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GENETICS IN MONITORING AND MANAGEMENT OF NON-INDIGENOUS SPECIES IN MARINE SYSTEMS

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The use of different approaches to ecosystem management is a demand. Especially with the established guidelines in conventions and regulations that seek to protect marine systems. For example, the European Union describes the need of mitigate the negative effects of non-indigenous species (NIS) to achieve "Good Environmental Status" for marine waters, habitats and coastal resources. Thus, the implementation of surveillance programs for non-indigenous marine species is demanded. In addition, there is a need to monitor the temporal changes in the condition of the marine ecosystem, incorporating metrics that describe the distribution and impacts of NIS. Therefore, it is important to achieve and promote standardized monitoring efforts. In this sense, genetic tools have arisen and were adapted proposing a more accurate and agile alternative for species identification, and more recently, the detection of the presence of species before their identification. Therefore, actions to develop and implement standard genetic tools can be taken in a reliable and affordable way. By implementing a series of methods based on the analysis of nucleic acids (DNA and RNA) already developed and thus improving the ability to evaluate and manage NIS (Gene Markers; FingerprintDNA; eDNA; etc.). Thus, to achieve the goals of a constant surveillance programs for non-indigenous marine species it does require the application of advanced tools for NIS risk monitoring and risk assessment, particularly due to known challenges associated with research and monitoring with traditional methods. On the other hand, getting a standardized analysis between different labs it is necessary intercalibrations for a compatible monitoring system is a big challenge. Especially considering ecosystem changes generated by invasions, habitat destruction and / or climate change. Therefore, it is necessary to highlight some of the possibilities for the future development of these genetic tools and for evaluation and management of NIS in marine systems. Therefore, it is necessary to emphasize that issues such as technological innovation, methodological standardization, data sharing and resource collaboration and integration of expertise (i.e. integrated taxonomy), are fundamental parts for the management of NIS.