Don't Sweat the Small Stuff

Hunter, MacKynzy (School: Grants High School)

In the 21st century, microplastics have become an increasingly common anthropogenic environmental pollutant. While the effects of microplastic contamination on many large species have been extensively studied and well documented, the physiological effects, if any, of microplastic pollution on members of basal trophic levels remain understudied. Since these organisms serve as the foundation of vital food webs, any negative physiological effects could predict major impacts upon higher-level organisms. This study explores the impact of microplastic pollution on one model aquatic organism, Daphnia magna, and one model terrestrial organism, Caenorhabditis elegans. The organisms were exposed in controlled laboratory settings to prepared samples of high-density polyethylene microplastics at known concentrations, then monitored for physiological response. It was hypothesized that if microplastic contamination poses a risk for these organisms, it would be seen as significantly altered physiological measurements against the control. Likewise, increasing the concentration of pollutants should increase the size of the response. Heart rate testing during the D. magna trial indicated physiological stress in the presence of microplastics, though this was not reflected in mortality rates. Additionally, the D. magna were observed to have higher levels of microplastics on their bodies, confirming this as a pathway for microplastics to enter the food web. The C. elegans data for population density and average size show no correlation with microplastic concentration, indicating the presence of microplastics has little to no effect on these organisms.

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