

Seaweeds as bioindicators in the context of the Water Framework Directive: The case of Andalusia

Ricardo Bermejo Lacida

Departamento de Biología (Área de Ecología)
Universidad de Cádiz

Facultad de Ciencias del Mar y Ambientales, Universidad de Cádiz, 11510 Puerto Real, Cádiz,
Spain

Marine ecosystems are increasingly subjected to a variety of anthropogenic pressures, which can alter environmental conditions (e.g., acidification, climate change, eutrophication, biological invasions, emergent contaminants, metal and organic contamination) giving rise to different levels of contaminative and pollution status. In order to monitor the contaminative status of coastal ecosystems many international initiatives are being developed, especially focused on the assessment of nutrients, turbidity and metal contamination. The analysis of water and sediment samples might give accurate information about the presence of contaminants, but not about its bioavailability and biological effects. Bioindicators and biomonitors provide a direct measurement of pollution and may indicate long-term effects yielding a more time-integrated response than physico-chemical indicators alone. To obtain a more comprehensive and complete assessment of the ecological status of European water bodies in order to develop more efficient management strategies, the European Commission (EC) implemented the Water Framework Directive (WFD, 2000/60/EC). This directive supports the combined use of physico-chemical and biological indicators to assess the ecological status of European waters, with particular focus on eutrophication. In the case of transitional (e.g., estuaries, lagoons, saltmarshes) and coastal waters (i.e., fully marine environments), seaweed is one of the biological quality elements proposed for the assessment of the ecological status. Different indices have been proposed following WFD requirements. Here, the main indices RSL and CARLIT proposed for the assessment of the ecological status of coastal waters in Andalusia will be described, analysed and discussed. Furthermore, a practical exercise will be developed to show how to calculate the Ecological Quality Ratio (EQR) and determine the Ecological Status (ES) of a water body using the RSL and the CARLIT indices.

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*DEPARTAMENTO DE BOTÁNICA Y FISIOLÓGÍA VEGETAL, FACULTAD DE CIENCIAS,
UNIVERSIDAD DE MÁLAGA*