

Bioremediation on anthropogenic affected areas: Ectomycorrhizal and plant growth bacteria as promoters of pine establishment

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ABSTRACT

The recovery of damaged areas due to inadequate farming policies and increased industrial sediment deposition, have contaminated not only soil and surrounding areas but also other natural resources. The potential use of disturbed sites for agriculture and forestry is jeopardised and their remediation is critical and expensive. The utilization of biotechnological tools, such as plant growth promoting bacteria (PGPB) and ectomycorrhizal fungi (ECM) could help remediation of such soils as they can be used as plant facilitators for land recovery. The aim of this study was to assess the potential of PGPB and ECM to enhance the growth of *Pinus pinaster* in anthropogenic sediments and forest soil. Pine seedlings were inoculated with *Suillus bovinus*, *Pisolithus tinctorius* and *Paxillus involutus*, and co-inoculated with *Bacillus* spp. and *Mesorhizobium* spp. Plants were harvested after 6 month growth and parametric and nutritional data determined. Results show that *P. involutus* increased seedling growth (height) in industrial sediments soil, whereas in forest soil, plant performance was higher with *S. bovinus*. The effect of inoculation on the fungal community in seedling roots and bacterial rhizosphere was also analysed by PCR-DGGE and differences arose between inoculated and uninoculated soil, indicating that PGPB and ECM may significantly influence the plant growth performance over a period of time. The study shows that PGPB and ECM fungi may be used as a biotechnology tool contributing to the successful plant establishment in disturbed environments. This work was supported by the FCT Project -PTDC-AGR-CFL-111583-2009. Albina R. Franco and Nadine R. Sousa thank to Fundação para a Ciência e a Tecnologia (FCT, Portugal) the grants SFRH/BD/47722/2008 and SFRH/BD/31250/2006 respectively. Authors are thankful for the collaboration of Autoridade Florestal Nacional and Forestis.

keywords: Pine, Ectomycorrhiza, Plant Growth Promoting Bacteria, Anthropogenic Sediments, Rhizoremediation

Theme: Subsoil remediation – in-situ chemical /biological technologies.