

Journal of Biological Research

Bollettino della Società Italiana di Biologia Sperimentale



**89th SIBS National Congress
on Climate and Life**

Ozzano dell'Emilia (BO), Italy, 1-2 December 2016

ABSTRACT BOOK

www.jbiolres.org

Journal of Biological Research

Bollettino della Società Italiana di Biologia Sperimentale

eISSN 2284-0230

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METAL-TOLERANT PLANT RESPONSE TO SOIL CONTAMINATION

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The global climate is predicted to change drastically over the next century. From literature it is clear that certain climate change scenarios will have effects on metal phytoremediation and plant-microorganism interactions, which are increasingly being explored [1, 2]. The hyperaccumulator plants actively take up large amounts of metals from the soil at concentrations 100–1000-fold higher than in other species, showing no symptoms of phytotoxicity, resulting in a strong metal-hypertolerance [3]. However, there is a lack of knowledge about hyperaccumulators, particularly as regards rhizosphere processes [4]. The aim of this study is to assess the metal-tolerant plant response to abiotic stress by nickel (Ni) through seed germination tests and through the evaluation of potential morpho-functional root alterations using hyperaccumulator and non-hyperaccumulator species under controlled growing conditions. Growing substrates were spiked with Ni at different concentrations. The Image J analysis of roots was used to

evaluate parameters like root elongation, surface area and number of lateral roots. Furthermore, Ni-hyperaccumulator plants and soil samples were collected on metalliferous soils to characterize the rhizospheric microbiota. The presence of Ni seems to determine a general decrease of seed germination and a greater root development in hyperaccumulator species, compared to non-hyperaccumulator species. Moreover, the bacterial isolations show a greater number of bacterial colonies in the rhizosphere soils compared to bare soils. The development of an integrated system plant-rhizobiota, using the rhizobiota as a natural metal-chelator could improve metal uptake, alleviating the nickel stress and promoting the recolonization of metal-polluted areas.

References:

1. Compant S, M. van der Heijden GA, Sessitsch A. Climate change effects on beneficial plant-microorganism interactions. *FEMS Microbiol Ecol* 2010;73:197-214.
2. Rajkumar M, Vara Prasad MN, Swaminathan S, Freitas H (2012). "Climate change driven plant-metal-microbe interactions. *Environ Int* 2013;53:74-86.
3. Rascio N, Navari-Izzo F. Heavy metal hyperaccumulating plants. How and why do they do it? And what makes them so interesting? *Plant Sci* 2011;180:169-81.
4. Ali H, Khan E, Sajad MA. Phytoremediation of heavy metals. Concepts and applications. *Chemosphere* 2013;91:869-81.