



Conference Abstract

Scanning ferry routes: looking for eDNA traces of marine mammals and their preys

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Abstract

Marine environmental DNA (eDNA) surveys are becoming a promising approach to monitor biodiversity status and its variation over time. However, monitoring offshore areas could be extremely costly when using dedicated vessels, beside the impossibility to sample simultaneously geographically distant (even if adjacent) areas. The unexplored possibility of availing on operating ferries as an opportunistic platform for eDNA sampling offers several advantages besides opening limitless opportunities for systematic surveys on marine biodiversity. We present the results of both metabarcoding and barcoding approaches obtained from the analysis of water samples collected on board of a ferry boat along a pilot Mediterranean route crossing the Pelagos Sanctuary for Mediterranean Marine Mammals. The recently described MarVer primer sets (12SrDNA and 16SrDNA regions), specifically designed for the simultaneous detection of marine mammals and other marine vertebrates, were employed. The High Throughput Sequencing (HTS) outcome showed that the markers successfully detected most trophic levels of vertebrate marine communities, and classes, including bony fish, rays, cetaceans and birds. Ferry-based sampling allow to collect sample at any time of the day, and we indeed found diel differences in both quantitative and qualitative distribution of read counts. For instances, we observed an increased abundance of lantern fish amplicons in night-time collect samples (50%), reflecting nocturnal migration through the water column. In general, the number of read counts was significantly higher in nocturnal samples. Such diel differences within our sample indirectly provides evidence of the efficiency of the eDNA approach to detect contemporary signals in the sampled environment. Similarly, cetaceans were

detected in correspondence of visual sightings (when these occurred, supplementary samples were collected). Rare species, such as the monk seal, are difficult to be detected in metabarcoding surveys, thus we opted to side the screening of the ferry-samples with a panel of species-specific qPCR assays, which were able to detect DNA traces of the endangered pinniped in the Tuscany archipelago (Tyrrhenian Sea) long before visual observations witnessed its presence in the same area. The study demonstrates the feasibility of using commercial shipping as a platform for eDNA marine sampling without dedicated survey cruises. Commercial shipping routes have potential to act as regular systematic sampling transects which can contribute to evaluating and monitoring marine biodiversity.

Keywords

MarVer, 12SrDNA, 16SrDNA, cetacean, monk seal, Mediterranean, metabarcoding, barcode, *Monachus monachus*

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