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DISPERSAL MODELING OF THE INVASIVE ALGAE *RUGULOPTERYX OKAMURAE* IN THE STRAIT OF GIBRALTAR AND ADJACENT BASINS

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Abstract: Since its initial detection on the coast of the Strait of Gibraltar in 2015, the exotic brown alga *Rugulopteryx okamurae* has spread explosively over a large part of the Atlantic and Mediterranean coasts, producing severe impacts on previously established benthic communities, and causing massive accumulations along the shorelines, affecting fisheries and tourism. The impact and adaptability of the algae in the Mediterranean environment has recently been the subject of extensive research, but crucial aspects of the invasion, including its distribution and the underlying causes of its success, remain unknown. To gain insight into the spreading and establishment of the species, two nested high-resolution hydrodynamic models coupled with a lagrangian particle tracking algorithm were used, with virtual tracers representing free spores, thalli fragments or detached mats of *Rugulopteryx okamurae*. The work focuses on the Strait of Gibraltar and its adjacent basins, the Gulf of Cadiz and the Alboran Sea, which have been significantly affected by the algal invasion so far. Simulations of larval dispersal from an introduction in the Strait indicate that the algal propagules first spread eastward before spreading westward, with transport by the Atlantic jet leaving the Strait of Gibraltar being the most influential process. The potential utility of computational tools in elucidating the dispersal dynamics of introduced and expanding species, identifying high-risk areas, and formulating management strategies for this species is discussed.

Key words: Invasive species, numerical modeling, dispersal patterns.

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