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Abstract: Many soil bacteria show a high tolerance to heavy metals and play a vital role in promoting plant growth in a heavy-metal-contaminated environment. In the study reported on in this paper the bacterial strains being analyzed included *Bacillus* sp. (ML 1-2), *Bacteroidetes bacterium* (RI 116-1), *Flavobacterium* sp. (RI 111-11), *Pseudomonas fluorescens* (LI C1), *Serratia entomophila* (RI 111-21), and *Variovorax* sp. (ML 3-12), which had been isolated from soils contaminated by heavy metal compounds, or degraded due to anthropogenic activity. Under *in-vitro* conditions selected were bacteria tolerant to Cd, Cu, Zn and Pb. It has been demonstrated that among the strains examined *S. entomophila* (RI 111-21) and *P. fluorescens* (LI C1) are endowed with the highest tolerance to the heavy metals in the substrate, specifically to Zn and Pb, whereas *B. bacterium* (RI 116-1) and *Flavobacterium* sp. (RI 111-11) display the highest vulnerability to heavy metals. Taking into account their negative influence on the growth and development of rape seedlings, the four heavy metals have been listed in the following order: Pb>Zn>Cu>Cd. Inoculation of winter rape (*Brassica napus* L. var. Kronos) has shown that some of the bacterial strains promote the growth and development of seedlings in the presence of heavy metals, especially copper and cadmium. The strains *Bacillus* sp. (ML 1-2) and *B. bacterium* (RI 116-1), which were particularly active in promoting rape seedling growth in an environment containing heavy metals, seem to have the greatest potential for the phytoremediation of soils.

Keywords: Phytoremediation, soil, heavy metals, rhizobacteria, rape.