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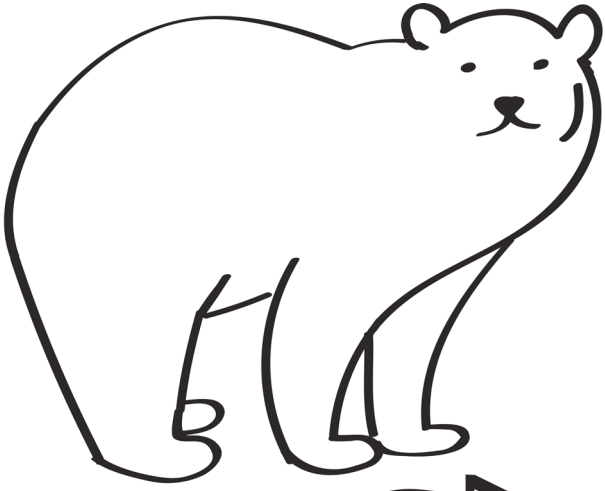

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ABSTRACT BOOK

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Quantitative assessment of micro- and nanoplastic ingestion and interactions with feeding in Daphnia magna

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The environmental pollution with plastic is an issue that concerns all aquatic ecosystems. This includes the prevalence of microscopic plastic particles, which can be found worldwide - from urban centres to some of the remotest areas. Although research has so far mainly focused on marine systems, freshwater environments are also affected. Due to their small size micro- and nanoplastics can be ingested by a large range of aquatic animals. Most studies on micro- and nanoplastic uptake are predominantly qualitative since quantitative measures are challenging. The aim of this study was therefore to use a quantitative approach to determine the amount of micro- and nanoplastic particles that is ingested and egested by the freshwater flea Daphnia magna in different exposure scenarios. Animals were exposed to 100 nm (i.e. nanoplastics) and 2 µm (i.e. microplastics) fluorescent polystyrene beads at a concentration of 1 mg/L for 24 hours (ingestion phase), followed by an egestion phase in clean medium for another 24 hours. During both phases animals were sampled at different time points, the tissues were dissolved enzymatically and the fluorescence of the solution was measured to determine the particle body burden. To analyse the influence of food availability on the ingestion and egestion of micro- and nanoplastics, the test was repeated with the addition of algae in the medium (6.7x105 cells/ml). Furthermore the feeding rates of D. magna in the presence of both particle types were measured to determine potential effects on the animals' physiology. Both particle sizes were rapidly ingested and body burdens increased with exposure time, but the mass per animal of 2 µm beads was 5 times higher, showing a more efficient uptake for this size. Complete egestion did not occur within 24 hours. The body burdens were strongly influenced by food availability, which reduced the values both during ingestion and egestion. In the absence as well as in the presence of food the egestion was more efficient for the 2 µm beads. Particles of nanometre size therefore have the potential to stay in organisms for a prolonged period of time, which could give rise to an increased hazard. The 100 nm beads also lead to a significant reduction of the animals' feeding rates, which can potentially have consequences for physiology and fitness.