

What is World Environment Day?

Every year, **World Environment Day** brings global attention to a different environmental issue. For 2025, the theme was **plastic pollution**.

The problem

Approximately **75% of plastic ever produced is now waste**.¹ This plastic is mostly discarded into the ocean. If current trends continue, by 2050, around 12 billion tonnes of plastic waste will have accumulated in landfills or in the natural environment – equivalent to **more than one tonne of plastic for every person on Earth**.²

Lesser mealworm, a species of beetle from Kenya, are able to consume polystyrene (PS).³

In this study, the beetles were reared in trays with a bedding of wheat and bran as a nutritional source. Three diets were compared:

- Bran alone
- PS alone
- Bran and PS

The lesser mealworm were able to **chew, burrow, and feed** on the PS. Rates of PS consumption and survival were higher in mealworms who were also fed with bran.



Lesser mealworms chew through a sample of polystyrene³

Lesser mealworm have many related species, some of which may also be able to feed on PS or other plastics.

A biological approach to plastic degradation, whether by the insects themselves, the bacteria in their guts, or by the enzymes that they produces, could offer a **path to reducing the impact of plastic accumulation**.

However, the role of **gut microbes** in PS degradation and plastic bioremediation is not yet fully understood nor is it known whether these mealworms could degrade **denser plastics**. This study does not analyse the excrement created by the mealworms, which may still contribute to plastic pollution, particularly in the form of **microplastics**. Further research is required to assess this potential risk. There is also room for research to discover whether **other, similar organisms** have the ability to degrade plastics.

Despite these limitations, in a controlled environment, lesser mealworms could still prove valuable in **breaking down plastic** and reducing the volume of waste in landfills. This could be useful for the containment of plastics, minimising the risk of dispersion into the environment.

References

1. World Bank Group, 'What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050' (2018), <https://openknowledge.worldbank.org/handle/10986/30317>
2. Soares S, Serralha F, Paz MC, Carriço N, Galatanu SV. Unveiling the data: An analysis of plastic waste with emphasis on the countries of the E³UDRES² alliance. Heliyon. 2024 Mar 19;10(7):e28375. doi: 10.1016/j.heliyon.2024.e28375. PMID: 38560229; PMCID: PMC10979095.
3. Ndotono, E.W., Tanga, C.M., Kelemu, S. *et al.* Mitogenomic profiling and gut microbial analysis of the newly identified polystyrene-consuming lesser mealworm in Kenya. *Sci Rep* **14**, 21370 (2024). <https://doi.org/10.1038/s41598-024-72201-9>