{rokbox title=| Map of the study area in the Northwestern (NW) Mediterranean Sea showing the sampling stations for white muscle tissue collection :: Image: Authors|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-evidence-within-between-stock-2026-kerametsidis-thumb-et-al.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-evidence-within-between-stock-2026-kerametsidis-et-al.jpg{/rokbox}

Georgios Kerametsidis, **Manuel Hidalgo**, Baptiste Mourre, Enrico Ser-Giacomi, Lucía López-López, Antonio Esteban, Encarnación García, Miguel Vivas, Angélique Jadaud, Grégoire Certain and Vincent Rossi, 2026. **Evidence of within- and between-stock connectivity in Mediterranean fisheries challenges the stock unit paradigm.**
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Abstract:Achieving sustainable management of marine resources and implementing biologically realistic assessment depend on accurate identification of stock structure. Most harvested marine species are currently assessed under the common and long-standing assumption of “stock unit” within designated spatiotemporally invariant polygons known as assessment units, despite evidence of passive and/or active dispersal across multiple scales. Our objective here is to investigate the connectivity and spatial structure of red mullet (*Mullus barbatus*) metapopulation system in the Northwestern Mediterranean Sea and compare the delineation of assessment units with biological units. To achieve this, we integrate simulated larval dispersal modelling with tissue stable isotope analysis, encompassing the entire life cycle. We observe misalignment between the present “closed” assessment units and the identified biologically informed units. The identified metapopulation system comprises northern and southern subpopulations with dissimilar demographic roles. This principally stems from the Northern Current mediated larval transport from high-density persistent spawning grounds and, secondarily, likely from the regional differences in the isotopic baseline associated with different productivity regimes. Such an interdisciplinary approach is of elevated importance for species with stark differences across their life history, such as red mullet. Moreover, larval connectivity diagnostics successfully capture the interannual variability of recruitment dynamics of this complex stock, evidencing the capacity of biophysical models to inform fisheries assessment and management. This study highlights the importance of implementing spatial stock assessment frameworks that rely on critical, yet still largely disregarded, ecological information.

Keywords:Fisheries, Marine biology.