

TEMPORAL DYNAMICS OF *EISENIA ANDREI* BEHAVIOR IN RESPONSE TO WATER HYACINTH-AMENDED SOILS



Centre for Environmental and Marine Studies (CESAM), University of Aveiro, 3810-193 Aveiro, Portugal
cvenancio@ua.pt

Carlos Silva
GEOBIOTEC, Geosciences Department, University of Aveiro, 3810-193, Aveiro, Portugal
carlos.dias.silva@ua.pt



Sara Costa
Centre for Environmental and Marine Studies (CESAM), University of Aveiro, 3810-193, Aveiro, Portugal
scosta@ua.pt

Isabel Lopes
Centre for Environmental and Marine Studies (CESAM), University of Aveiro, 3810-193 Aveiro, Portugal
ilopes@ua.pt

Carla Patinha
GEOBIOTEC, Geosciences Department, University of Aveiro, 3810-193, Aveiro, Portugal
cpatinha@ua.pt

Acknowledgements: This work was funded by national funds through FCT - Fundação para a Ciência e a Tecnologia I.P., under the project CESAM-Centro de Estudos do Ambiente e do Mar, references UID/50017/2025 (doi.org/10.54499/UID/50017/2025) and LA/P/0094/2020 (doi.org/10.54499/LA/P/0094/2020) and to FCT/MEC through national funds for financing the project "LIFT - Leveraging rot Fungi potential for the rehabilitation of degraded soils: from mechanisms of action to field-case effectiveness (Reference 2023.18428.ICDT, COMPETE2030-FEDER-00814600, 36G03030-16864).

Introduction

Eichhornia crassipes

- ✓ Invader, vast amounts of biomass
- ✓ With no clear purpose
- ✓ Require costly disposal

- Control costs
- Repurposing
- Circular economy goals
- Compliance with European and National Assembly Resolution No. 13/2020

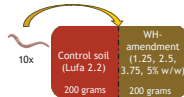
May its biomass be repurposed as an agricultural amendment without disrupting soil habitat function?

Objective

To evaluate the avoidance behaviour of the earthworm *Eisenia andrei* under exposure to soils amended with increasing proportions of WH biomass (0%, 1.25%, 2.5%, 3.75%, and 5% w/w).

Methodology

- ✓ Behavioral assays followed the OECD/ISO guideline
- ✓ Four repeated exposures at weekly intervals: potential cumulative effects or adaptive responses?



$$\% \text{ Avoidance} = ((C-T)/N) \times 100,$$

where C is the number of organisms in the control compartment, T is the no. of organisms in the test compartment, and N=10.

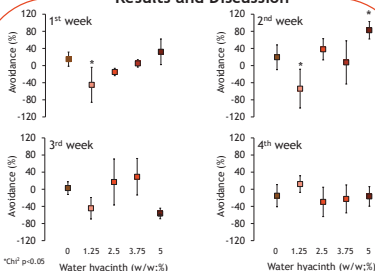
4 x replicates

21 °C; Dark

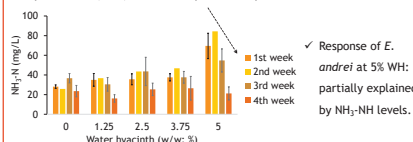
48 h: no organisms/compartment

- ✓ Ammonia (NH₃-N, mg/L) determination to monitor WH decomposition: Nessler method

Results and Discussion



- ✓ 1st and 2nd week: preference (44% and 54%) for WH-amended soil compared to the control compartment at 1.25% WH (w/w).
- ✓ 4th week: significant shift at 5% WH from avoidance (32%-78%) to preference (-56%) in the 3rd exposure compared to the control.



- ✓ Response of *E. andrei* at 5% WH: partially explained by NH₃-NH levels.

- ✓ NH₃-NH: found to be the highest in the 1st exposure in 5% WH (69.5 ± 12.9 mg/L). Decreased over time to levels like other WH treatments (3rd exposure concentration dropped to 44.9 ± 6.67 mg/L).

Conclusions

- ✓ Low additions of WH to soils may not impair earthworms' activity.
- ✓ Behaviour changed over time, possibly driven by biomass deterioration.

RISCOS



ASSOCIAÇÃO PORTUGUESA
DE RISCOS, PREVENÇÃO
E SEGURANÇA