POSTER

Non-pollen palynomorphs preserved in sedimentary archives of Lake Caldeirão, Azores: Fungal and algal remains as paleoecological indicators

Souto M[1], Gonçalves V[1], Ritter C[1], Pla-Rabés S[2], Richter N[3], Sáez A[4], Bao R[5], de Boer EJ[6], Benavente-Marín M[6], Hernández A[6], Giralt S[6] & Raposeiro PM[1]

martin.s.souto@uac.pt

[1] Centro de Investigação em Biodiversidade e Recursos Genéticos, CIBIO, InBIO Laboratório Associado, Pólo dos Açores & Faculdade de Ciências e Tecnologia da Universidade dos Açores, Ponta Delgada, Açores, Portugal

[2] CREAF, University Autonoma of Barcelona (UAB), Bellaterra, Spain

[3] Department of Earth, Environmental, and Planetary Sciences, Brown University, Providence, USA

[4] Department of Earth and Ocean Dynamics, Universitat de Barcelona, Barcelona, Spain

[5] Centro de Investigacións Científicas Avanzadas, Universidade da Coruña, Spain

[6] Institute of Earth Sciences Jaume Almera (ICTJA), Spanish National Research Council (CSIC), Barcelona, Spain

Non-Pollen Palynomorphs (NPPs) are sub-fossil remains from a wide range of organisms that can be sensitive to various ecological and/or anthropogenic factors. These microfossils include the remains of fungi, algae and invertebrates. Here we describe NPPs from the sedimentary record of Lake Caldeirão (Corvo Island, 400m a.s.l.), which spans the last two millennia. There are three successional NPP assemblages that track changes from a pristine ecosystem to an area severely altered by human activities. 1) The first assemblage includes diverse fungi wood saprophytes and mycorrhizae, indicating a pristine forest, and a set of aquatic fungal species associated with littoral plant communities. 2) This is followed by an increase in hyphomycetes conidia from decaying wood, and ascospores from the forest pathogen *Kretzschmaria deusta.* This assemblage also includes Glomeraceae, which is derived from a forested landscape that is disturbed by soil erosion and herbivores. The NPP assemblage points to the major transformation of the landscape from a forest to open grass and wetlands. 3) The most recent assemblage is dominated by ascospores of the coprophilous fungi (*Podospora* spp. and Sordariaceae) found in the faeces of pasture-livestock. This interpretation is supported by the presence of *Lacunastrum* and *Desmodesmus*, planktonic algae, which are associated with nutrient enrichment. The use of NPPs will improve palaeoenvironmental reconstructions from the Azores, although further studies of modern analogues are required to get a better understanding of the specific habitats associated with particular NPPs.

POSTER

Monitoring the response of Maltese microalgae to climate variability

Fenech K & **Zammit G**

gabrielle.zammit@um.edu.mt

Laboratory of Applied Phycology, Centre for Molecular Medicine and Biobanking, University of Malta, Msida, Malta

Research into the effects of global climate variability (GCV) on microalgae is generally lacking, with bloom-forming cyanobacteria being the exception. This study aimed to assess morphological and biochemical changes in different strains of Maltese microalgae by replicating climate change parameters within a laboratory setting. These included increases in temperature (T), exposure to ultraviolet radiation (UV) and carbon dioxide (CO_2) concentration. These set parameters were based on the 2014 IPCC predictions, which estimate a CO_2 concentration of 800 ppm and a 4 °C increase in temperature by the year 2100. A six-month study has been conducted on the freshwater filamentous cyanobacterium *Nostoc* sp. AD0303 and the coccal chlorophyte *Jenufa* sp. AD0402. Increased UVR had the most pronounced effect on the morphology of cells. In fact, *Nostoc* sp. AD0303 presented as aggregated filaments, whereas *Jenufa* sp. AD0402 exhibited thicker cell walls. Such morphological adaptations protected against elevated UVR and allowed both strains to accumulate biomass at a significantly higher rate than the control. An elevated CO_2 concentration resulted in an inhibition of growth in *Jenufa* sp. AD0402 and bleaching of filaments in *Nostoc* sp. AD0303, both leading to culture death. An increase in T stimulated growth and biomass accumulation of *Nostoc* AD0303, whereas growth of *Jenufa* AD0402 was partially inhibited. The study is ongoing with two halotolerant strains; the cyanobacterium *Calothrix* sp. SLM02-11and the chlorophyte *Coelastrella* sp. SLM05-03. So far, our findings indicate that the effects imposed by GCV are strain-specific, making changes at an ecosystem level difficult to predict.