

How do laser beams affect earthworm mortality in the soil?

Earthworms

Earthworms are ecologically important due to their activity in the bioturbation and decomposition of organic matter in many soil types. Earthworms belonging to Enchytraeids are widespread on moist soil types from the arctic to the tropics, occurring in quantities from 100s to more than 100,000 individuals per m². Generally, they thrive within a temperature range of 8 °C to 25 °C. They represent a large range of annelid worm species with soft skin and a fast reproduction rate. Enchytraeids are often used as model organisms in toxicological laboratory tests. We studied whether the mortality of the two earthworm species *Enchytraeus albidus* and *Enchytraeus crypticus* were affected when the soil was exposed to laser beams.

Experiments with *Enchytraeus albinus* and *Enchytraeus crypticus*

Worms were studied in three soil types (sandy soil, clay soil, and organic soil). The soil was kept moist but not wet. The worms were fed with rolled oats weekly. The rolled oats were grounded and autoclaved before use to avoid flour or predacious mites' infestation. Fifty mL plastic tubes were used. The tubes containing 10 g dry soil were added demineralized water to achieve 50% water-holding capacity. Each tube had three worms. The soil surface of the tubes was exposed to the laser beam with four doses of energy, respectively: 0 (control), 25, 50, and 75 J. Each treatment was replicated ten times resulting in 4 dosages × 10 replicates = 40 treatments for each soil type. After the treatment, the tubes were placed in darkness in a climate cabinet at 20 °C. The number of immobile, dead, or missing enchytraeids in all treatments was recorded after a week. The experiments were repeated four times.



Small white earthworms (Enchytraeids) with long thin bodies can grow up to 3 cm long.

Results and Conclusion

In none of the experiments, the mortality of the earthworms living in soils exposed to laser beams was different from the mortality of earthworms living in tubes with untreated soils, even though the worms were very close to the soil surface and could not escape. Therefore, it is unlikely that laser weeding will harm earthworms.

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Date: March 13, 2023



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