OOS2025-447, updated on 23 Apr 2025
https://doi.org/10.5194/oos2025-447
One Ocean Science Congress 2025

Ecological Roles of Mesopelagic Micronekton in the Northeast Atlantic: A Trait-Based Perspective

Hélène Thibault[1], Frédéric Ménard[1], Gildas Roudaut[2], Anne Lebourges-Dhaussy[2], Yves Cherel[3], Alejandro Ariza[4], Leandro Nolé Eduardo[5], and Séverine Martini[1]

[1]Mediterranean Institute of Oceanography, Aix-Marseille Université, France (helene.thibault@mio.osupytheas.fr)
[2]Institut de Recherche pour le Développement (IRD), UMR LEMAR 195 (UBO/CNRS/IRD), Campus Ifremer, BP 70, 29280 Plouzané, France
[3]Centre d'Etudes Biologiques de Chizé, CEBC-CNRS UPR 1934, F-79360, Villiers en Bois, France
[4]DECOD, Ifremer, INRAE, Institut Agro, Nantes, France
[5]MARBEC, Univ. Montpellier, CNRS, Ifremer, IRD, Sète, France

Micronekton comprises a diverse assemblage of actively swimming aquatic animals in oceanic ecosystems, including mesopelagic fishes from 2 to 20 cm. They live in the mesopelagic zone (200-1000 meters), characterized by high environmental gradients and distinct temporal dynamics across depth layers. Depending on their vertical habitat, mesopelagic fishes have developed various adaptions and contribute to essential ecosystem processes, including nutrient cycling and carbon transport. However, the link between their functional diversity, vertical habitat use and survival strategies requires further clarification. This study, conducted during a scientific cruise in the Northeast Atlantic (APERO program), uses multi-depth trawling and acoustic observations to investigate the behaviors and habitats of mesopelagic fishes, highlighting distinct movement patterns across vertical zones. To examine the ecological roles of these species, we developed a trait matrix encompassing 80 fish species and 12 functional traits related to fitness, including morphological, physiological, life-history, and behavioral characteristics. Based on this information, we performed a factor analysis of mixed data including quantitative and qualitative traits. Mesopelagic fishes were then classified in functional groups based on clustering of the factor analysis. Traits that contributed the most to the first two axes were swimming type, teeth type, presence of swimbladder and trophic level. Traits and trade-offs were associated with survival strategies – mainly feeding and predator avoidance - differing between functional groups. We analyzed which patterns of functional diversity emerge across these different structures. This study elucidates the relationships between functional traits, habitat preferences, and feeding behaviors to deepen our understanding of the processes structuring mesopelagic fish assemblages. By exploring these relationships, we gain insights into the adaptive strategies of micronekton and their ecological roles in oceanic ecosystems.