

Study finds greenhouse gas reduction strategy may be safe for soil animals

June 1 2011

A new study has found that an emerging tool for combating climate change may cause less harm to some soil animals than initial studies suggested.

Earthworms perform many essential and beneficial functions in the soil ecosystem, including [soil structure](#) improvement and nutrient mineralization. However the earthworms' ability to perform these crucial functions can be suppressed when they are exposed to toxic substances.

A Baylor University geology researcher, along with scientists from Rice University, tested a new soil additive called biochar for its effects on the common earthworm. The researchers found that wetting the biochar before applying it to the soil mitigates the harmful effects of biochar to earthworms and the earthworms' avoidance of soil with biochar.

"Because of the high potential for widespread application, it is essential to proactively assess and mitigate any unintended consequences associated with biochar soil enrichment," said study co-author Dr. Bill Hockaday, assistant professor of geology at Baylor. "The results show us that depending on [rainfall patterns](#) and irrigation, wetting biochar either before or immediately after soil application would be needed to prevent the disappearance of earthworms and enable their beneficial effects on plants."

The results appeared in the journal *Soil Biology and Biochemistry*.

Biochar is of increasing interest because of concerns about climate change caused by emissions of carbon dioxide and other [greenhouse gases](#). It is a byproduct of renewable energy and fuel production from plant materials like forest wastes and [crop residues](#). Biochar is a form of charcoal that enhances [soil fertility](#) and plant growth by increasing [soil water](#) and nutrient retention, and can store carbon in the soil for hundreds of years.

The researchers found that [earthworms](#) avoided soil enriched with dry biochar, and when they were exposed, their weight decreased. After performing several different tests, the researchers found that insufficient moisture was a key factor affecting earthworm behavior in soil enriched with dry biochar. The researchers also found that biochar did not affect earthworm reproduction.

"Most importantly, we are the first to demonstrate that biochar did not stress the immune system of a very sensitive soil organism," said Dong Li, study co-author and a graduate student at Rice. "This is an important step forward for a very promising strategy in combating climate change."

Provided by Baylor University

Citation: Study finds greenhouse gas reduction strategy may be safe for soil animals (2011, June 1) retrieved 6 May 2024 from <https://phys.org/news/2011-06-greenhouse-gas-reduction-strategy-safe.html>

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