

Non-native species barnacles (genus: *Amphibalanus*) in southern Iraq: spatial distribution and abundance

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Abstract

Invasion rates of non-native species into new habitats are increasing across the globe and most are due to either human activities or climate change. Whereas most of these species fail to expand or have slight impacts on their new ecosystems, the large number of invasive species has led to serious economic and ecological problems. However, in Iraq, knowledge of the fundamental drivers shaping the current distribution and abundance of invasive species barnacles within the genus *Amphibalanus*, are still poorly understood. Accordingly, to quantify the main drivers of the geographical distribution and abundance of these species across the study area, we collected samples from 21 sites ranging from the lower reaches of Shatt Al-Arab where the salinity ranged from 20 ppt to 24 ppt to upper part of Shatt Al-Arab River, then north west to the Al-Hammar marshes and Euphrates River where the salinity ranged from 0.9 ppt to 2.8 ppt. This work showed that *A. Amphitrite* is widely distributed in most sites. With the exception of a few sites closest to the lower reaches of Shat Al-Arab, *A. improvises* was restricted in the sites with salinity ranging from 22 to 37 ppt. *A. subalbidus* has an oligohaline distribution that is found in a moderate range of salinities. The role of water quality drivers in shaping the composition of invasive species barnacle assemblages and their distribution patterns was assessed using Redundancy analysis (RDA). This ordination revealed that the spatial distribution and abundance of *A. improvises*, *A. Amphitrite* and *A. subalbidus* were influenced by salinity and temperature. Overall, this study suggested the importance of mapping spatial distribution and abundance of invasive species to assess and manage these species risks in the future.

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Conflict of interests

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