{rokbox title=| Sampling sites where specimens of the studied species were collected :: Image: Authors|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-genetic-diversity-in-mitochondrias-farriols-2026-thumb-et-al.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-genetic-diversity-in-mitochondrias-farriols-2026-et-al.jpg{/rokbox}

Noemi Pasini, Marta Bassitta, Joana F. Ferragut, **Maria Teresa Farriols**, Natalia Petit-Marty, **Francesc Ordinas**
, Sergio Ramírez-Amaro and Antònia Picornell , 2026.
Genetic diversity in mitochondrial DNA reveals the effect of a Fisheries Protection Zone on exploited marine species in the Menorca Channel (Western Mediterranean).
Biodiversity and Conservation.Volume 35.Article number 280 (2026).
https://doi.org/10.1007/s10531-026-03483-w

Abstract:Overexploitation can drive evolutionary changes and erode genetic diversity, reducing species' adaptive capacity to environmental and anthropogenic pressures. Spatial marine conservation measures, such as Marine Protected Areas and Fisheries Protection Zones (FPZs), aim to mitigate these impacts by preserving biodiversity and promoting sustainable fisheries. Recently, nucleotide diversity of the mitochondrial Cytochrome C Oxidase subunit I (COI) marker has emerged as a promising proxy for assessing species conservation status. To evaluate the effectiveness of an FPZ established in 2016 in the Menorca Channel, COI genetic diversity was assessed in four exploited marine species across three areas: the FPZ and two nearby non-protected zones. All species exhibited consistently higher genetic diversity within the FPZ, despite evidence of high gene flow among areas. To test whether these differences were consistent with expected changes in effective population size—such as expansions driven by fisheries protection or bottlenecks caused by fishing pressure—we conducted coalescent simulations under a neutral model of evolution. These simulations supported a scenario of population expansion in the FPZ, contrasting with signs of genetic erosion in fished areas. These patterns align with Vessel Monitoring System (VMS) data, which show a post-protection-establishment shift in fishing effort toward non-protected zones, potentially contributing to population declines outside the FPZ. This study provides genetic evidence of the positive effects of fishing restrictions on fishery resources in the Menorca Channel, supporting the FPZ's role in preserving genetic diversity and promoting population recovery. Furthermore, it highlights COI nucleotide diversity as a simple, cost-effective tool for monitoring marine species' conservation status and guiding resource management strategies.

Keywords:Nucleotide diversity,COI,Coalescent simulations,Fisheries resources,Protected areas,Mediterranean Sea.