



The effects of soil composition on behavioural endpoints and energy budget of *Eisenia fetida*

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1. Introduction

Earthworms play an important role in the regulation of soil physicochemical processes and ecosystem services. The burrowing activity of organisms influences soil physical characteristics, chemical composition, and nutrient cycling and thus affects species composition and population dynamics of other species within ecosystems. This study investigated the effects of soil composition on behavioural characteristics and energy reserves of *Eisenia fetida*.



2. Materials and methods

The test soils were prepared using different dry weight ratios of sphagnum peat (SP), kaolin clay (KC), and quartz sand (QS). By combining the ratios of the components specified in the OECD 207/222 standards (10% : 20% : 70%), a total of 6 test soils were obtained. Earthworm behaviour was monitored during 24 hours in 2D terraria filled with test soils (water holding capacity adjusted to 50%) and quantified using a system based on deep learning [1]. To test the effects of soil composition on energy reserves, the earthworms were exposed to the test soils for 7 days. The weight of the organisms was recorded at the beginning of the experiment and after 7 days. Protein [2] and carbohydrate [3] contents were determined after the exposure, by spectrophotometric methods.



Fig. 1. Test soils used in the experiments.

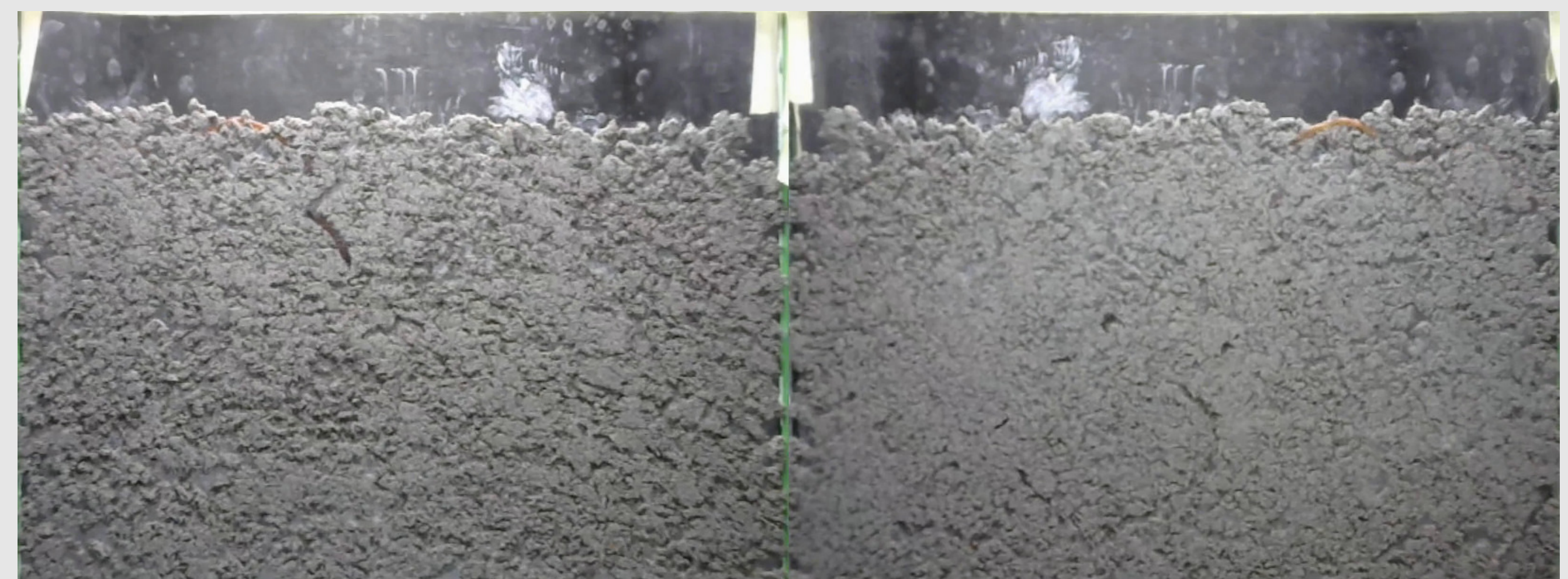
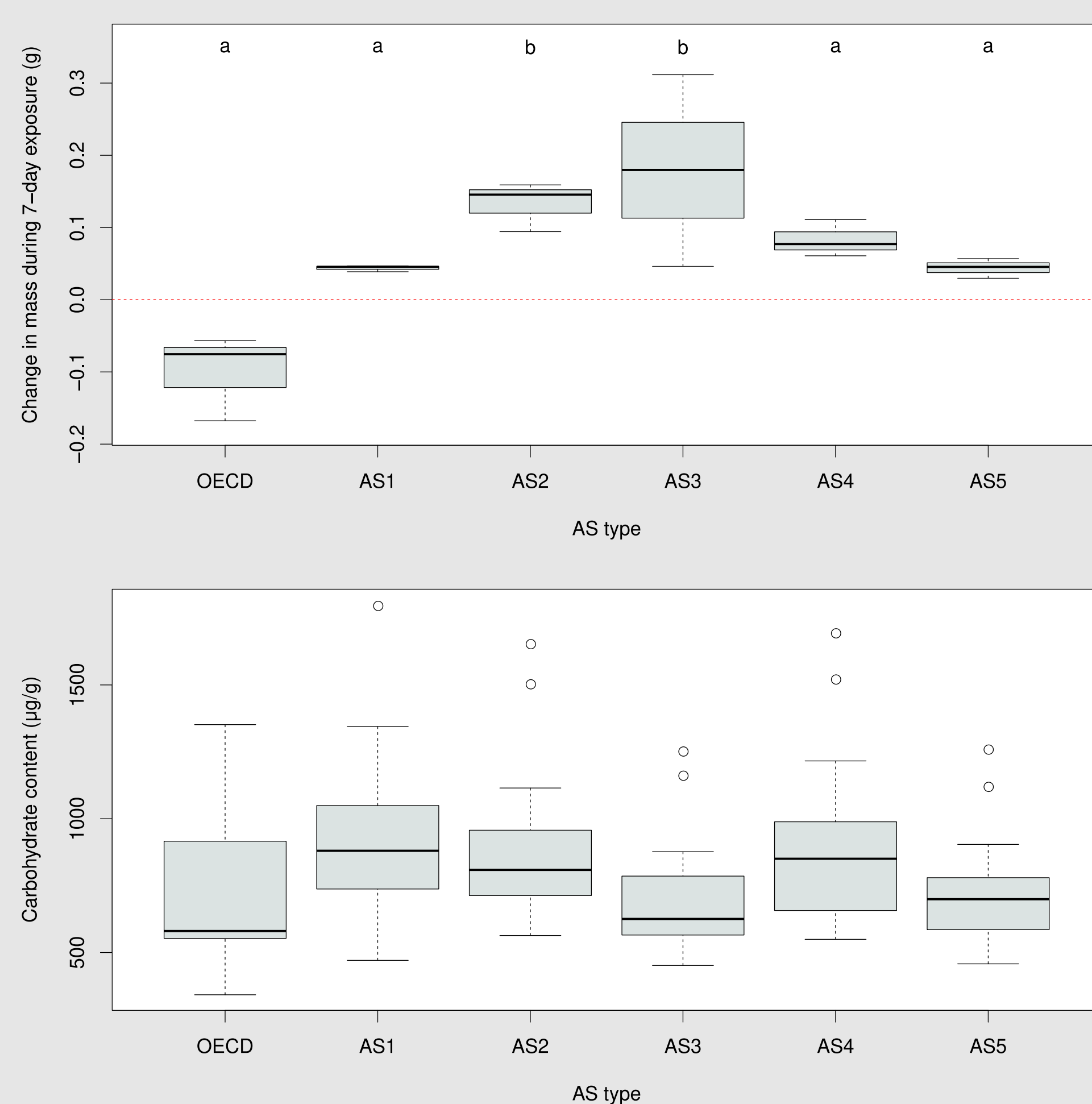


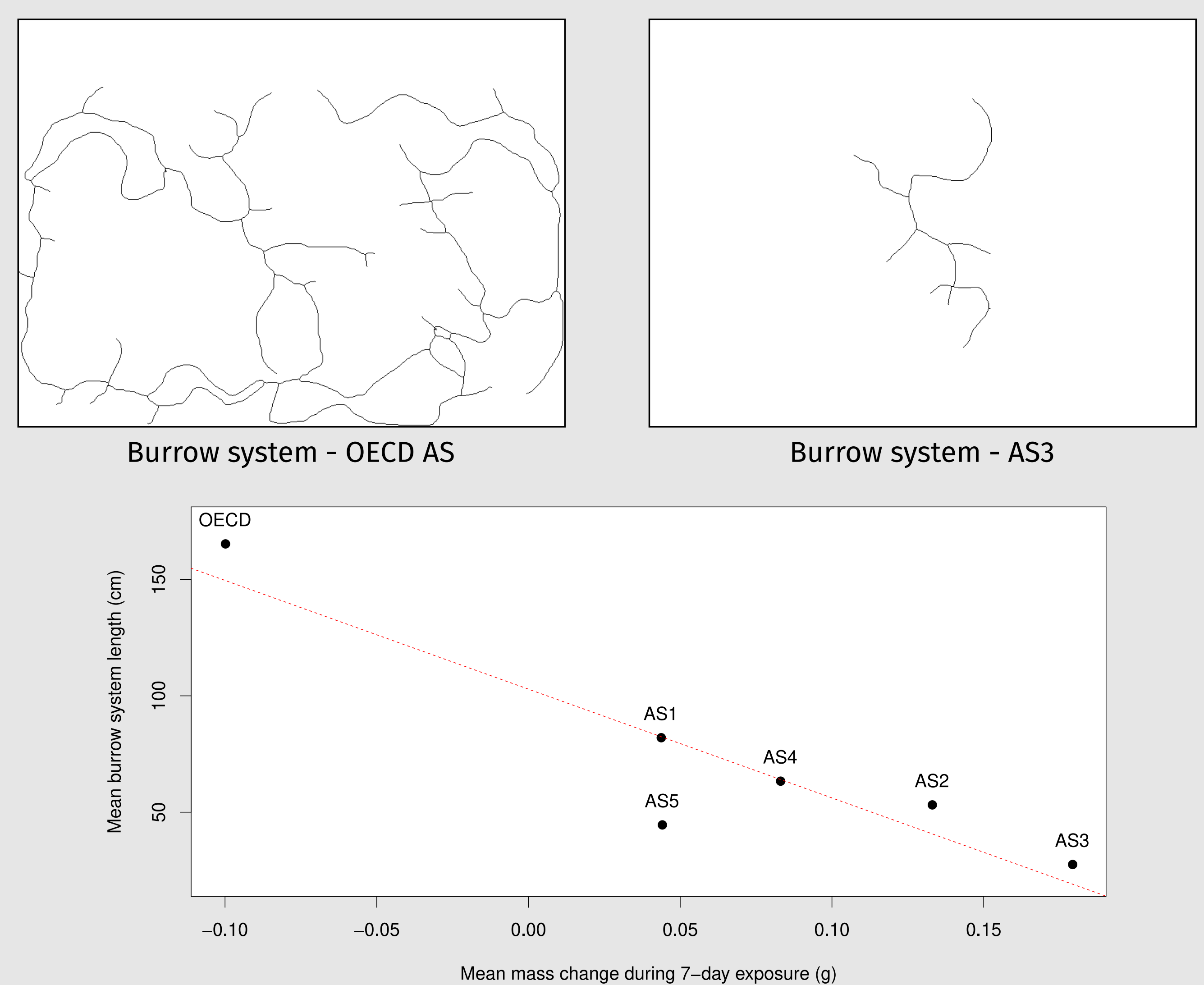
Fig. 2. Capturing earthworm behaviour continuously from both sides of the 2D terrarium.

3. Results

ENERGY RESERVES



BEHAVIOURAL PARAMETERS



4. Conclusions

Preliminary results suggest correlation between soil composition and behavioural endpoints. The results of this research can be explained by avoidance mechanisms due to mechanical irritation or reduction of energy expenditure on movement due to food availability.

References

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