

Interactive comment on “What do we know about how the terrestrial multicellular soil fauna reacts to microplastic?” by Frederick Büks et al.

Anonymous Referee #2

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Microplastics are a new emerging soil pollutant of global importance. It is caused by fragmentation of larger plastic particles or by direct environmental emissions. Due to the widespread use and pathways of plastics, microplastics can be identified in the environment worldwide. The contamination of microplastic in terrestrial ecosystems is at least as big than in aquatic systems. Microplastics are small enough to ingest by a variety of soil organisms and plastic in nano-scale, they may cross biological barriers. In this review many studies were analyzed and evaluated regarding the effects of microplastics on soil and soil life. Based on the studies, significant changes in soil and soil properties were observed. The material properties (hydrophobicity, surface-

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volume-ratio) of microplastics make it to a potential vector of chemical pollutants due to its sorption capacity with organic compounds. In addition, there are evidences for the adverse interaction of microplastics with terrestrial organisms and protists which fulfill important ecosystem services and functions. Microplastics can be transported by soil fauna (for example earthworms) and due to their small size, they also can reach the groundwater. Every change in soil or adverse effects on soil life affects the soil, which in turn is reflected in soil fertility. Microplastics per se are not a pollutant for the soil but its adverse effects could be a danger to the soil and thus to soil conservation. Despite the growing interest, previous studies are not sufficient to develop a better understanding of the problem of microplastics in soil, so further research is needed in the future. The authors of “What do we know about how the terrestrial multicellular soil fauna reacts to microplastic?” systematically reviewed studies on the transport, uptake and bioaccumulation of microplastic by soil organisms as well as adverse effects on their metabolism, microbiome, growth and survival parameters. The comprehensive review includes 77 studies until January 2020. Written in a compact and coherent manner it gives a low-threshold and widespread overview of the effects of microplastic on diverse branches of the edaphon, identifies gaps of former experimental setups and recommends key improvements. From my point of view, the manuscript corresponds to the interests of a large number of scientists, protagonists and stakeholders and fits very well into the growing discussion about the ecological effects of microplastics. For that reason, I strongly recommend the publication in SOIL.

In the following, I have only a few minor objections: Line 53: Is that only “microbial” decay? Line 507: “Preferably” instead of “preferrably”. Lines 549-550: Is that proved that carboxylation of microspheres decreases hydrophobicity in an appreciable extent? Figure 1: The taxonomic group “further Panarthropods” is placed centrally, the other groups are not. Table 7: The last three experiments within this table were conducted by feeding the mice with a MP suspension. You might write “(food)” behind the concentration data as in the other tables. Table 8: Could you explain the meaning of the numbers within the table? Are these the numbers of experiments with the named type-shape

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combinations?

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