

Irena Sherameti
Ajit Varma
Editors

SOIL BIOLOGY

Soil Heavy Metals



Springer

Contents

1 Soil: The Living Matrix	1
Helwig Hohl and Ajit Varma	
2 Definition of “Heavy Metals” and Their Role in Biological Systems	19
Klaus-J. Appenroth	
3 Soil Microbial Diversity in Relation to Heavy Metals	31
Shwet Kamal, Ram Prasad, and Ajit Varma	
4 Uptake and Effect of Heavy Metals on the Plant Detoxification Cascade in the Presence and Absence of Organic Pollutants	65
Lyudmila Lyubenova and Peter Schröder	
5 Arbuscular Mycorrhiza, Heavy Metal, and Salt Tolerance	87
Hermann Bothe, Marjana Regvar, and Katarzyna Turnau	
6 Quantitative Analyses of Trace Elements in Environmental Samples: Options and (Im)possibilities	113
Katarina Vogel-Mikuš, Peter Kump, Marijan Nečemer, Primož Pelicon, Iztok Arčon, Paula Pongrac, Bogdan Povh, and Marjana Regvar	
7 At the Crossroads of Metal Hyperaccumulation and Glucosinolates: Is There Anything Out There?	139
Paula Pongrac, Roser Tolrà, Katarina Vogel-Mikuš, Charlotte Poschenrieder, Juan Barceló, and Marjana Regvar	
8 Plants Under Heavy Metal Stress in Saline Environments	163
Valentina Kholodova, Kirill Volkov, and Vladimir Kuznetsov	
9 Utilizing Microbial Community Structure and Function to Evaluate the Health of Heavy Metal Polluted Soils	185
M. Belén Hinojosa, Roberto García-Ruiz, and José A. Carreira	

10	Streptomycete Heavy Metal Resistance: Extracellular and Intracellular Mechanisms	225
	Erika Kothe, Christian Dimkpa, Götz Haferburg, André Schmidt, Astrid Schmidt, and Eileen Schütze	
11	Effects of Heavy Metals on Soil Enzyme Activities.....	237
	Ayten Karaca, Sema Camci Cetin, Oguz Can Turgay, and Ridvan Kizilkaya	
12	Effect of Heavy Metals on Saprotrophic Soil Fungi	263
	Petr Baldrian	
13	Copper-Containing Oxidases: Occurrence in Soil Microorganisms, Properties, and Applications	281
	Harald Claus	
14	Biomethylation of Heavy Metals in Soil and Terrestrial Invertebrates.....	315
	Burkhard Knopf and Helmut König	
15	Phytostabilization of Lead-Polluted Sites by Native Plants	329
	Andrea Zanuzzi and Angel Faz Cano	
16	Impact of Heavy Metals on Sugarcane	339
	D.V. Yadav, Radha Jain, and R.K. Rai	
17	Effects of Earthworms on the Availability and Removal of Heavy Metals in Soil.....	369
	Ayten Karaca, Ridvan Kizilkaya, Oguz Can Turgay, and Sema Camci Cetin	
18	Phytoremediation of Heavy Metal Contaminated Soils	389
	T.J. Purakayastha and P.K. Chhonkar	
19	Remediation of Heavy Metal Contaminated Tropical Land.....	431
	Preeti Saxena and Neelam Misra	
	Index.....	479