



Conference Abstract

# Soil nematodes in the rhizosphere of a metal accumulating plant in a pollution gradient from a non-ferrous metal factory in Bulgaria

Slavka Smilenova Georgieva<sup>‡</sup>, Juliana Atanassova<sup>§</sup>, Nikolai Dinev<sup>|</sup>

<sup>‡</sup> Department of Zoology and Anthropology, Faculty of Biology, Sofia University, Sofia, Bulgaria

<sup>§</sup> Department of Botany, Faculty of Biology, Sofia University, Sofia, Bulgaria

<sup>|</sup> Institute of Soil Science, Agrotechnologies and Plant Protection, Sofia, Bulgaria

Corresponding author: Slavka Smilenova Georgieva ([slavgeorgieva@abv.bg](mailto:slavgeorgieva@abv.bg))

Received: 14 Sep 2019 | Published: 16 Sep 2019

Citation: Georgieva SS, Atanassova J, Dinev N (2019) Soil nematodes in the rhizosphere of a metal accumulating plant in a pollution gradient from a non-ferrous metal factory in Bulgaria. ARPHA Conference Abstracts 2: e46577.

<https://doi.org/10.3897/aca.2.e46577>

## Abstract

Nematodes were studied at sites with low, medium and high level of soil metal contamination in the area of a non-ferrous metal plant. Soil total metal concentrations ranged from values below their maximum permissible concentrations (MPC) in soil to 48, 44, 16 and 4 times higher than the MPC for Cd, Pb, Zn and Cu, respectively. Nematodes were isolated from uncultivated, monoculture stands of the metal accumulating mustard weed (*Lepidium draba* L., Brassicaceae) in April, May and June 2015.

Overall, 55 nematode genera were identified during the investigation: 50 genera at low, 39 at medium, 37 at high levels of soil metal pollution. Several nematode diversity measures and the specific responses of some nematode genera differentiated the three investigated sites. Both nematode richness (S) and diversity (H') of genera correlated negatively with the soil metal concentrations in the following order: Cd>Pb>Zn>Cu. Several genera (*Alaimus*, *Cylindrolaimus*, *Paramphidelus*, *Scutylenchus*, *Steinernema*) were common at the least contaminated site and were either rare or not found at the rest of the sites. Some genera (*Clarkus*, *Filenchus*) were most abundant at the medium level of contamination. The abundance of eleven genera correlated negatively with the metal concentrations in the samples. Most of the negative correlations (*Acrobeles*, *Coslenchus*, *Geomonhystera*,

*Plectus*) were in the following order: Cd>Zn>Pb>Cu. The abundance of nine genera correlated positively with the metal concentrations and most of their correlations were in the order: Cu>Pb>Zn>Cd.

Faunal profile analyses of the free living nematode assemblages revealed higher values of Structure index (SI) at low (75–91%) and medium (77–87%) levels of contamination in comparison with the most polluted site (35–46%). Nematode structure metabolic footprints (SFP) at low and medium levels of contamination were much higher than at the high pollution level. Both SI and SFP at the medium level of metal contamination indicated low bioavailability and low toxicity of Pb (1290 mg kg<sup>-1</sup>soil), Cd (34 mg kg<sup>-1</sup>soil), Zn (1779 mg kg<sup>-1</sup>soil) and Cu (190 mg kg<sup>-1</sup>soil) for the free-living nematodes, isolated from the rhizosphere of the mustard weed at this site. The rhizosphere of the metal accumulating plant might be protective for these nematodes, providing conditions of reduced bioavailable metals in contaminated soil during the vegetation period of the plants.

## Keywords

bioindication, soil nematodes, metal pollution

## Presenting author

Slavka Smilenova Georgieva

## Presented at

V<sup>th</sup> International Congress on Biodiversity: „Taxonomy, Speciation and Euro-Mediterranean Biodiversity“

## Funding program

Project DTK 02/01.05.2010 supported by the National Science Fund of the Bulgarian Ministry of Education and Science