

Barcoding of non-indigenous gelatinous zooplankton species in the Adriatic

Rade **Garić**¹, Mirna Batistić¹, Marijana Hure¹, Ana Baričević², Mirta Smodlaka Tanković², Priscilla Licandro³ and Marcell Dénes¹

¹Institute for marine and coastal research, University of Dubrovnik, Dubrovnik, Croatia. E-mail: rade.garic@unidu.hr

²Center for Marine Research, Ruđer Bošković Institute, Rovinj, Croatia.

³Stazione Zoologica Anton Dohrn, Naples, Italy.

Over the past three decades, a persistent influx of non-indigenous gelatinous zooplankton species into the Adriatic Sea has been observed. Among these species, some have firmly established themselves as permanent members of the Adriatic zooplankton community, while others appear periodically, their presence contingent on the prevailing water masses entering the Adriatic. Furthermore, a number of previously undocumented species have been recently discovered in the Adriatic, and their long-term impact remains uncertain. With the advent of genetic techniques there has been increasing need to genetically profile these species, aiming to unveil their origins, whether from the Atlantic or the Indopacific, and to assess the utility of metabarcoding as a monitoring method for detecting non-indigenous gelatinous zooplankton species.

We barcoded 14 species non-indigenous species in the Adriatic: *Thalia orientalis*, *Brooksia lacromae*, *Dolioletta advena*, *Doliopsis rubescens*, *Pegea bicaudata*, *Pyrosoma atlanticum*, *Aurelia pseudosolida*, *Paracytaeis octona*, *Muggiaea atlantica*, *Porpita porpita*, *Charistephane fugiens*, *Pontodora pelagica*, *Pelagobia longicirrata*, *Fritillaria helenae*, and *Oxygyrus inflatus*. Over a 12-month period, samples for metabarcoding were collected from both the South and North Adriatic.

In the Mediterranean, non-indigenous species arrive through the Suez Canal or Gibraltar. Identifying their origins informs us which entry point has a greater impact on the Adriatic Sea, aiding in predicting future changes. However, genetic analysis alone in this case was mostly unable to pinpoint their origin due to limited genetic reference data. A multi-marker approach in metabarcoding has shown the best results in detecting non-indigenous species within the Adriatic ecosystem.