

{rokbox title=|Spatially Explicit Modeling Reveals Cephalopod Distributions Match Contrasting Trophic Pathways in the Western Mediterranean Sea :: Photo: Patricia Puerta (COB-IEO)| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-cadenas-trophicas-cefalopodos-mediterraneo-occidental-puerta-et-al-2015-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-cadenas-trophicas-cefalopodos-mediterraneo-occidental-puerta-et-al-2015.jpg{/rokbox}

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Abstract: Populations of the same species can experience different responses to the environment throughout their distributional range as a result of spatial and temporal heterogeneity in habitat conditions. This highlights the importance of understanding the processes governing species distribution at local scales. However, research on species distribution often averages environmental covariates across large geographic areas, missing variability in population-environment interactions within geographically distinct regions. We used spatially explicit models to identify interactions between species and environmental, including chlorophyll a (Chla) and sea surface temperature (SST), and trophic (prey density) conditions, along with processes governing the distribution of two cephalopods with contrasting life-histories (octopus and squid) across the western Mediterranean Sea. This approach is relevant for cephalopods, since their population dynamics are especially sensitive to variations in habitat conditions and rarely stable in abundance and location. The regional distributions of the two cephalopod species matched two different trophic pathways present in the western Mediterranean Sea, associated with the Gulf of Lion upwelling and the Ebro river discharges respectively. The effects of the studied environmental and trophic conditions were spatially variant in both species, with usually stronger effects along their distributional boundaries. We identify areas where prey availability limited the abundance of cephalopod populations as well as contrasting effects of temperature in the warmest regions. Despite distributional patterns matching productive areas, a general negative effect of Chla on cephalopod densities suggests that competition pressure is common in the study area. Additionally, results highlight the importance of trophic interactions, beyond other common environmental factors, in shaping the distribution of cephalopod populations. Our study presents a valuable approach for understanding the spatially variant ecology of cephalopod populations, which is important for fisheries and ecosystem management.

Keywords: