W11: MEQ Workshop
Harnessing Environmental DNA (eDNA) for Early Detection and Monitoring of Marine Invasions in the Face of Climate Change

Duration:
1-day workshop

Format:
Contributed: 20-min time slot (16-min talk + 3 min questions + 1 min transition)
Invited: 40-min time slot (34-min talk + 5 min questions + 1 min transition)

Convenors:
Satoshi Nagai (Japan), *corresponding*
Keun-Hyung Choi (Korea)
Seongjun Bae (Korea)
Joseph R. Krieger (USA)

Invited Speakers:
Keiji Iwasaki
(Nara University, Faculty of Letters, Department of Geography, Japan)
Tadasi Kajita
(Ryukyu University, Japan)

Non-indigenous species (NIS) pose significant ecological and economic risks to marine ecosystems, further intensified by globalization and climate change. Global climate change has reshaped species distributions, increasing the likelihood of new introductions and invasions, with a noticeable rise over the last decade. Despite prevention efforts, species continue to be introduced requiring effective and cost-efficient early detection strategies. This workshop will explore the application of environmental DNA (eDNA) and environmental omics techniques for detecting and monitoring NIS in the North Pacific and beyond, aligning with PICES' mission to enhance marine science and promote sustainable resource management. The workshop will review the global landscape of eDNA and environmental omics monitoring, examining their strengths and limitations for detecting NIS, while emphasizing the need for standardized approaches. Additionally, it will investigate the impact of climate change on NIS patterns and how these advanced detection techniques can improve monitoring accuracy, supporting PICES' focus on understanding climate-related shifts in marine ecosystems. The workshop aims to foster collaboration by creating a platform for sharing best practices, methodologies, and lessons learned, reinforcing PICES' commitment to capacity building and scientific exchange among member nations. Lastly, it will discuss how data from eDNA and environmental omics can be effectively integrated into management strategies, bridging the gap between science and policy to enhance ecosystem resilience and biodiversity protection. Although the focus will be on NIS we recognize molecular techniques are of interest to the PICES community broadly and so invite participation where eDNA and omics approaches have been used for other applications (conservation monitoring, stock assessment, etc.).

Time	Name	Invited	Ttitle
900	Satoshi Nagai	Convener	Greeting remarks
905	Tadashi Kajita	Invited	Harnessing eDNA metabarcoding for transregional biodiversity monitoring: Lessons from JSPS Core-to-Core and ANEMONE Global
945	Kenji Takata	Oral	Evaluating the effectiveness of eDNA for assessing the diversity of octocoral communities in the twilight zone, including fisheries-important species
1005	Seongjun Bae	Oral	Quantitative monitoring and spatial detection of ascidians using environmental DNA
1025	Coffee break		
1055	Mikio Watai	Oral	Molecular approaches to enhancing fish egg monitoring in the Pacific waters off Japan
1115	Tomohiro Kuroita	Oral	QuickConc: A highly sensitive eDNA concentration method with cationic-assisted capture
1135	Satoshi Nagai	Oral	Comparative analysis of eDNA-based taxonomic assignment in micro eukaryotes from Mombetsu using different databases
1155	Tomohiro Nishimura	Oral	Risk assessment of paralytic shellfish toxins from Alexandrium species in Japan based on multiple analyses: Diversity, toxin production, and seasonal occurrence revealed by environmental DNA
1215	Lunch break		
1410	Keiji Iwasaki	Invited	Island biogeography of marine nonindigenous species in Japanese Waters
1450	Tsuyoshi Watanabe	Oral	Spatiotemporal dynamics of Karenia selliformis during the 2021 harmful algal bloom along the Pacific coast of Hokkaido, Japan
1510	Keun-Hyung Choi	Oral	High-throughput DNA metabarcoding for zooplankton community analysis
1530	Coffee break		
1550	Junya Hirai	Oral	DNA metabarcoding and reference DNA sequence databases toward a better understanding of marine zooplankton biodiversity in the western North Pacific Ocean
1610	Joseph Krieger		Closing remarks