INTRODUCTION AND AIM: Microplastics can potentially enter the terrestrial environment by fragmentation of plastic wastes, via microplastic contaminated sewage sludge deposition on agricultural land, or as a result of extreme agricultural praxes where plastic bags are used as mulch. Despite the potential presence of microplastics in terrestrial environments, data regarding the effects of microplastic on terrestrial organisms are very scarce. In this study, we investigated if terrestrial isopods Porcellio scaber and earthworms Eisenia andrei avoid soil contaminated with microplastic. Namely, by avoiding contaminated soil their habitat function is reduced.

METHODS:

MICROPLASTICS: facial scrub (microbeads) (Fig. 1) and plastic bag (Fig. 2)

Fig 1. Microbeads from facial scrub. Average diameter cca. 200-300 um

Fig 2. Median diameter value 4 mm; 60% of particles below 5 mm.

ISOPODS:

Test with isopods were done according to [1]. Microplastics (final concentration 4 mg/g dry weight) was mixed with soil and moistened with dH2O to reach a final moisture content equivalent to 40% of the water holding capacity of the Lufa 2.2 soil. One vessel was filled with 20 g of moist soil microplastics mixture, and the other with clean soil (Fig. 3). In individual test the soil selection test was run with 10 replicates per treatment, each replicate contained 1 animal. The group exposure was done in 5 replicates per treatment, each replicate contained 10 animals. In individual exposures the vessels were monitored 10 times at regular time intervals and the location of the individual animal was recorded (control vs. mixture side). In group experiments the number of animals on each side was recorded after 48 h of exposure only.

RESULTS: equal share of animals was found in microplastic contaminated soil and uncontaminated soil. No avoidance response of isopods or earthworms toward microplastic contaminated soil was found (Fig. 4).

Fig 3. Experimental set-up with isopods (left) and earthworms (right).

CONCLUSIONS: Our results revealed no avoidance response of isopods and earthworms toward microplastic contaminated soil. It remains to be investigated how longer exposures to microplastic would affect the behaviour of terrestrial organisms. Also it is of interest how environmentally aged microplastic (e.g. coated with biofilm) would affect the organisms. Knowledge in this field is important to assess the potential hazard of microplastic released to soil.

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ACKNOWLEDGEMENTS: Slovenian Research Agency, through Research program "Integrative zoology and speleobiology P1-0184" and "Chemical engineering" (P2-0191). We thank students Milan Obradovič, Andraž Dolar and assistant professor Tina Skalar for technical assistance.