

# **Dynamics of soil nematodes and earthworms in urban vegetable irrigated with wastewater in the Nairobi river basin, Kenya**

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## **Abstract**

The effects of heavy metals lead (Pb), Cadmium (Cd) and Chromium (Cr) on nematode communities and earthworm density and biomass were studied in the wastewater irrigated farms of the Nairobi river basin. The levels of Cr and Pb in the wastewater were below the threshold values considered to be toxic while those of Cd exceeded the permissible limit. Heavy metal accumulation in soils in the Kibera and Maili Saba farms were Cd (14.3 mg kg<sup>-1</sup>), Cr (9.7 mg kg<sup>-1</sup>) and Pb (1.7 mg kg<sup>-1</sup>) and 98.7 mg Cd kg<sup>-1</sup>, 4.0 mg Cr kg<sup>-1</sup> and 74.3 mg Pb kg<sup>-1</sup>, respectively. High heavy metal concentrations as well as soil organic matter were negatively correlated with plant feeding nematodes in the genera Criconea, Meloidogyne, Paratylenchus, Pratylenchus and Scutellonema. Bacterial feeding nematodes genera Rhabditis, Plectus, Cephalobus and Acrobeles were predominant in the gardens treated with wastewater. An average density of 198 m<sup>-2</sup> earthworms and a biomass of 68 g m<sup>-2</sup> and 102 earthworms m<sup>-2</sup> with 33g m<sup>-2</sup> biomass were recorded in Kibera and Maili Saba, respectively. The earthworms isolated from both sites were all epigeic with the metal content in Maili Saba suppressing their populations. This study has demonstrated that the use of untreated urban wastewater for irrigation has adverse effects on nematode and earthworm abundance and diversity and their potential as bioindicators of heavy metal presence. Key words: Heavy metal accumulation; soil fauna; diversity