniques. We then visited the selected sites during early summer 2017, filtered water for collecting eDNA, and simultaneously performed conventional methods to sample fish, mussels and other benthic macroinvertebrates with the joint efforts of other ongoing projects. We also collected fin tissues from the fish species occurring in the study area to complete DNA reference collection at InBIO-CIBIO. In a further step, we used those tissues to sequence Citb, COI and 12s genes, if not available in GenBank or BOLD databases. Finally, we present future steps of the project, including the development of eDNA metabarcoding field and lab protocols and the design of an optimal network to monitor ecological status and the occurrence of rare species in the Douro Basin watercourses.

Multiple introductions and first record of Phoxinus phoxinus in the Douro Basin revealed by molecular data

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Biological invasions are a major threat to global biodiversity. Freshwater ecosystems are particularly vulnerable to anthropogenic introductions, including in the Iberian Peninsula where the number of introduced species has been increasing during the last decades. This is the case of the minnows (*Phoxinus genus*), which have been used as a live bait since the 1900s. Until recently, *Phoxinus phoxinus* was thought to be distributed across most of the European watercourses, including the Iberian Peninsula in the Ebro Basin and some streams of the Cantabrian region. In 2007, these Iberian populations were identified as *Phoxinus bigerri*, including the traslocated populations in the Douro Basin near Burgos (Spain). Currently, little is known about the distribution of *Phoxinus bigerri* in the Douro Basin. During early summer 2017, we sampled 75 stream reaches using electrofishing across the Douro Basin (Portugal and Spain). We identified 267 individuals as the Pyrenean minnow P. bigerri, and we cliped and stored fin tissues from 153 individuals in 96% ethanol for DNA reference collection. Among those, 26 were barcoded for cytochrome oxidase I (COI) and cytochrome b (Cytb) genes to confirm the taxonomic identification at the species level. Results confirmed, for the first time, the presence of the common minnow *P. phoxinus* in the Douro basin, being five individuals collected in the western Douro (Portugal near Porto) closely related to populations from Adour Basin in France. The remaining 21 individuals from eastern Douro (Spain near Brugos) were identified as *P. bigerri*, as expected. Our study is the first record of *P. phoxinus* in the Douro Basin, which can be easly missidentified when using only morphologically identifications. The study highlights the value of using molecular approaches for detecting new introductions and tracking spread histories, which can be relevant for designing proper management plans dealing with erradication, control or containemnt of invasive species. Importantly, the *P. phoxinus* introduction in western Douro river (Potugal) seem to be related with human activities (sport fisheries by Portuguese immigrants living in France) rather than geographical proximity.