

Microplastic Accumulation in Native and Invasive Sea Urchin Populations on Lipsi Island (Aegean Sea)

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Abstract : Sea urchins are keystone species in many global benthic ecosystems. The concentration of microplastics (MPs) in sea urchin organs was quantified in 120 individuals of 2 different species and from 4 sites across the Greek island Lipsi, with special interest in the differences between the native *Arbacia lixula* and the invasive *Diadema setosum*. Over 93% of MPs observed in both species were fibrous. MP abundance was found to correlate with exposure to open sea and harsh prevailing winds, irrespective of proximity to urban activities. The MP abundance in the invasive species was not found to be significantly dependent on site. Interestingly, the smaller native species contained significantly larger sized MPs than the invasive, possibly as a result of a greater feeding rate in *A. lixula* individuals. Sexually immature urchins may also have a higher feeding rate, giving rise to the negative correlation between gonad index and MPs per individual. The size of MPs ranged from 10 μ m to 24210 μ m, heavily skewed towards smaller particles. Few differences in colour were noted between the species and sites. MPs were detected in 100% of the samples with abundance ranging from 19.27 ± 6.77 to 26.83 ± 8.15 items per individual, or 3.55 ± 3.73 to 7.34 ± 10.51 items per gram of wet organ weight. This high value could lead to health risks in East Asia and the Mediterranean, where sea urchin is widely consumed, due to toxins adsorbed to the MPs.

Keywords : microplastics, plastic pollution, invertebrate ecology, invasive marine species

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