

{rokbox title=| Principal coordinates analysis (PCoA) based on Bray–Curtis dissimilarities showing compositional variation in benthic assemblages along the R :: Image:

Authors|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-habitat-monopolization-invasive-alga-2026-morato-thumb-et-al.jpg|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-habitat-monopolization-invasive-alga-2026-morato-et-al.jpg{/rokbox}

Alejandro Bernal-Ibáñez, Jorge Santamaría, Cèlia Sitjà, Emma Cebrian, Enrique González Ortegón, Gustavo F. de Carvalho-Souza, Justine Lallau-Vazzoler, Esperanza G. Sumariva, Alejandro Terrón-Sigler, Francisco Luengo, Alejandro J. Ibáñez-Yuste, **Maite Vázquez-Luis, Mercè Morató**

, **José Manuel Cañizares-González**

, Ignacio Gestoso, Iván F. Rodil and Ismael Hachero Cruzado, 2026.

[Habitat monopolization by the invasive alga *Rugulopteryx okamurae* is associated with impaired performance of the grazer *Paracentrotus lividus*.](#)

Original Paper. 14 September 2026. Volume 28. Article number 212 (2026).

<https://doi.org/10.1007/s10530-026-03931-2>

Abstract: The rapid proliferation of the invasive brown alga *Rugulopteryx okamurae* along southern European coasts is driving the replacement of native macroalgal assemblages, promoting habitat homogenization and altering trophic pathways in shallow benthic ecosystems. However, the extent to which native herbivores can regulate this invasion, and the longer-term consequences for their population viability, remain poorly understood. Here, we assessed the community- and consumer- level effects of *R. okamurae* along a gradient of invasion intensity in the Alboran Sea (southern Iberian Peninsula), focusing on the keystone grazer *Paracentrotus lividus*. Benthic surveys revealed a pronounced decline in macroalgal diversity and species richness with increasing invader cover, confirming a strong restructuring of native assemblages. Sea urchin density exhibited a unimodal response, peaking at intermediate invasion levels and declining sharply at the highly invaded location. Individuals from highly invaded areas showed significantly reduced gonadosomatic index (GSI) and strong avoidance of *R. okamurae*, indicating constrained reproductive investment and weak trophic integration of the invader. Stable isotope analyses revealed significant $\delta^{13}\text{C}$ enrichment in *P. lividus* at highly invaded sites, without concurrent changes in $\delta^{15}\text{N}$, suggesting a reorganization of basal carbon sources rather than a shift in trophic level. Fatty acid profiles further demonstrated a lack of essential polyunsaturated fatty acids associated with *R. okamurae* dominance, consistent with a nutritional deficiency affecting reproductive performance. Together, these results show that *R. okamurae* dominance is associated with simplified macroalgal assemblages, reduced reproductive condition of *P. lividus*, avoidance and low trophic integration of the invader, and

altered isotopic and fatty-acid signatures. These patterns suggest that *R. okamurae* may reduce the capacity of native grazers to provide top–down control by replacing nutritionally diverse native macroalgae with a resource that is poorly consumed or assimilated.

Keywords:marine bioinvasions,sea urchins,non-indigenous species,invasive alien species.