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27100 Pavia, Italy
Tel. +39.0382.464340 – Fax. +39.0382.34872
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METAL-TOLERANT PLANT RESPONSE TO SOIL CONTAMINATION

S. Rosatto[1*], E. Roccotiello[1], M. Zotti[2], M.G. Mariotti[1]

[1]Laboratory of Plant Biology; [2]Laboratory of Micology, DISTAV – Department of Earth, Environment and Life Sciences, University of Genoa, Genova, Italy

**E-mail: stefano.rosatto@gmail.com*

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.

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