



## Environmental DNA for Detection of Endangered Grouper Species (*Ephinephelus spp.*)

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### Abstract

Marine ecosystems nestle species or populations known to be threatened due to human overexploitation. Reliable detection and monitoring of threatened organisms is crucial for data-driven conservation actions. Furthermore, misidentification of species represents a major problem. Here, we investigate the potential of using metabarcoding of environmental DNA (eDNA) obtained directly from seawater samples to detect endangered grouper species (*Ephinephelus spp.*). Cytochrome c oxidase subunit I (COI) fragment of mtDNA was used to detect groupers species in the Mediterranean Coasts. We conducted eDNA sampling at sites by underwater diving across the range of the Grouper species habitats in Northeastern Mediterranean (Antalya-Kas Region and Iskenderun Bay). eDNA was isolated from 2 liter seawater samples which were vacuum-filtered onto 0.45-mm membrane filters. Filters were then folded inwards, placed in 2 ml tubes and stored at -20 °C until DNA extraction, which took place within 24 hours. DNA was extracted from the water sample filters using the DNeasy Blood and Tissue Kit (Qiagen, USA). Manufacturer's protocols were used during all steps. PCR amplification of eDNA samples were done using selective primers of COI region of mitochondrial DNA, and next-generation DNA sequencing of PCR applications was conducted. For the successfully obtained COI sequences, maximum matching rates were revealed as 80% for *Epinephelus marginatus*, 78,95% for *Epinephelus aeneus*, 73,48% for *Epinephelus costae*, 63,45% for *Epinephelus caninus*, 60,12% for *Mycteroperca rubra* and 57,12% for *Hyporthodus haifensis*. Despite the methodological challenges inherent in eDNA analysis, the results demonstrated that eDNA method may be proved to step towards a new beginning to detect and monitor endangered grouper species. This study was supported to TUBITAK project (214O575).

### Keywords:

Environmental DNA, Endangered Grouper Species, *Ephinephelus spp.*, Cytochrome c oxidase subunit I (COI)

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