{rokbox title=|PCA biplot of integrative multi-variate analysis, showing differences between geographical sites based on PC values derived from multiple data types :: Image: Authors| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-holistic-multitracer-assessment-hidalgo-2025-thumb-et-al.jpeg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-holistic-multitracer-assessment-hidalgo-2025-et-al.jpeg{/rokbox}

Rachele Corti, Alice Ferrari, **Manuel Hidalgo**, Elisabetta Piazza, Fausto Tinti, Alessia Cariani, 2025. **Holistic multi-tracer assessment of stock structure for common sole (Solea solea) in the Mediterranean Sea**. ICES Journal of Marine Science.Volume 82.Issue 7.July 2025. https://doi.org/10.1093/icesjms/fsaf125

Abstract: The identification of biological population structure is vital for sustainable marine resource management. Misalignment between management units and actual fish populations can result in ineffective regulations, impacting the sustainability of exploited species. The common sole, *Solea solea* (Linnaeus, 1758), a commercially important demersal flatfish in the Mediterranean Sea, has been previously studied, but gaps remain in understanding its spatial structure within a pan-Mediterranean context. This study employed a multi-tracer holistic approach, integrating genomic and otolith data across various spatio-temporal scales using semi-quantitative methods and integrative multi-variate analysis. This holistic approach revealed the existence of at least three distinct regional stocks within the Mediterranean, highlighting a complex spatial population structure. The Stock Differentiation Index indicated a strong spatial structure, with multi-variate analysis showing consistent and complementary results across different tracers. The integration of these tracers supports the identification of distinct management units, offering a valuable uptake of the resulted information to the management strategies of common sole. Furthermore, this study advocates for the regular application of the holistic approach in the stock assessment of other fishery resources, underscoring its potential to enhance sustainable exploitation of marine resources across various species.

Keywords:genomic,otolith,flatfish,integrative multi-variate analysis,spatio-temporal scales,stocks management.