

Session A
Biochemical, biogeochemical, and molecular approaches to the study of plankton ecology and species diversity

Conveners: Steve Hay (UK), Janna Peters (Germany), and Ann Bucklin (USA)

Rationale: Understanding of marine ecology and biodiversity are increasingly benefiting from novel biochemical, biogeochemical, and molecular approaches and techniques. Plankton species diversity can be accurately assayed using molecular approaches, including DNA barcoding and community metagenomics. Material flow (e.g., nutrient uptake) and trophic relationships in pelagic food webs can be traced using biochemical markers, trace elements composition and stable isotopes. Other biochemical approaches include correlation of dietary components and food quality with vital rates and recruitment success; histochemical and enzyme kinetic assays to gain insight into physiological condition, growth, and impacts of biotoxins and pollutants. Gene expression analysis using quantitative PCR and DNA microarrays can reveal impacts of environmental variability. These and other technical advances are transforming the research areas of plankton population and community ecology, and improving our understanding of species diversity, distribution, abundance and adaptability.

The new knowledge gained is critical for determining marine ecosystem function and health; understanding global biogeochemical cycles; and modelling and predicting impacts of climate change, acidification, and associated stressors. Marine ecosystem analysis must include accurate information on species-level diversity, distribution, and abundance, as well as species-specific processes and transfer rates.

Specifically this session would explore biochemical, biogeochemical, and molecular studies that:

- 1) Characterize plankton species diversity, distribution, and abundance;
- 2) Determine the effects of environmental variability on individuals and populations in terms of physiological condition and vital rates; and
- 3) Explore material transfer and trophic relationships in pelagic food webs, especially in relation to climate change.

This session will be in partnership with the Census of Marine Life projects, Census of Marine Zooplankton (CMarZ). This session will contribute to ICES mandates for determining the status of marine biodiversity and understanding impacts of climate change in North Atlantic regions.

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