BOOK OF ABSTRACTS

ISAP 2024

16-21 JUNE 2024 • PORTO • PORTUGAL

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WELCOME MESSAGE

Dear Participants,

Welcome to the 8th Congress of the International Society for Applied Phycology (**ISAP 2024**), set to take place from June 16 to 21, 2024, in the charming city of Porto, Portugal.

We are thrilled to host this year's conference, with a special focus on *Algae 2030: Challenges and Opportunities*. Over the course of five days, you will be immersed in lively discussions and engaging debates, creating the perfect environment to initiate interdisciplinary consortia. The scientific programme ranges from a classical overview to the cutting edge and hot topics of modern applied phycology, with 7 Keynotes, 143 selected oral presentations, 8 special sessions, and 187 posters.

ISAP 2024 provides a unique opportunity for our student attendees to exchange ideas, gain inspiration, and form new networks. We are pleased to offer special activities for PhD students, such as sponsored sessions on Career and Self-development, PhD Surviving Skills: A Mental Health Perspective, and a Springer-sponsored workshop on getting your paper published.

We sincerely thank all sponsors, exhibitors, presenters, and attendees for their continued support and active participation. We are particularly excited about the **sponsor talk** by **AQUALGAE's**, focusing on the "New Generation of Photobioreactors for Seaweed Seedling Production," scheduled for **June 18th at 14:45**.

A special thanks to our session chairs and scientific committee, whose contributions are critical to the quality and success of our programme.

In addition to a stimulating scientific programme, ISAP 2024 promises a diverse social and cultural experience. Attendees will have the opportunity to participate in excursions showcasing the numerous applications of micro- and macroalgae, such as Sustainable Algae Innovation: A Journey Through Allmicroalgae’s Pioneering Solutions and Rediscovering Traditional Algal Uses in the North of Portugal.

We hope you enjoy ISAP 2024 and Porto, where together, we will explore, innovate, and build a brighter future for applied phycology.

Warm regards,

The Local Organising Committee

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Abstract
Alaria esculenta, commonly known as winged kelp, is a type of brown seaweed flourishing in cold waters. It contains has various bioactive compounds with significant industrial potential (Blanco et al., 2023). Integrated Multi-Trophic Aquaculture (IMTA) synergizes the cultivation of species from different trophic levels, thereby improving environmental and economic sustainability (Fossberg et al., 2018). The present study investigates the effects of growth and quality of *A. esculenta* within an IMTA system, co-cultured with Atlantic salmon in Bantry Bay, West Cork, Ireland. This system is compared to a control site in Toormore Bay, where no salmon farming is present, but which shares similar climatic conditions with to Bantry Bay. *A. esculenta* is expected to act as an extractive species, absorbing nutrients released by the salmon (Sickander & Filgueira, 2022). Monthly growth assessments will be performed at each site followed by analyses of bioactive compounds, such as phenolics, phlorotannin, fucans and polysaccharides. Periodic water samples from both sites will be analyzed to assess nutrient abundance. Continuous logging light and temperature data will be done by probes attached to the cultivation lines, enabling the precise measurement of hourly photosynthetically active radiation and water temperature. Upon harvesting, the kelp's final biomass will be evaluated. The findings aim to contribute more sustainable aquaculture practices by optimizing nutrient cycling and enhancing the viability of seaweed cultivation in proximity to fish farms.
This project has received funding from the EU Framework Programme for Research and Innovation Horizon Europe under SEACHEM and IMPRESS Grant Agreement No.101073471 and 101084437, respectively.

Keywords: Seaweed, Aquaculture, Sustainability, Bioactive compounds, Circularity

Biodiversity and applications of algae

(22876) - THE USE OF CHAROPHYTE ALGAE IN ECOLOGICAL STATUS ASSESSMENT OF LAKES – DEVELOPING NEW METHODS BASED ON EDNA

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Abstract
Charophyte algae have long been used for the ecological status assessment of lakes. Traditional fieldwork and species determination are, however, time-consuming and expensive. In the BIOLAWEB project, we aim to use environmental DNA (eDNA) for metabarcoding of Chara sp. in the water samples from selected lakes, and use this information to develop new or improve existing indices for the ecological status assessment of lakes.
Ecological status assessment of lakes is important to safeguard biodiversity, and to ensure that lakes are in good enough status to safely be used for, among others, drinking water production, and recreation. Charophytes are benthic algae which are

sensitive to changes in water quality and therefore are important indicators for ecological status. The use of eDNA is an approach that can be used to quickly detect the presence of different species in a lake, including species that are easily overlooked with more traditional, time-consuming methods. The use of eDNA for ecological status assessment is, therefore, a new and promising field of study.
Here we present preliminary results of charophyte investigations in four lakes in Serbia, two freshwater and two saline lakes, in three seasons. Besides traditional sampling of charophytes, water samples were filtered for eDNA, aiming to generate new knowledge on the use of DNA metabarcoding for the detection of charophyte algae and for improving indices for ecological status assessment.

Acknowledgments
This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101079234 (BIOLAWEB project). The work was supported by the Ministry of Science, Technological Development and Innovation of Republic of Serbia (Contract No: 451-03-47/2023-01/200026).

Keywords: charophytes, saline lakes, freshwater lakes, eDNA, ecological status assessment

Biodiversity and applications of algae

(22879) - TRANSCRIPTIONAL RESPONSE OF THE DIATOM PHAEODACTYLUM TRICORNUTUM IN DUAL-SYSTEM CO-CULTURES WITH FOUR BACTERIA ISOLATED FROM ITS PHYCOSPHERE

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Abstract
The coexistence of diatoms and heterotrophic bacteria over evolutionary times has promoted intimate associations between them. The ecological interactions between diatoms and marine bacteria play important roles in shaping the microenvironment surrounding these microorganisms and in turn influence the biogeochemical cycling of key nutrients and the aquatic food chain. Diatoms commonly co-occur with specific bacterial phylotypes, but the mechanism of potential interactions is mostly unknown. Here we investigated the transcriptional and physiological responses of the model diatom *Phaeodactylum tricornutum* when grown in dual-system co-cultures with four selected bacteria isolated from its own phycosphere. The effects of single bacteria, belonging to four different genera, on the growth and transcriptome of the diatom were evaluated.
The isolated bacteria showed different effects on diatom growth: three bacteria showed a positive effect and one resulted in the inhibition of the diatom growth.
RNA-Seq analysis revealed the transcriptome of *P. tricornutum* was differentially affected by the four isolates, suggesting that the diatom-bacteria interactions were highly specific. In presence of bacteria, it was observed a different regulation mainly of carbon, nitrogen and photosynthetic pathways. Moreover, Weighted Gene Co-expression Analysis (WGCNA) further identified unique gene co-expression modules linked to each bacterial strains, by confirming the hypothesis that each isolated bacterium has a specific relationship with the diatom.