

Año: 2019

Título artículo: Life history and physiological responses of native and invasive brine shrimps exposed to zinc

Revista, volumen, páginas: Aquatic Toxicology, 210: 148-157

Autores: Pais-Costa, A.J.; Varó, I.; Martínez-Haro, M.; Vinagre, P.A.; Green, A.J.; Hortas, F.; Marques, J.C.; Sánchez, M.I.

RESUMEN: Although a substantial amount of research exists on pollution and biological invasions, there is a paucity of understanding of how both factors interact. Most studies show that pollution favours the establishment of invasive species, but pollution may also promote local adaptation of native species and prevent the establishment of new incomers. However, evidence for this is extremely limited because most studies focus on successful invasions and very few on cases where an invasion has been resisted. Here we provide evidence of local adaptation of native species to pollution combining life history and physiological data. We focused on the invasion of the North American brine shrimp *Artemia franciscana*, which is causing a dramatic biodiversity loss in hypersaline ecosystems worldwide, and one of the last native *Artemia* populations in SW Europe (*A. parthenogenetica* from the historically polluted Odiel estuary, SW Spain). Life table response experiments were carried out in the laboratory to compare the demographic responses of *A. parthenogenetica* and a nearby *A. franciscana* population to long-term Zn exposure (0.2 mg L⁻¹). We also evaluated oxidative stress by measuring antioxidant defences (catalase, glutathione reductase and superoxide dismutase) and lipid peroxidation (thiobarbituric acid reactive substances). A high concentration of Zn induced strong mortality in *A. franciscana*, which also showed high levels of lipid peroxidation, suggesting relatively poor physiological resistance to pollution compared with *A. parthenogenetica*. The age at maturity was shorter in *A. parthenogenetica*, which may be an adaptation to the naturally high mortality rate observed in the Odiel population. Exposure to Zn accelerated age at first reproduction in *A. franciscana* but not in *A. parthenogenetica*. In contrast, Zn had a stimulatory effect on offspring production in *A. parthenogenetica*, which also showed higher reproductive parameters (number of broods, total offspring and offspring per brood) than in *A. franciscana*. Overall, the results of this study strongly suggest that native *Artemia* from Odiel estuary is locally adapted (at both, reproductive and physiological levels) to Zn contamination and that *A. franciscana* is highly sensitive. This is a good example of how pollution may play a role in the persistence of the last native *Artemia* populations in the Mediterranean.